PROCEEDINGS OF THE 64TH NIGERIAN LIBRARY ASSOCIATION CONFERENCE ON OUR FUTURE, OUR HOPE: THE STATE OF LIBRARIES AND LIBRARIANSHIP IN NIGERIA.

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Preface

The global information ecosystem is undergoing a profound revolution. Driven by rapid technological disruption, changing user demographics, and shifting socio-economic realities, the traditional boundaries of the library have dissolved. Today, libraries are no longer mere storehouses of books; they are dynamic innovation hubs, centers for community empowerment, and the vital infrastructure upon which the knowledge economy is built.

For centuries, libraries have served as the custodian of knowledge, the arbiters of information, and the vibrant hubs of community engagement. From the scrolls of Alexandria to the digital repositories of today, their fundamental mission has remained constant: to connect people with the information they need to learn, grow, and thrive. But as the 5th Industrial Revolution gather pace, the very definition of "information" and "service" is undergoing a radical re-evaluation in library and information profession. In response to the above, the Nigerian Library Association hosts her 64rd National Conference at Minna, Niger State from 12th to 17th July, 2026 culminating in this landmark two-volume book of proceedings with the Theme *"Our Future, Our Hope: The State of Libraries and Librarianship in Nigeria"*. It is a theme that is considered very apt in the face of rising competitiveness in the information market and the quest for professional identity and relevance among library and information professionals in Nigeria. This collection stands as a testament to the resilience, adaptability, and intellectual vigor of Nigerian information professionals at a defining moment in our history.

This book is an invitation to librarians, information professionals, educators, policymakers, and indeed, anyone invested in the future of knowledge, creation, access, and use to contemplate the profound implications of this new era. The proceedings provide a comprehensive reflection on contemporary developments, emerging trends, persistent challenges, and future directions for libraries and librarianship in Nigeria. It has also encouraged scholarly engagement with strategies for building resilient, innovative, and inclusive library systems. Collectively, the papers demonstrate that although libraries in Nigeria continue to face challenges associated with funding, infrastructure, technology adoption, policy implementation, and human capacity development, there are numerous opportunities for renewal through research, innovation, strategic partnerships, and professional collaboration.

The conference tagged "Minna 2026", attracted 292 papers on the various sub-themes of the conference theme. Each submission was reviewed by selected experts/professionals in the relevant areas of Librarianship and Information Science. After each paper was subjected to scrutiny by the reviewers, 220 papers were selected and presented at the Conference. The selected papers were assembled in this book of proceedings. The contributions span diverse thematic areas, including Artificial Intelligence and emerging technologies in libraries, the state and of school libraries, public library development in Nigeria, academic and special library services, information and knowledge management, digital preservation, information literacy, collection development, professional ethics, capacity building, library and information science education and the role of professional associations in promoting excellence and sustainability within the library profession. These themes underscore the multidisciplinary nature of Library and Information Science and highlight the evolving responsibilities of libraries in supporting education, research, innovation, lifelong learning, and national development.

We specially thank the participants of the 64th NLA National Conference 2026, for their unalloyed cooperation, loyalty, support and contributions over the years. Gratitude is also extended to the reviewers for their valuable time, expertise, and constructive evaluations, which ensured the academic quality and integrity of the published papers. Their collective efforts have contributed significantly to the success of this publication.

It is hoped that these proceedings will serve as an important resource for researchers, librarians, educators, students, policymakers, and other stakeholders in the information sector. Beyond documenting the scholarly contributions presented at the conference, the volumes are expected to stimulate further research, encourage professional dialogue, inform policy development, and inspire innovative practices that will strengthen libraries and librarianship in Nigeria and beyond

Dr. Juliet C. Alex-Nmecha
Vice President & Chairman, National Organizing Committee

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A Comparative Analysis of IFLA Foundational Knowledge Areas and NBTE Library and Information Science Curriculum in Nigeria: Alignment, Gaps and Implications

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Abstract

This study is a comparative analysis of IFLA Foundational Knowledge Areas and the National Board for Technical Education Curriculum for Library and Information Science (LIS) Education in Nigeria. The study's main objective was to comparatively analyse the alignment, gaps, and areas of convergence and divergence between the IFLA Foundational Knowledge Areas (FKAs) and the NBTE curriculum for LIS education in Nigeria, with a view to strengthening LIS education and professional practice in Nigeria. The study adopted a documentary research design employing qualitative content analysis and quantitative curriculum mapping techniques. The study relied exclusively on secondary data sources, which included the official IFLA Foundational Knowledge Areas (FKAs) framework for LIS education and the approved NBTE curriculum for National Diploma (ND) and Higher National Diploma (HND) in LIS in Nigeria. Data were analysed using qualitative content analysis. The findings revealed that The NBTE LIS curriculum aligns reasonably well with traditional IFLA FKAs, but alignment weakens in areas related to learning and literacies, digital transformation, research, and ethics. The underrepresentation of certain knowledge areas in the NBTE curriculum may limit graduates' ability to engage in research-driven practice, policy formulation, digital innovation, and global professional discourse. The study concludes that indigenous elements enhance the local relevance of LIS education in Nigeria and ensure compliance with national development goals. However, their heavy emphasis may reduce curriculum space for globally oriented competencies unless deliberate integration strategies are adopted for the introduction of emerging technology competencies to prepare Nigerian LIS graduates for global competitiveness.

***Keywords**:* IFLA Foundational Knowledge Areas, National Board for Technical Education, Curriculum, Library and Information Science Education, Nigeria

Introduction

The dynamic evolution in the information professions, largely influenced by emerging digital technologies in the 5th Industrial Revolution era continues to demand for enhanced disciplinary competencies. These competencies are to be acquired through the education and training of contemporary information professionals including those in Library and Information Science, an interdisciplinary field of study that is concerned with the management of information resources, human and material, in libraries and information centres with the sole aim of getting the information resources and their contents across to a target group of users, i.e. matching the right information with the right people and for the right purpose at the appropriate time (Ayandokun & Musa, 2020). LIS professionals serve as custodians of printed materials, records, photographs, audiovisual materials, and ephemera, in both analogue and digital form (School of Library and Information Science, University of Iowa, 2024). The essence of Library and Information Science (LIS) education, according to the University of Southern Mississippi (2025) is to prepare a diverse population of qualified professionals for roles in libraries, archives, and other information environments. Through evidence-based active learning, students of LIS gain appropriate knowledge, applied scholarship, and skills to serve the information needs of their diverse communities.

Library and Information Science (LIS) education plays a critical role in preparing information professionals who are capable of managing, organising, preserving, and disseminating information resources in diverse formats and environments. Chu et al (2022) state that libraries and information services are essential for culture, science, education, and other sectors, contributing to the sustainable development of individuals, organisations, communities and nations. In the contemporary knowledge society, rapid technological advancements, the proliferation of digital information resources, and the increasing complexity of users' information needs have significantly transformed professional practices within libraries and other information centres. Consequently, LIS education worldwide has undergone continuous curriculum reforms to ensure that graduates possess the requisite competencies, ethical grounding, and professional adaptability needed to function effectively in both traditional and emerging information settings.

At the global level, professional bodies have increasingly influenced LIS education by articulating competency frameworks that reflect international best practices (Alam, 2026). The International Federation of Library Associations and Institutions (IFLA), as the leading global organisation representing the interests of library and information services, developed the Foundational Knowledge Areas (FKAs) to provide a comprehensive framework of core knowledge, skills, and professional values expected of LIS practitioners. The IFLA FKAs encompass areas such as information and knowledge organisation, information access and retrieval, research methods, digital technologies, information ethics, management, user services, and lifelong learning (Chu et al, 2022). These foundational knowledge areas serve as a benchmark for curriculum development, accreditation, and quality assurance across diverse national and institutional contexts.

In Nigeria, the training of Library and Information Science professionals occurs at multiple levels, including universities, colleges of education, and polytechnics. The education and training of middle-level and technical LIS professionals are regulated by the National Board for Technical Education (NBTE), which prescribes curricula for National Diploma (ND) and Higher National Diploma (HND) programmes in Library and Information Science. While the NBTE curriculum is designed to address national manpower needs and local institutional contexts, concerns have increasingly been raised by educators, employers, and professional bodies regarding the extent to which Nigerian curriculum adequately reflects global best practices, emerging competencies, and international professional requirements (Abubakar, 2021; Adeoye et al, 2023; Furfuri, 2023; Onyeachona, 2025; Jegbefume, Ikhimeaku, & Muhammad, 2025), including standards such as those articulated by IFLA in the Foundational Knowledge Areas for Library and Information Science Education. Employers now expect LIS graduates to demonstrate not only technical proficiency but also competencies in digital librarianship, data management, information literacy instruction, research support services, and ethical information practice; areas strongly emphasised in the IFLA Foundational Knowledge Areas. This expectation places renewed pressure on national curriculum frameworks, such as that of the NBTE, to remain current, comprehensive, and internationally competitive.

Despite the growing emphasis on internationalisation, quality assurance, and graduate employability in LIS education (Rani & Sharma, 2021; Okonoko, Abubakar, & Udoh, 2023), there is paucity of empirical evidence assessing the level of alignment or divergence between the IFLA Foundational Knowledge Areas and the NBTE LIS curriculum in Nigeria. This gap raises critical questions about whether graduates of NBTE-accredited LIS programmes are sufficiently prepared to operate effectively in a rapidly evolving information landscape, compete globally, and meet the expectations of contemporary library and information service environments.

More so, most of the recent studies on curriculum of LIS in Nigeria have focused solely on the university curriculum (Babalola et al, 2018; Onwubiko, 2020; Olubiyo, 2022a; Oladokun & Olatokun, 2026) while very few have considered polytechnic LIS education alongside universities in the past (Nwosu, Eyisi & Aghauche, 2013; Saka, Garba & Zarma, 2018). Against this backdrop, this study undertakes a comparative analysis of the IFLA Foundational Knowledge Areas and the National Board for Technical Education curriculum for Library and Information Science education in Nigeria. By examining the content, structure, and competency focus of both frameworks, the study seeks to provide evidence-based understanding that can inform curriculum review, policy formulation, and quality assurance initiatives. Ultimately, such an analysis is expected to contribute to strengthening the relevance, effectiveness, and global responsiveness of Library and Information Science education in Nigeria while improving the capacity of Library and Information Science professionals to contribute towards national development.

Statement of the Problem

Librarians and librarianship in Nigeria have not been receiving the adequate recognition that is commensurate with the goals for which they exist, especially when compared with what is obtainable in the global North where most Nigerian libraries are modelled after. This situation calls for a deep concern considering the importance of the roles libraries are expected to play in societal development. Chu et al (2022) noted that in educating LIS professionals, it is important to develop both disciplinary and cross-sector knowledge. This includes recognising commonalities libraries and information services share with related sectors, such as archives, museums, records management and data management, and developing complementary knowledge from cognate fields, such as computer science, data science, education, and communications. The current status of the innovativeness of Nigerian libraries and information centres is still far from the contemporary innovative services being offered in developed societies. Over the years, much attention has been focused on the facilities than competencies and the training to acquire such competencies for the delivery of contemporary library services. This leads to continued expanding gaps between service delivery and expectations, threatening the relevance and reputation of libraries as social institutions and librarians as critical stakeholders in nation building.

The dynamic transformation of the global information environment, driven by emerging digital technologies, data-intensive practices, the birth of more competitive information professions and evolving user expectations, has significantly reshaped the competencies required of contemporary library and information professionals. In response, the International Federation of Library Associations and Institutions (IFLA) developed the Foundational Knowledge Areas (FKAs) to serve as an internationally benchmarked framework that outlines the core competencies, skills, and knowledge required for effective professional practice in Library and Information Science (LIS) (Chu et al, 2022). These knowledge areas emphasize adaptability, ethical information practice, digital literacy, information organization, research skills, and user-centred service delivery. However, in Nigeria, the National Board for Technical Education (NBTE) curriculum for LIS education in Nigerian polytechnics has not been subjected to such an empirical scrutiny to examine if the curriculum content is fully aligned with these global standards, potentially affecting the quality and competitiveness of Nigerian LIS graduates.

The absence of a systematic comparative analysis of these two frameworks may result in curriculum stagnation, skills mismatch, and reduced professional mobility for Nigerian LIS graduates. Without such an evaluation, efforts at curriculum review, harmonisation, and policy reform may lack empirical grounding. Therefore, there is a compelling need to comparatively analyse the IFLA Foundational Knowledge Areas and the NBTE LIS curriculum to identify areas

of convergence, gaps, and opportunities for curriculum enhancement that will strengthen the relevance, quality, and global competitiveness of Library and Information Science education in Nigeria.

Objectives of the Study

The general objective of the study is to comparatively analyse the alignment, gaps, and areas of convergence and divergence between the IFLA Foundational Knowledge Areas (FKAs) and the NBTE curriculum for Library and Information Science (LIS) education in Nigeria, with a view to strengthening LIS education and professional practice. The specific objectives seek to:

i. Identify and describe the core Foundational Knowledge Areas (FKAs) recommended by IFLA for Library and Information Science education.
ii. Examine the structure, content, and learning outcomes of the NBTE LIS curriculum for Nigerian polytechnics and related institutions.
iii. Determine the extent of alignment between IFLA FKAs and the NBTE LIS curriculum content.
iv. Identify knowledge areas and competencies emphasized in IFLA FKAs but underrepresented or absent in the NBTE LIS curriculum.
v. Identify indigenous, contextual, or regulatory components of the NBTE LIS curriculum that are not explicitly captured in the IFLA FKAs.
vi. Analyse the implications of identified gaps and overlaps for the quality, relevance, and global competitiveness of LIS graduates in Nigeria.

Literature Review

The field of Library and Information Science is situated among the multidisciplinary disciplines, and as such, has been experiencing massive evolution over the years, which has necessitated the expected intervention of its apex professional body, the International Federation of Library and Information Science in recommending a framework that covers the core Foundational Knowledge Areas (FKAs) for the education of Library and Information Science professionals all over the world. They present key LIS foundational knowledge areas (FKAs) and the elements for a robust LIS education programme, replacing the 2012 IFLA Guidelines for Professional Library/Information Educational Programmes (Chu, et al, 2022). The 8 Foundational Areas of IFLA include *Information in Society; Foundations of the LIS Profession; Information and Communication Technologies; Research and Innovation; Information Resources Management; Management for Information Professionals; Information Needs and User Services; Literacies and Learning*. The diagram below is a representation of IFLA's FKAs:

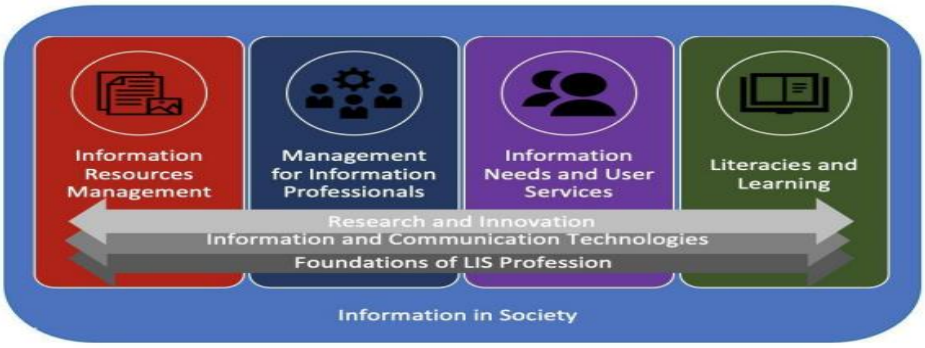

Fig 1: LIS Foundational Knowledge Areas (FKAs) Model (Chu et al, 2022).

According to Okoye and Arimonu (2016), technical education, as enshrined in the Nigerian national policy on education, is concerned with qualitative technological human resources development directed towards a national pool of skilled and self-reliant craftsmen, technicians and technologists in technical and vocational education fields. Technical education in Nigeria is regulated by the National Board for Technical Education. The discipline of Library and Information Science in Nigerian polytechnics is guided by the structure, content, and learning outcomes of the NBTE LIS curriculum for Nigerian polytechnics and related institutions.

A curriculum is referred to as an essential teaching and learning standards-based sequence of planned experiences and central guide for educators, where students practice and achieve proficiency in content and applied learning skills (Department of Education, Rhode Island, 2026). Chu et al (2022) note that LIS, which engages all aspects of information, needs to integrate multiple ways of knowing in its education to prepare professionals to provide effective, equitable, inclusive, and accessible services appropriate to a diverse community and relevant to its local contexts in a globalised economy. The curriculum is therefore not just a set of guidelines to follow in teaching, it is a tool that must indicate the contemporary skills that an intending professional must acquire in order to remain relevant and competitive. Rani and Sharma (2021) iterate that LIS curriculum must be well-designed to fulfill the market demands by including all the essential employability skills for contemporary information practice. All professions require dynamic skills to align with contemporary trends, and LIS is not an exception. This is why Ismail and Khan (2021) assert that the changing

labour market and rapidly evolving library profession demand that library schools constantly update and revitalize their curricula.

Most of the studies on curriculum in Library and Information Science have focused mainly on university education (Babalola et al, 2018; Onwubiko, 2020; Olubiyo, 2022a; Yadav, 2021; Rani & Sharma, 2021; Oladokun & Olatokun, 2026), and by comparing institutional curricular differences rather that comparing the existing curriculum with neutral benchmarks such as IFLA Guidelines and Foundational Knowledge Areas (FKAs). For instance, Ogungbade and Ipadeola (2019) conducted a comparative study of library and information science curriculum in Nigeria library schools. The authors examined the historical and current status of curriculum development in Nigeria. It compared the changes in curricula from various stages and analyzes the factors influencing the curriculum development to include the lack of contents that are germane to the current information landscape. Also, Igwe, et al (2015) reported the curricular enrichment executed at the Department of Library and Information Science, Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State, Nigeria, where innovative and competitive subjects such as Information Literacy Education in the Digital Era, Statistics for Library and Information Services, Perspectives and Opportunities in Library and Information Science, Knowledge Management, Public Relations in Library and Information Science, Infopreneurship and Management Information Systems were integrated into the existing National Board for Technical Education curriculum for LIS education in polytechnics in Nigeria. These were steps taken to enhance the potentials of LIS graduates from the department to fit into the emerging global information landscape.

Understanding the differences between LIS education in developing and developed countries can help identify lapses and gaps, and these gaps need to be identified by comparing LIS curricula to internationally recognised benchmarks, rather than just the curricula of certain institutions. Yet, most studied have compared curricula of developing countries with those of developed countries. For instance, Mortezaie and Naghshineh (2002) conducted a comparative case study of graduate course in library and information studies in the UK, USA, and revealed that there is a widening chasm between LIS education in developing countries without any significant restructuring, and that there is a direct correlation between the efficiency of the courses offered with the state of the information industry in the countries studied. This position, which has a huge implication for the sustainability and practice of LIS in contemporary developing countries is recently upheld by Jegbefume, Ikhimeakhu and Muhammad (2025) who revealed that outdated curricula is one of the main factors that limit the ability of LIS graduates to meet the demands of the modern information environment in developing countries.

According to the National Board for Technical Education (2020), the curriculum of LIS is divided into two levels. One part is the National Diploma Curriculum while the other is the Higher National Diploma Curriculum, each divided into four semesters of two academic sessions each (four academic sessions, altogether). The objective of the National Diploma (ND) programme in Library and Information Science is producing the nation's library and information science technicians who will be capable of performing middle level functions in libraries. The curriculum is structured into three main components: General Studies (GS), Professional Courses (LIS core) and SIWES (Industrial Attachment). The supervised Industrial Work Experience Scheme (SIWES) is 4 months. The curriculum also has coursework, examinations, practical works, and a final project.

The NBTE LIS curriculum is targeted at ensuring that, on completion of this course, the diplomate will be able to (a) classify and catalogue books; (b) process journals and other reference materials; (c) compile some general and specific subject bibliographies, indexes and abstracts; (d) perform readers' services with minimum supervision; (e) supervise junior (clerical and non-technical) staff in a library; (f) take charge of a school or community library efficiently and effectively; (g) utilize information and communication technologies (ICT) in information handling and processing. The structure of the programme consists of four semesters of classroom, laboratory and workshop activities in the institution and a semester (3-4 months) of Supervised Industrial Work Experience Scheme (SIWES). Each semester shall be of 17 weeks duration made up as follows: 15 contact weeks of teaching and practical exercises, and two weeks for registration and examinations (NBTE, 2020).

Meanwhile, according to National Board for Technical Education (2020), the Higher National Diploma (HND) programme in Library and Information Science is designed to produce diplomates with the knowledge and skills to actively participate in the provision of efficient library and information services to meet the diverse information needs of the society. On completion of this course, the diplomates will be able to carry out the following functions:

a) Select, acquire and process library and information resource without or with minimum supervision; b) Compile general, Subject and Analytical Bibliographies, Indexes and Abstracts; c) Effectively and efficiently use Information and Communication Technologies (ICT) in the generation, acquisition, storage, preservation and dissemination of textual, graphic, numeric and pictorial information to meet the different information need of users; d) Supervise subordinate staff (clerical and technical) in Library and Information Centers.

e) Effectively manage medium-size libraries and information centers.

The structure of the programme consist of four semesters of classroom, laboratory and workshop activities in the college-each semester shall have 17 weeks duration made up as follows:- 15 contact weeks of teaching, i.e., recitation, practical exercises, quizzes, test, etc.; and 2 weeks for examinations and registration.

Saka and Dawha (2021) averred that unlike 20th century librarianship when employment was confined to the four walls of libraries with the provision of traditional core library services, the 21st century library schools maintains a designed curriculum that prepares prospective Library and Information Science and Library and Information Technology (LIS/LIT) graduates and information professionals for employment opportunities in organizations other than libraries. These include organisations exploring the potentials of the digital revolution to discharge their information-related statutory responsibilities. Similarly, Malik and Ameen (2017) conducted a survey titled "Library/information education programmes in Pakistan: a comparison with IFLA Guidelines". The study, based on a documentary analysis and telephonic interviews with master's programs' coordinators of all LIS departments, revealed that while there is some compliance with IFLA core elements, the courses are largely inclined toward the management of libraries and less toward the information communication technologies (ICTs) components. Generally, the courses were traditional in nature, indicating a problem of widespread reliance on outdated and some irrelevant contents that do not reflect the current needs of the changing environment (Malik & Ameen, 2017). This revelation implies that there is a need for increased efforts towards seeking alignment with international standards by redesigning and reorienting LIS curricula.

In the Nigerian context, Saka and Dawha (2021) emphasised that there are some gaps to be filled in the Library and Information Science Education (LISE) in Nigeria, as library schools have to carry the regulatory bodies along in matters of establishment of Library Schools, curriculum design and review, admission requirements and appropriate institutions to run diploma programme. This is a call for an efficient and robust synergy between regulatory bodies, on behalf of government, and Library and Information Schools. Unfortunately, close to nothing has been reported in literature concerning the weighing of the current LIS curriculum for NBTE-regulated LIS schools in Nigeria, against a global recommended guideline such as the IFLA Foundational Knowledge Areas (FKAs). This gap in literature justifies the need for the current study.

Theoretical Framework

This study is anchored on the Curriculum Alignment Theory developed by John Biggs (1996), specifically his concept of Constructive Alignment**.** The Constructive Alignment Theory is an educational theory that emphasizes the systematic alignment of curriculum objectives, learning outcomes, teaching activities, and assessment processes to ensure that students acquire the intended knowledge and competencies.

According to Biggs (1996), curriculum effectiveness depends on the degree of consistency between:

- Intended learning outcomes;
- Curriculum content;
- Teaching and learning activities; and
- Assessment methods.

The theory assumes that meaningful learning occurs when all curriculum components are aligned with predetermined competencies and standards. In curriculum evaluation studies, Constructive Alignment Theory is frequently used to determine whether educational programmes adequately reflect professional standards, competency frameworks, or accreditation requirements.

The present study seeks to determine the extent to which the NBTE Library and Information Science curriculum corresponds with the competencies prescribed by the IFLA Foundational Knowledge Areas. The IFLA FKAs represent internationally recognized standards for LIS education and serve as the benchmark against which the NBTE curriculum is evaluated.

Using Constructive Alignment Theory, the study examines whether:

i. The content of the NBTE LIS curriculum reflects the knowledge domains specified by IFLA;
ii. The curriculum provides adequate coverage of internationally recognized LIS competencies;
iii. There are gaps between curriculum content and professional expectations;
iv. Certain knowledge areas are overemphasized or underrepresented; and
v. The curriculum incorporates additional contextual competencies relevant to the Nigerian environment.

The theory is relevant to this study because it provides a framework for evaluating the degree of correspondence between the National Board for Technical Education (NBTE) Library and Information Science curriculum and the International Federation of Library Associations and Institutions (IFLA) Foundational Knowledge Areas. By comparing curriculum content and learning outcomes with internationally recognized LIS competencies, the study assesses the extent of alignment, identifies existing gaps, and determines areas requiring curriculum enhancement. Consequently, Constructive Alignment Theory provides an appropriate lens for examining the adequacy, relevance, and global responsiveness of the NBTE LIS curriculum. Thus, the theory provides a framework for assessing the congruence between national curriculum content and global professional standards.

Methodology

The study adopted a documentary research design employing qualitative content analysis and quantitative curriculum mapping techniques. A qualitative content analysis is a flexible systematic research method used to describe, interpret, and categorize textual, visual, or audio data, identifying underlying patterns, themes, and meanings (both manifest and latent) rather than just counting word frequencies (Lindgrem, Lundman, & Graneheim, 2020; Ivankova, 2023). It also involves dividing data into manageable chunks, coding these chunks, and finally grouping the codes into categories that reflect patterns found across the data set used in the study (Bohm & Sundqvist, 2025). Meanwhile, curriculum mapping techniques are described as systematic, visual methods used to align, document, and analyze academic course content (Okojie, Bastas, & Miralay, 2022). Rowla, Bowen, Murk, and Hong (2017) state that by visualizing and diagramming learning outcomes, assessments, and instructional materials, educators can identify and eliminate learning gaps, prevent redundant instruction, and ensure logical progression across grade levels or degree programmes.

The design was considered appropriate because the study relied on the systematic examination of documentary sources rather than data collected from respondents through questionnaires, interviews, or observations. The design is suitable for the current study as the study relies entirely on documentary evidence obtained from the International Federation of Library Associations and Institutions (IFLA) Foundational Knowledge Areas (FKAs) and the National Board for Technical Education (NBTE) Library and Information Science (LIS) curriculum. The approach enabled a systematic comparison between internationally recognized LIS knowledge domains and the curriculum content prescribed for National Diploma (ND) and Higher National Diploma (HND) programmes in Nigeria. This implies that documentary sources were the major instruments for data collection. Data for the study were obtained from two primary documentary sources:

i. The IFLA Foundational Knowledge Areas (FKAs), which specify the core knowledge domains and competencies expected of LIS education programmes globally.
ii. The National Board for Technical Education (NBTE) Curriculum for Library and Information Science (2020), including:
    - Programme structure;
    - Course titles;
    - Course descriptions;
    - Learning outcomes; and
    - Curriculum content for ND and HND programmes.

These documents constituted the corpus of analysis for the study.

The researchers extracted all curriculum components relevant to Library and Information Science from the NBTE curriculum document and compiled them semester-by-semester for both National Diploma and Higher National Diploma programmes. Similarly, the eight IFLA Foundational Knowledge Areas and their associated competencies were extracted from the IFLA Guidelines for Professional Library and Information Science Education Programmes (Chu et al, 2020). The extracted information was organized into comparative matrices to facilitate curriculum mapping and content analysis.

To determine the extent of alignment, a curriculum mapping matrix was developed in which each NBTE LIS course was mapped against the eight IFLA Foundational Knowledge Areas. Each course was coded using a three-point relevance scale alongside each of the eight (8) IFLA FKAs:

Table 1: Rating of course relevance to IFLA FKAs

Score	Interpretation
0	Not represented/No evidence of alignment
1	Slightly represented/Low alignment
2	Moderately represented/Moderate alignment
3	Strongly represented/Strong alignment

The coding was based on the course title, content, objectives, and learning outcomes.

For each FKA:

1. Courses with scores of 1, 2, or 3 were identified as mapped courses.
2. The total score obtained for all mapped courses was computed.
3. The maximum obtainable score was calculated as:

Maximum Score = (Number of Mapped Courses) ×3

4. The alignment percentage was determined using:

Alignment Percentage = Total Score Obtained/Maximum Obtainable Score ×100

$$\text{Alignment (\%)} = \frac{\text{Total FKA Score}}{\text{Number of Courses Mapped} \times 3} \times 100$$

Where:

- Total FKA Score = sum of all coding scores for the FKA
- Number of Courses Mapped = courses with score ≥ 1
- 3 = maximum score per course

The resulting percentages were interpreted using the benchmark:

Table2: Percentage rating of alignment

Percentage Range	Interpretation
0–24%	Low Alignment
25–49%	Moderate Alignment
50–74%	High Alignment
75–100%	Very High Alignment

Total curriculum alignment was computed by aggregating all FKA scores and maximum obtainable scores:

$$\text{Alignment} = \frac{\sum \text{Total Scores}}{\sum \text{Maximum Scores}} \times 100$$

To identify knowledge areas and competencies emphasized in IFLA FKAs but underrepresented or absent in the NBTE LIS curriculum, gap analysis was conducted by deducting the percentage of extent of alignment from the total alignment percentage (100%). This helps to identify at a glance, the deviation of NBTE curriculum from IFLA FKAs, since the alignment is established by an earlier mapping of existing NBTE courses with IFLA FKAs.

Meanwhile, a comparative content analysis was used to identify indigenous, contextual, or regulatory components of the NBTE LIS curriculum that are not explicitly captured in the IFLA FKAs. The analysis of the implications of identified gaps and overlaps for the quality, relevance, and global competitiveness of LIS graduates in Nigeria was done based on evidence-based framework from the identified gaps compared to the stated global competencies expected of contemporary Library and Information Scientists in contemporary literature.

Table 3: Summary of Analytical Techniques by Objective

Objective	Analytical Technique
Objective 1	Documentary Analysis of IFLA FKAs
Objective 2	Documentary Analysis of NBTE Curriculum Structure, Content, and Learning Outcomes
Objective 3	Curriculum Mapping and Alignment Analysis
Objective 4	Gap Analysis
Objective 5	Comparative Content Analysis
Objective 6	Evidence-Based Recommendation Framework

Data Analysis and Discussion of Findings

The Core Foundational Knowledge Areas (FKAs) Prescribed by IFLA

The 8 Foundational Areas of IFLA include Information in Society; Foundations of the LIS Profession; Information and Communication Technologies; Research and Innovation; Information Resources Management; Management for Information Professionals; Information Needs and User Services; Literacies and Learning (Source: Chu, et al (2022). *IFLA Guidelines for Professional Library and Information Science (LIS) Education Programmes.*

Table 4: Foundational Knowledge Areas (FKAs) in LIS and Core Subjects

FKA	Foundational Knowledge Area	Description	Core Subjects / Course Areas
FKA 1	*Information in Society*	Explores the role, value, and impact of information within social, cultural, economic, and political contexts, including ethical and legal considerations.	Information Society, Information Policy, Freedom of Information, Intellectual Property, Ethics in LIS, Digital Divide
FKA 2	*Foundations of the LIS Profession*	Examines the history, philosophy, principles, and professional ethics guiding library and information science practice.	Introduction to LIS, History of Libraries, Professional Ethics, Professional Issues in LIS, Role of Libraries in Development
FKA 3	*Information and Communication Technologies*	Focuses on the application of ICT tools and systems in the creation, organization, storage, and dissemination of information.	ICT in Libraries, Library Automation, Database Management, Networking, Digital Libraries, Institutional Repositories, Web Development, Database Management, Advanced Digital Librarianship and Data Management, Management Information Systems, Information Architecture and User Experience, Information Assurance and Security
FKA 4	*Research and Innovation*	Emphasizes research methods, critical inquiry, and innovative practices for advancing knowledge and solving problems in LIS.	Research Methods, Statistics, Bibliometrics, Data Analysis, Innovation in LIS, Scholarly Communication
FKA 5	*Information Resources Management*	Covers the selection, acquisition, organization, preservation, and management of information resources in various formats.	Collection Development, Cataloguing, Classification, Indexing, Metadata, Preservation and Conservation
FKA 6	*Management for Information Professionals*	Focuses on administrative and managerial competencies required for effective leadership of libraries and information centers.	Library Management, Human Resource Management, Strategic Planning, Financial Management, Project Management
FKA 7	*Information Needs and User Services*	Deals with understanding user information needs and providing appropriate services to meet those needs effectively, with particular consideration of EDIA (Equity, Diversity, Inclusion and Accessibility).	Reference Services, Information Services, User Studies, Information Literacy, Community Information Services, Innovative Inclusive Information Services
FKA 8	*Literacies and Learning*	Focuses on developing users' competencies in information, digital, and media literacy, as well as supporting lifelong learning.	Information Literacy, Digital Literacy, Media Literacy, User Education, Lifelong Learning, Instructional Design

Document analysis revealed that the IFLA FKAs articulate a broad, competency-based framework designed to guide LIS education globally. The core FKAs identified include: Information and Knowledge Organisation, Information Access, Retrieval, and Discovery, Digital Technologies and Digital Environments, Research Methods and Evidence-Based Practice, Information Ethics, Policy, and Legal Issues, Management and Leadership of Information Services, User Services, Information Literacy, and Learning Support, Cultural Heritage, Preservation, and Memory Institutions, Communication, Advocacy, and Professional Values, and Lifelong Learning and Continuing Professional Development. These knowledge areas emphasise professional adaptability, digital competence, ethical responsibility, research capacity, and user-centred service delivery.

The Structure, Content, and Learning Outcomes of the NBTE LIS Curriculum

Table 5: Structure of NBTE Curriculum for LIS

SN	National Diploma (ND)	Higher National Diploma (HND)
	The **structure** of the programme consists of four semesters of classroom, laboratory and workshop activities in the institution and a semester (3-4 months) of Supervised Industrial	The **structure** of the programme consists of four semesters of classroom, laboratory and workshop activities in the college-each semester shall have 17 weeks duration made up as follows:- 15 contact weeks of teaching, i.e., recitation,

	Work Experience Scheme (SIWES). Each semester shall be of 17 weeks duration made up as follows: 15 contact weeks of teaching, industrial visitations/excursions, and practical exercises, and two weeks for registration and examinations.	practical exercises, quizzes, test, etc.; and 2 weeks for examinations and registration

Source: National Board for Technical Education (2020).

Table 6: Content of NBTE Curriculum for LIS

SN	National Diploma (ND)	Higher National Diploma(HND)
1st Semester (Year I)	LIS 111 (Foundation of Library and Information Science); LIS 112 (Cataloguing I); LIS 113 (Basic Reference Tools and Services I); LIS 114 (History of Libraries I); LIS 115 (Book Production and Publishing); LIS 116 (Classification I); LIS 117 (Sociology of Library and Information Science); GNS 101 (Use of English I); GNS 127 (Citizenship Education I); GNS 111 (Basic French I)	LIS 311 (Introduction to Information Science); LIS 312 (Collection Development I); LIS 313 (Research Methods I); LIS 314 (Theory of Knowledge and Classification); LIS 315 (Libraries and the Society); LIS 316 (Current Awareness Services I); LIS 317 (Computer Programming); LIS 318 (Routines and Services in Libraries); GNS 301 (Use of English III)
2nd Semester (Year I)	LIS 121 (Cataloguing I); LIS 122 (Basic Reference Tools and Services II); LIS 123 (History of Libraries II); LIS 124 (Classification II); LIS 125 (Basics of Computer and Operating Systems); LIS 126 (Compilation of Bibliographies, Indexes and Abstracts); LIS 127 (Information Literacy in the Digital Era)*; LIS 128 (Public Relations in Libraries)*; LIS 129 (Perspectives and Opportunities in LIS)*; GNS 102 (Communication in English I); GNS 121/128 (Citizenship Education II); GNS 122 (Basic French II), EED 126 (Introduction to Entrepreneurship); SIWES (Students' Industrial Work Experience Scheme)	LIS 321 (Research Methods I); LIS 322 (Advanced Cataloguing and Classification I); LIS 323 (School Libraries and Media Centres); LIS 324 (Children's Literature); LIS 325 (Science and Technology Information Sources and Services); LIS 326 (Oral Archives and Indigenous Knowledge); LIS 327 (Current Awareness Services II); LIS 328 (Public Libraries); LIS 329 (Publishing and Infopreneurship); GNS 302 (Communication in English III); EED 323 (Basic Entrepreneurship)
1st Semester (Year 2)	LIS 211 (Elements of Library Administration); LIS 212 (Cataloguing and Classification I); LIS 213 (Research Methods); LIS 214 (Elements of Reprography); LIS 215 (Types of Libraries and Information Centres); LIS 216 (Conservation and Preservation of Library and Information Materials); LIS 217 (Collection Development); LIS 218 (Elements of Library Automation); LIS 219* (Records and Information Management);	LIS 401 (Project I); LIS 410 (Library Advocacy and Marketing); LIS 411 (Business Information Sources and Services); LIS 412 (Academic Libraries); LIS 413 (Social Science Information Sources and Services); LIS 414 (Humanities Information Sources and Services); LIS 415 (Archives And Records Management); LIS 416 (Advanced Cataloguing and Classification II); LIS 417 (Book Editing and indexing); LIS 418 (Collection Development); LIS 419 (Management of Libraries and Information Centres); GNS 401 (Communication in English), EED 413 (Entrepreneurship Education)
2nd Semester (Year 2)	LIS 221 (Cataloguing and Classification II); LIS 222 (Project); LIS 223 (Types of Libraries and Information Centres II); LIS 224 (Audio-Visual Equipment Production and Maintenance); LIS 225 (Introduction to the Internet and Virtual Library); LIS 226 (Knowledge Management)*; GNS 202 (Communication in English II)	LIS 402 (Project); LIS 421 (Special Libraries); LIS 422(National Libraries); LIS 423 (Indexing and Abstracting); LIS 424 (Legal Issues in Information Handling); LIS 425 (International and Comparative Librarianship); LIS 426 (Serials Librarianship); LIS 427 (Library Automation); LIS 428 (Management Information Systems); LIS 429* (Knowledge Management); GNS 413 (Literary Appreciation and Oral Communication)

Source: National Board for Technical Education (2020);

** Enrichment courses in the Department of Library and Information Science, Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State, Nigeria*

Table 7: Learning Outcomes of NBTE Curriculum for National Diploma and Higher National Diploma in Library and Information Science

SN	National Diploma (ND)	Higher National Diploma(HND)
A	Classify and catalogue books	Select, acquire and process library and information resource without or with minimum supervision
B	Process journals and other reference materials;	Compile general, Subject and Analytical Bibliographies, Indexes and Abstracts
C	Compile some general and specific subject bibliographies, indexes and abstracts	Effectively and efficiently use Information and Communication Technologies (ICT) in the generation, acquisition, storage, preservation and dissemination of textual, graphic, numeric and pictorial information to meet the different information need of users
D	Perform readers' services with minimum supervision	Supervise subordinate staff (clerical and technical) in Library and Information Centers
E	Supervise junior (clerical and non-technical) staff in a library	Effectively manage medium-size libraries and information centers
F	Take charge of a school or community library efficiently and effectively	
G	Utilize Information and Communication Technologies (ICT) in information handling and processing	

Source: National Board for Technical Education (2020).

Analysis of the NBTE LIS curriculum showed that it is structured into ND and HND levels, with a strong emphasis on Foundations of librarianship, Cataloguing and classification, Collection development, Reference and information services, Library routines and operations, ICT applications in libraries, and Industrial training (SIWES)

Learning outcomes are largely skill-based and practice-oriented, reflecting NBTE's mandate to produce technically competent middle-level manpower. The curriculum also incorporates general studies courses, entrepreneurship education, and supervised industrial training.

The extent of alignment between IFLA FKAs and the NBTE LIS Curriculum

FKA Alignment Formula:

$$\text{Alignment (\%)} = \frac{\text{Total FKA Score}}{\text{Number of Courses Mapped} \times 3} \times 100$$

Where:

- Total FKA Score = sum of all coding scores for the FKA
- Number of Courses Mapped = courses with score ≥ 1
- 3 = maximum score per course

Table 8: Extent of alignment rating scores for IFLA FKA mapped courses

Score	Interpretation
0	Not represented/No evidence of alignment
1	Slightly represented/Low alignment
2	Moderately represented/Moderate alignment
3	Strongly represented/Strong alignment

Table 9: Percentage of alignment rating scores

Percentage Range	Interpretation
0–24%	Low Alignment
25–49%	Moderate Alignment
50–74%	High Alignment
75–100%	Very High Alignment

Table 9: FKA Total score and Course Counts

FKA	Total Score	Courses Mapped
FKA1 Information in Society	56	33
FKA2 Foundations of LIS Profession	51	37
FKA3 ICT	29	17
FKA4 Research & Innovation	32	20
FKA5 Information Resources Management	102	52
FKA6 Management for Information Professionals	34	23
FKA7 Information Needs & User Services	55	34
FKA8 Literacies & Learning	38	34

Explanation: A course was considered mapped to an FKA if it received a score of **1, 2, or 3** under the particular FKA. For instance, the total score for FKA1 (Information in Society) was obtained by summing all coding scores assigned to courses mapped to the knowledge area. Thirty-three courses were identified as contributing to FKA1 (Information Society), yielding a cumulative score of 56. The score was derived by adding the individual coding values assigned during the curriculum mapping exercise. This total score was subsequently used to compute the alignment percentage for FKA1.

For data transparency, the tables below (in **Table 10** to **Table 17**) explain the coding matrix used for each FKA, as reflected in **Table 9** above:

Table 10: Calculation of Total Score for courses mapped to FKA1: **Information in Society**

Course	FKA1 Score
LIS 111 Foundations of LIS	2
LIS 114 History of Libraries I	2
LIS 115 Book Production	2
LIS 117 Sociology of LIS	3
GNS Courses	1
LIS 123 History II	2
LIS 127 Information Literacy	1
LIS 128 Public Relations	1
LIS 129 Perspectives & Opportunities in LIS	2
SIWES	2
LIS 215 Types of Libraries	2
LIS 219 Records Management	1
LIS 223 Types of Libraries II	2
LIS 226 Knowledge Management	1
LIS 311 Introduction to Information Science	2
LIS 314 Theory of Knowledge & Classification	1
LIS 315 Libraries and Society	3
LIS 323 School Libraries	1
LIS 324 Children's Literature	1
LIS 326 Indigenous Knowledge	3
LIS 328 Public Libraries	2
LIS 329 Publishing & Infopreneurship	2
LIS 410 Library Advocacy & Marketing	2
LIS 411 Business Information Sources	1
LIS 412 Academic Libraries	1
LIS 413 Social Science Information Sources	1
LIS 414 Humanities Information Sources	1
LIS 421 Special Libraries	1

LIS 422 National Libraries	2
LIS 424 Legal Issues in Information Handling	3
LIS 425 International & Comparative Librarianship	3
LIS 428 Management Information Systems	1
LIS 429 Knowledge Management	1
Total	**56**

Table 11: Calculation of Total Score for courses mapped to FKA2: Foundations of the LIS Profession

Course	FKA2 Score
LIS 111 Foundations of LIS	3
LIS 112 Cataloguing I	1
LIS 114 History of Libraries I	3
LIS 115 Book Production	1
LIS 116 Classification I	1
LIS 117 Sociology of LIS	2
LIS 121 Cataloguing I	1
LIS 123 History of Libraries II	2
LIS 124 Classification II	1
LIS 129 Perspectives & Opportunities in LIS	2
SIWES	1
LIS 211 Library Administration	1
LIS 212 Cataloguing and Classification	1
LIS 215 Types of Libraries	2
LIS 221 Cataloguing and Classification II	1
LIS 223 Types of Libraries II	2
LIS 311 Introduction to Information Science	2
LIS 314 Theory of Knowledge and Classification	2
LIS 315 Libraries and Society	2
LIS 318 Library Routines and Services	1
LIS 322 Advanced Cataloguing and Classification	1
LIS 323 School Libraries	1
LIS 324 Children's Literature	1
LIS 326 Indigenous Knowledge	1
LIS 328 Public Libraries	1
LIS 329 Publishing and Infopreneurship	1
LIS 410 Library Advocacy and Marketing	1
LIS 412 Academic Libraries	1
LIS 416 Advanced Cataloguing and Classification II	1
LIS 417 Editing and Indexing	1
LIS 419 Management of Libraries	1
LIS 421 Special Libraries	1
LIS 422 National Libraries	2
LIS 423 Indexing and Abstracting	1
LIS 424 Legal Issues in Information Handling	1
LIS 425 International and Comparative Librarianship	2
LIS 426 Serials Librarianship	1
Total	**51**

Table 12: Calculation of total score for courses mapped to FKA 3: ICT

Course	FKA3 Score
LIS 125 Basics of Computer and Operating Systems	3
LIS 127 Information Literacy in the Digital Era	1
SIWES	1
LIS 214 Elements of Reprography	1
LIS 218 Elements of Library Automation	3
LIS 224 Audio-Visual Equipment Production & Maintenance	2
LIS 225 Introduction to the Internet and Virtual Library	3
LIS 226 Knowledge Management	1
LIS 311 Introduction to Information Science	1
LIS 316 Current Awareness Services I	1
LIS 317 Computer Programming	3
LIS 318 Routines and Services in Libraries	1
LIS 325 Science & Technology Information Sources and Services	1
LIS 327 Current Awareness Services II	1
LIS 427 Library Automation	3
LIS 428 Management Information Systems	2
LIS 429 Knowledge Management	1
Total	**29**

Table 13: Calculation of Total Score for courses mapped to FKA4: Research and Innovation column

Course	FKA4 Score
LIS 129 Perspectives and Opportunities in LIS	1
SIWES	1
LIS 213 Research Methods	3
LIS 222 Project	3
LIS 226 Knowledge Management	1
LIS 311 Introduction to Information Science	1
LIS 313 Research Methods I	3
LIS 314 Theory of Knowledge and Classification	1
LIS 321 Research Methods II	3
LIS 325 Science & Technology Information Sources and Services	1
LIS 326 Oral Archives and Indigenous Knowledge	1
LIS 329 Publishing and Infopreneurship	1
LIS 401 Project I	3
LIS 413 Social Science Information Sources and Services	1
LIS 414 Humanities Information Sources and Services	1
LIS 402 Project II	3
LIS 424 Legal Issues in Information Handling	1
LIS 425 International and Comparative Librarianship	1
LIS 428 Management Information Systems	1
LIS 429 Knowledge Management	1
Total	**32**

Table 14: Calculation of Total Score for courses mapped to FKA5: Information Resources Management

Course	FKA5 Score
LIS 111 Foundations of LIS	1
LIS 112 Cataloguing I	3
LIS 113 Reference Services I	1
LIS 115 Book Production and Publishing	2
LIS 116 Classification I	3
LIS 121 Cataloguing I	3
LIS 122 Reference Services II	1
LIS 124 Classification II	3
LIS 125 Computer Basics	1
LIS 126 Bibliography, Indexes and Abstracts	3
SIWES	2
LIS 212 Cataloguing and Classification	3
LIS 214 Reprography	1
LIS 215 Types of Libraries	1
LIS 216 Preservation and Conservation	3
LIS 217 Collection Development	3
LIS 218 Library Automation	1
LIS 219 Records Management	3
LIS 221 Cataloguing and Classification II	3
LIS 223 Types of Libraries II	1
LIS 224 Audio-Visual Media	1
LIS 225 Internet and Virtual Library	1
LIS 226 Knowledge Management	2
LIS 311 Introduction to Information Science	1
LIS 312 Collection Development I	3
LIS 314 Theory of Knowledge and Classification	2
LIS 316 Current Awareness Services I	1
LIS 317 Computer Programming	1
LIS 318 Library Routines and Services	2
LIS 322 Advanced Cataloguing and Classification I	3
LIS 323 School Libraries	1
LIS 324 Children's Literature	1
LIS 325 Science & Technology Information Sources	2
LIS 326 Indigenous Knowledge	1
LIS 327 Current Awareness Services II	1
LIS 328 Public Libraries	1
LIS 329 Publishing and Infopreneurship	2
LIS 411 Business Information Sources	2
LIS 412 Academic Libraries	2
LIS 413 Social Science Information Sources	2
LIS 414 Humanities Information Sources	2
LIS 415 Archives and Records Management	3
LIS 416 Advanced Cataloguing and Classification II	3
LIS 417 Editing and Indexing	3
LIS 418 Collection Development	3
LIS 421 Special Libraries	2

LIS 422 National Libraries	2
LIS 423 Indexing and Abstracting	3
LIS 426 Serials Librarianship	3
LIS 427 Library Automation	1
LIS 428 Management Information Systems	1
LIS 429 Knowledge Management	2
Total	**102**

Table 15: Calculation of Total Score for courses mapped to FKA6: Management for Information Professionals

Course	FKA6 Score
LIS 128 Public Relations in Libraries	2
LIS 129 Perspectives and Opportunities in LIS	1
SIWES	2
LIS 211 Elements of Library Administration	3
LIS 217 Collection Development	1
LIS 219 Records and Information Management	1
LIS 226 Knowledge Management	2
LIS 312 Collection Development I	1
LIS 318 Routines and Services in Libraries	1
LIS 328 Public Libraries	1
LIS 329 Publishing and Infopreneurship	2
LIS 410 Library Advocacy and Marketing	2
LIS 411 Business Information Sources and Services	1
LIS 412 Academic Libraries	1
LIS 415 Archives and Records Management	1
LIS 418 Collection Development	1
LIS 419 Management of Libraries and Information Centres	3
LIS 421 Special Libraries	1
LIS 422 National Libraries	1
LIS 424 Legal Issues in Information Handling	1
LIS 425 International and Comparative Librarianship	1
LIS 428 Management Information Systems	2
LIS 429 Knowledge Management	2
Total	**34**

Table 16: Calculation of Total Score for courses mapped to FKA7: Information Needs and User Services column

Course	FKA7 Score
LIS 111 Foundations of LIS	1
LIS 113 Basic Reference Tools and Services I	3
LIS 117 Sociology of LIS	1
LIS 122 Basic Reference Tools and Services II	3
LIS 126 Compilation of Bibliographies, Indexes and Abstracts	1
LIS 127 Information Literacy in the Digital Era	1
LIS 128 Public Relations in Libraries	2
SIWES	2
LIS 211 Elements of Library Administration	1
LIS 215 Types of Libraries and Information Centres	1

LIS 223 Types of Libraries and Information Centres II	1
LIS 224 Audio-Visual Equipment Production and Maintenance	1
LIS 225 Introduction to the Internet and Virtual Library	1
LIS 311 Introduction to Information Science	1
LIS 315 Libraries and the Society	1
LIS 316 Current Awareness Services I	3
LIS 318 Routines and Services in Libraries	2
LIS 323 School Libraries and Media Centres	2
LIS 324 Children's Literature	2
LIS 325 Science and Technology Information Sources and Services	2
LIS 326 Oral Archives and Indigenous Knowledge	1
LIS 327 Current Awareness Services II	3
LIS 328 Public Libraries	2
LIS 410 Library Advocacy and Marketing	2
LIS 411 Business Information Sources and Services	2
LIS 412 Academic Libraries	2
LIS 413 Social Science Information Sources and Services	2
LIS 414 Humanities Information Sources and Services	2
LIS 417 Book Editing and Indexing	1
LIS 421 Special Libraries	2
LIS 422 National Libraries	1
LIS 423 Indexing and Abstracting	1
LIS 425 International and Comparative Librarianship	1
LIS 426 Serials Librarianship	1
Total	**55**

Table 17: Calculation of Total Score for courses mapped to Courses Mapped to FKA8: Literacies and Learning column

Course	FKA8 Score
LIS 111 Foundations of LIS	1
LIS 113 Basic Reference Tools and Services I	1
LIS 114 History of Libraries I	1
LIS 117 Sociology of LIS	1
LIS 122 Basic Reference Tools and Services II	1
LIS 123 History of Libraries II	1
LIS 126 Compilation of Bibliographies, Indexes and Abstracts	1
LIS 127 Information Literacy in the Digital Era	3
LIS 128 Public Relations in Libraries	1
LIS 129 Perspectives and Opportunities in LIS	1
LIS 213 Research Methods	1
LIS 215 Types of Libraries and Information Centres	1
LIS 222 Project	1
LIS 311 Introduction to Information Science	1
LIS 313 Research Methods I	1
LIS 314 Theory of Knowledge and Classification	1
LIS 315 Libraries and the Society	1
LIS 321 Research Methods II	1

LIS 323 School Libraries and Media Centres	2
LIS 324 Children's Literature	2
LIS 326 Oral Archives and Indigenous Knowledge	1
LIS 328 Public Libraries	1
LIS 329 Publishing and Infopreneurship	1
LIS 401 Project I	1
LIS 410 Library Advocacy and Marketing	1
LIS 412 Academic Libraries	1
LIS 413 Social Science Information Sources and Services	1
LIS 414 Humanities Information Sources and Services	1
LIS 417 Book Editing and Indexing	1
LIS 402 Project II	1
LIS 421 Special Libraries	1
LIS 422 National Libraries	1
LIS 424 Legal Issues in Information Handling	1
LIS 425 International and Comparative Librarianship	1
Total score	**38**

Table 18: Calculated Maximum Obtainable Scores

FKA	Courses Mapped	Total Score	Maximum Score
FKA1: Information in Society	33	56	99
FKA2: Foundations of the LIS Profession	37	51	111
FKA3: ICT	17	29	51
FKA4: Research and Innovation	20	32	60
FKA5: Information Resources Management	52	102	156
FKA6: Management for Information Professionals	23	34	69
FKA7: Information Needs and User Services	34	55	102
FKA8: Literacies and Learning	34	38	102

Computation of Alignment Percentages

FKA1 Information in Society: 56/99×100=56.57%

FKA2 Foundations of the LIS Profession: 51/111×100=45.95%

FKA3 ICT: 29/51×100=56.86%

FKA4 Research and Innovation: 32/60×100=53.33%

FKA5 Information Resources Management: 102/156×100=65.38%

FKA6 Management for Information Professionals: 34/69×100=49.28%

FKA7 Information Needs and User Services: 55/102×100=53.92%

FKA8 Literacies and Learning: 38/102×100=37.25%

Table 19: Alignment of NBTE LIS Curriculum with IFLA FKAs

FKA	Total Score	No. of Courses Mapped	Maximum Score	Ranking of Alignment (%)	Interpretation
FKA1: Information in Society	56	33	99	56.6	High

FKA2: Foundations of LIS Profession	51	37	111	46.0	Moderate
FKA3: ICT	29	17	51	56.9	High
FKA4: Research & Innovation	32	20	60	53.3	High
FKA5: Information Resources Management	102	52	156	65.4	High
FKA6: Management for Information Professionals	34	23	69	49.3	Moderate
FKA7: Information Needs & User Services	55	34	102	53.9	High
FKA8: Literacies & Learning	38	34	102	37.25	Moderate
Total score	397		750		

General Curriculum Alignment

Using the mapped-course normalization approach:

General alignment: $\frac{\Sigma \text{ Total Scores}}{\Sigma \text{ Maximum scores obtainable}} * 100$

Total number of scores obtained by each FKA: 56 +51 + 29 + 32 + 102 + 34 + 55 + 38 = 397

Total (Maximum) number of obtainable scores by each FKA: 99 + 111 + 51 + 60 + 156 + 69 + 102 + 102 = 750

397/750 * 100 = 52.93

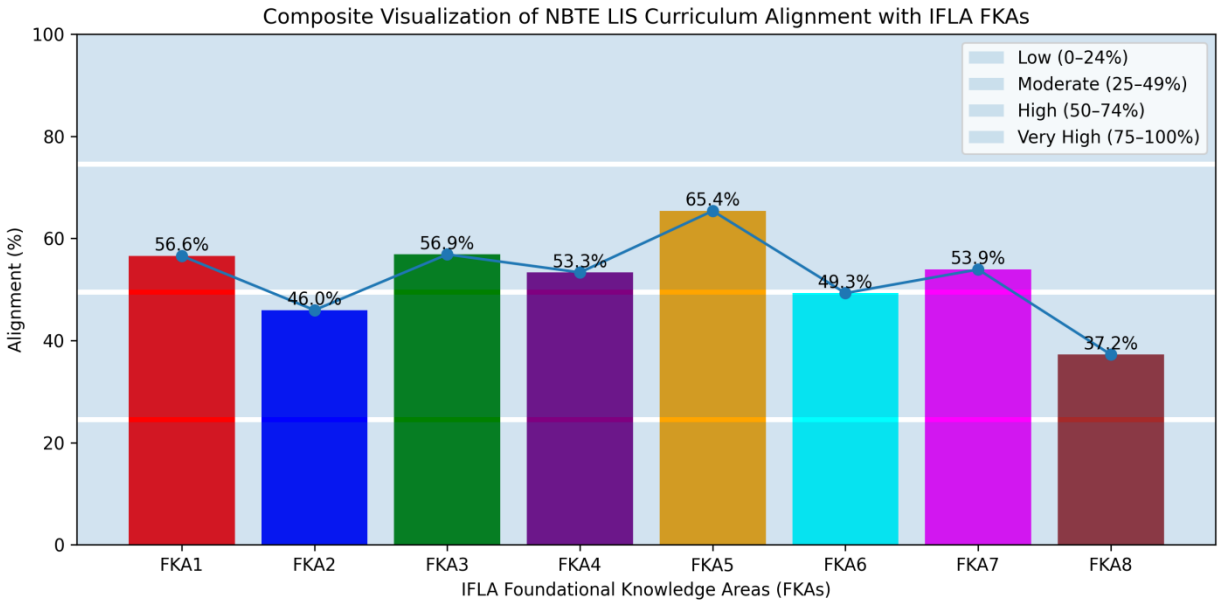

Fig 2: Composite Visualisation of NBTE Curriculum Alignment with IFLA FKAs

The general alignment between the NBTE LIS curriculum and the IFLA Foundational Knowledge Areas was determined using the mapped-course normalization approach. The cumulative score obtained across the eight FKAs was 397, while the total maximum obtainable score was 750. Applying the alignment formula yielded a general alignment score of 52.93%. This indicates a high level of alignment between the NBTE LIS curriculum and the IFLA FKAs, suggesting that the curriculum substantially incorporates internationally recognized LIS knowledge areas while still presenting opportunities for strengthening underrepresented competencies in management, literacies and learning, and professional foundations.

The analysis revealed that the NBTE LIS curriculum demonstrates a cumulative alignment of 52.93% with the IFLA Foundational Knowledge Areas, indicating a generally high level of correspondence with international LIS education standards. Information Resources Management recorded the highest alignment score (65.4%), reflecting the curriculum's strong emphasis on cataloguing, classification, collection development, preservation, indexing, archives, and records management. Information and Communication Technologies (56.9%), Information in Society (56.6%), Research and Innovation (53.3%), and Information Needs and User Services (53.9%) also demonstrated high levels of alignment.

Conversely, Foundations of the LIS Profession (46.0%), Management for Information Professionals (49.3%), and Literacies and Learning (37.25%) recorded moderate levels of alignment. The relatively lower representation of Literacies and Learning suggests limited emphasis on instructional design, digital literacy pedagogy, media literacy, and lifelong learning competencies. In summary, the findings indicate that while the NBTE LIS curriculum aligns substantially with the IFLA FKAs, opportunities remain for strengthening professional foundations, strategic management competencies, and literacy-related learning outcomes. These findings conform to the findings of Malik and Ameen (2017) who compared the LIS curriculum in Pakistan with IFLA guidelines also revealed that the courses were traditional in nature, indicating a problem of widespread reliance on outdated and some irrelevant contents that do not reflect the current needs of the changing digitally-driven knowledge economy and information environment. These findings are also in tandem with the findings of Ismail and Khan (2021) indicating that the present LIS curricula and training programmes in the country (Pakistan) do not adequately meet the present job market needs due to insufficient educational resources, a dearth of suitable ICT related contents in the courses among others such as inadequate industrial attachment. In the current study, the use of SIWES (Student Industrial Experience Scheme) is a compulsory industrial attachment, which shows that NBTE-regulated LIS schools in Nigeria are given adequate opportunities to engage with the industry for practical experience, in contrast to university systems.

The findings revealed that the NBTE Library and Information Science curriculum achieved a total alignment score of 52.93% with the IFLA Foundational Knowledge Areas. This finding supports the propositions of Constructive Alignment Theory (Biggs, 1996), which emphasizes the need for coherence between curriculum content and intended professional competencies. The moderate level of alignment suggests that the NBTE curriculum incorporates many of the knowledge domains required by international LIS standards, particularly in Information Resources Management and Information Needs and User Services. However, the alignment is not complete, indicating that some intended competencies within the IFLA framework are not adequately reflected in the curriculum. From the perspective of Constructive Alignment Theory, this implies that the curriculum only partially achieves congruence with the professional outcomes expected of contemporary LIS education.

IFLA FKAs underrepresented or absent in the NBTE LIS Curriculum

The chart and table below ranks the FKAs according to their **curriculum gap score**, calculated as:

Total Expected Alignment Percentage: 100%. Thus, higher values indicate larger gaps and greater need for curriculum enhancement.

Table 20: Gap Analysis of NBTE LIS Curriculum Relative to IFLA FKAs

IFLA FKA	Alignment (%)	Gap (%)
FKA1 Information in Society	56.57	43.43
FKA2 Foundations of LIS Profession	45.95	54.05
FKA3 ICT	56.86	43.14
FKA4 Research & Innovation	53.33	46.67
FKA5 Information Resources Management	65.38	34.62
FKA6 Management for Information Professionals	49.28	50.72
FKA7 Information Needs & User Services	53.92	46.08
FKA8 Literacies & Learning	37.25	62.75

Higher gap percentages indicate greater underrepresentation of IFLA competencies within the NBTE LIS curriculum.

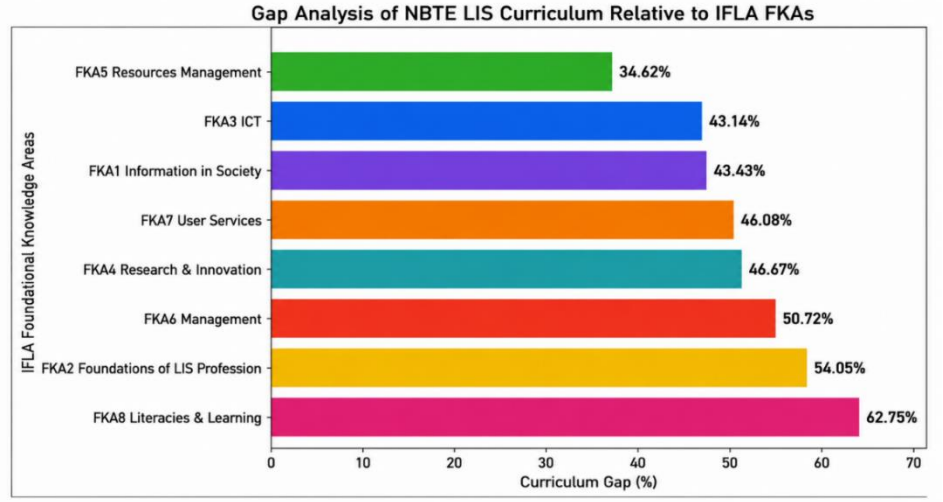

Fig 3: Gap Analysis of NBTE Curriculum Relative to IFLA FKAs

The table and chart above show that FKA8 (Literacies and Learning) exhibits the largest curriculum gap (62.75%), indicating that competencies relating to digital literacy, media literacy, data literacy, instructional design, lifelong learning, and teaching skills are insufficiently represented within the NBTE LIS curriculum. The second-largest gap occurs in FKA2 (Foundations of the LIS Profession) with a gap score of 54.05%, suggesting inadequate emphasis on professional ethics, professional identity, international professional standards, and emerging professional competencies. FKA6 (Management for Information Professionals) also records a substantial gap (50.72%), indicating weak coverage of strategic leadership, innovation management, project management, organizational change, and performance management. This is a major challenge that technological innovations have led to an increase in demand for pedagogical skills on the part of library and information science professionals for them to empower users with knowledge and skills to navigate the complex digital information ecosystem. While foundational aspects are present, advanced competencies such as digital literacy instruction, lifelong learning facilitation, strategic leadership, and innovation management are not adequately developed across the curriculum. These areas, where present, were often treated implicitly or embedded within other courses rather than addressed as standalone competencies. This also aligns with the findings of Chisunka and Nsibirwa (2026) who revealed that there are no explicit AI components in the LIS Master's programmes of two universities studied, even at higher levels in Zambia and South Africa, implying the need for integration of explicit Artificial Intelligence in LIS in African LIS schools.

Moderate gaps are observed in FKA4 (Research and Innovation) (46.67%), FKA7 (Information Needs and User Services) (46.08%), FKA1 (Information in Society) (43.43%), and FKA3 (ICT) (43.14%). This suggests limited emphasis on competencies such as evidence-based practice, data analysis, information policy, and the socio-political dimensions of information. The analysis revealed that Information Architecture and Information Assurance, including competencies related to cybersecurity, privacy protection, digital risk management, and information security governance, is not explicitly represented in the NBTE LIS curriculum. This gap suggests that graduates may possess basic ICT competencies but may be inadequately prepared to address contemporary challenges relating to information security, data protection, and digital trust in modern information environments. The smallest gap is found in FKA5 (Information Resources Management) (34.62%), confirming that the NBTE curriculum is strongest in traditional librarianship functions such as cataloguing, classification, collection development, indexing, archives, preservation, and records management. This is corroborated by Krishnamurty (2020) who noted that most of the fresh graduates, having been introduced to the latest developments in information communication technology applications through their revised library science curriculum in India have the advantage over other experienced professionals who went through traditional library training in that they have a basic idea about the advancements in ICT.

Based on the gap analysis, the most underrepresented IFLA competency domains in the NBTE LIS curriculum are Literacies and Learning (FKA8), Foundations of the LIS Profession (FKA2), and Management for Information Professionals (FKA6). These areas should receive priority attention during future curriculum review and revision exercises to improve alignment with international LIS education standards.

The above findings imply that the NBTE LIS curriculum is heavily oriented toward traditional technical competencies, with insufficient emphasis on research, innovation, policy, and emerging professional skills required in contemporary information environments. In conformity with the above findings, Olubiyo (2022b) noted that the challenges presented by current forces in the labour market demand that LIS schools' curriculum content in Africa should be reviewed with the aim of equipping their graduates with the knowledge and skills that would enable them succeed in the ever changing world of information. This was evidently reported in a survey of the perspectives of LIS school alumni who now practice in various information profession on the knowledge, skills and abilities of LIS professionals in the digital era, as reported by Yadav (2021), affirming that computing skills, library automation and library digitization are considered absolutely essential for contemporary LIS in practice.

The identification of significant gaps within FKA8 (Literacies and Learning), FKA2 (Foundations of the LIS Profession), and FKA6 (Management for Information Professionals) further illustrates the relevance of Constructive Alignment Theory. According to Biggs (1996), effective curricula should ensure that learning experiences and content adequately support the competencies expected of graduates. The underrepresentation of competencies such as digital literacy, media literacy, strategic leadership, innovation management, professional ethics, and lifelong learning indicates areas where alignment between curriculum content and international professional expectations is weak. Consequently, the findings suggest that the curriculum does not fully support the development of certain competencies required in contemporary information environments, thereby limiting the extent of constructive alignment.

Indigenous, contextual, or regulatory components of the NBTE LIS curriculum that are not explicitly captured in the IFLA FKAs.

Based on the comparative content analysis between the NBTE Library and Information Science (LIS) Curriculum (2020) and the IFLA Foundational Knowledge Areas (FKAs), several components of the NBTE curriculum were found to be indigenous, contextual, or regulatory in nature and are not explicitly represented within the IFLA FKAs**.** These components reflect Nigeria's socio-cultural realities, educational policies, labour market needs, and national development priorities.

Table 21: Indigenous, Contextual, and Regulatory Components Unique to the NBTE LIS Curriculum

Component	Type	Evidence in NBTE Curriculum	Presence in IFLA FKAs	Significance
Oral Archives and Indigenous Knowledge (LIS 326)	Indigenous	Dedicated HND course	Not explicitly stated	Strong representation of preservation of indigenous knowledge systems, oral traditions, and cultural heritage
Students' Industrial Work Experience Scheme (SIWES)	Regulatory/Contextual	Mandatory industrial attachment	Not specified	Provides practical workplace experience and employability skills
Citizenship Education I & II (GNS 127, GNS 121/128)	Regulatory	General studies requirement	Not included	Promotes national consciousness, civic responsibility, and citizenship values
Basic French I & II (GNS 111, GNS 122)	Contextual	Language requirement	Not included	Enhances communication with West African Francophone neighbours and international collaboration
Entrepreneurship Education (EED 126, EED 323, EED 413)	Contextual	Entrepreneurship courses at ND and HND levels	Limited emphasis	Promotes self-employment and entrepreneurial skills
Public Relations in Libraries (LIS 128)	Contextual	Stand-alone course	Indirectly implied	Enhances community engagement and library visibility
Library Advocacy and Marketing (LIS 410)	Contextual	Dedicated HND course	Not explicitly represented	Supports advocacy for libraries and information services
Perspectives and Opportunities in LIS (LIS 129)	Contextual	LIS-related Career-oriented course	Not explicitly represented	Introduces employment and professional opportunities in LIS in Nigeria
Publishing and Infopreneurship (LIS 329)	Contextual	Specialized course	Partially covered	Encourages information entrepreneurship and publishing ventures
Oral Communication and Literary Appreciation (GNS 413)	Contextual	General studies component	Not included	Strengthens communication and presentation skills
National Libraries (LIS 422)	Contextual/Regulatory	Dedicated course	Not explicitly represented	Addresses national information policies and functions of national libraries
International and Comparative Librarianship (LIS 425)	Contextual	Comparative focus	Partially represented	Examines differences among library systems and professional practices

Indigenous Components

The most significant indigenous component identified is Oral Archives and Indigenous Knowledge (LIS 326). While the IFLA FKAs emphasize information resources, knowledge organization, and cultural heritage preservation, they do not explicitly address African indigenous knowledge systems or oral traditions. This course reflects Nigeria's cultural context by focusing on Indigenous knowledge preservation, Oral history documentation, Traditional knowledge management, Community memory institutions, and Cultural heritage conservation. Its inclusion demonstrates an effort to make LIS education responsive to local realities while preserving valuable indigenous knowledge resources.

Contextual Components

Several courses were designed to address local socio-economic and professional realities rather than international competency frameworks.

Entrepreneurship Education

The inclusion of Entrepreneurship Education at both ND and HND levels reflects Nigerian government policy aimed at reducing graduate unemployment and promoting self-reliance. The IFLA FKAs do not explicitly require entrepreneurship training. Therefore, the NBTE curriculum extends beyond traditional LIS competencies by preparing graduates for Information consultancy, Publishing ventures, Information brokerage, Knowledge entrepreneurship, and self-employment opportunities.

Library Advocacy and Marketing

The NBTE curriculum recognizes the need for librarians to advocate for funding, visibility, and public support. Consequently, courses such as Library Advocacy and Marketing and Public Relations in Libraries were introduced. These competencies are particularly relevant in developing countries where libraries often face challenges related to funding and public awareness.

Regulatory Components

The NBTE curriculum incorporates several elements that arise from national educational regulations rather than professional LIS standards.

Students' Industrial Work Experience Scheme (SIWES)

SIWES is a mandatory component of Nigerian tertiary education regulated by national policy. Unlike the IFLA FKAs, which focus primarily on knowledge and competencies, SIWES emphasizes workplace experience, professional exposure, practical skills development, Industry-academia linkage, and employability enhancement. This component significantly strengthens the practical orientation of the curriculum. This position was emphasised in a study by Okonoko, Abubakar and Udoh (2023) who revealed that students need practical work training through internships among others in order to assist the students to build their own competitiveness.

Citizenship Education

Citizenship Education courses are compulsory under Nigerian higher education policy. Their objectives include national integration and cohesion, civic responsibility, democratic values, national development awareness, and responsible citizenship. These objectives fall outside the scope of the IFLA FKAs and therefore constitute a uniquely regulatory component of the curriculum.

Basic French Language

The inclusion of Basic French reflects Nigeria's geopolitical position within West Africa, where many neighbouring countries are French-speaking. This requirement seeks to enhance regional communication and cooperation, a competency not specifically addressed in the IFLA framework. In support of this, Olubiyo (2022b) asserts that communication skills are essential in order to manage the information at hand and deal with users' needs. Yadav (2021) also found out that foreign languages were reported as prerequisites for working in special libraries.

Summary of Unique NBTE Components

The comparative analysis revealed that the NBTE LIS curriculum contains three broad categories of elements that are not explicitly captured by the IFLA FKAs:

1. **Indigenous Components**
    - Oral Archives and Indigenous Knowledge
2. **Contextual Components**
    - Entrepreneurship Education
    - Library Advocacy and Marketing
    - Public Relations in Libraries
    - Publishing and Infopreneurship
    - Perspectives and Opportunities in LIS
    - Basic French
3. **Regulatory Components**
    - SIWES
    - Citizenship Education
    - General Studies requirements

The presence of these components indicates that although the NBTE LIS curriculum demonstrates substantial alignment with international LIS standards, it also incorporates local, national, and regional priorities that are not explicitly reflected in the IFLA FKAs. These additions enhance the curriculum's contextual relevance by addressing indigenous knowledge preservation, employability, entrepreneurship, civic responsibility, and practical professional training. Consequently, the curriculum can be viewed as a hybrid model that combines global LIS competencies with local educational and developmental needs. The presence entrepreneurship education aligns with the goals of the Nigerian polytechnic education system, which lays emphasis on competencies for self-reliance in the labour market. This, when merged with Perspective and Opportunities in LIS will expand the scope of job opportunities for LIS graduates in institutions supervised and regulated by the NBTE.

The study also identified several indigenous, contextual, and regulatory components that are unique to the NBTE LIS curriculum and not explicitly captured within the IFLA Foundational Knowledge Areas. These include Oral Archives and Indigenous Knowledge, Entrepreneurship Education, Citizenship Education, Library Advocacy and Marketing, and SIWES. While these components may not directly correspond to international competency standards, Constructive Alignment Theory recognizes the importance of aligning curricula with intended educational outcomes and contextual realities. Therefore, the inclusion of these courses demonstrates an effort by the NBTE curriculum to respond to local socio-cultural, economic, and professional needs while complementing internationally recognized LIS competencies. This finding suggests that curriculum alignment should not be interpreted solely as conformity to global standards but also as responsiveness to national priorities and contextual demands.

Implications of the Identified Gaps and Overlaps for the Quality, Relevance, and Global Competitiveness of LIS Graduates in Nigeria

The alignment analysis between the NBTE Library and Information Science (LIS) curriculum and the IFLA Foundational Knowledge Areas (FKAs) revealed both areas of strength and areas requiring improvement. These findings have significant implications for the quality of LIS education, the relevance of graduates to contemporary professional practice, and their competitiveness within the global information environment.

Implications for the Quality of LIS Education

The findings indicate that the NBTE LIS curriculum demonstrates strong alignment with Information Resources Management (FKA5), which recorded the highest alignment score (65.38%). This suggests that graduates are likely to acquire substantial competencies in traditional librarianship functions such as cataloguing, classification, indexing, abstracting, collection development, archives management, preservation, and records management. Consequently, the curriculum provides a solid foundation in core professional practices and supports the production of graduates who are technically competent in organizing and managing information resources.

However, the relatively lower alignment scores recorded in Literacies and Learning (FKA8), Foundations of the LIS Profession (FKA2), and Management for Information Professionals (FKA6) suggest limitations in the breadth and depth of professional preparation. Modern LIS education increasingly emphasizes information literacy instruction, digital learning support, leadership, strategic planning, innovation management, and professional ethics. Limited coverage of these competencies may reduce the general quality of graduate preparation by creating an imbalance between traditional technical skills and emerging professional capabilities. This conforms to the findings of Rani and Sharma (2021) who revealed that LIS graduates were dissatisfied with employability skills due to a lack of implementation of Suitable employability skills in LIS curricula. In alliance with this position, Krishnamurty (2020) also affirmed that due to the fast changing scenario of education, LIS educators must be dynamic by equipping themselves with the knowledge and skills of the emerging technologies, so as to impart effective LIS education by making use of varied teaching methods and skills relevant to the changing context.

Furthermore, the moderate alignment in Research and Innovation (FKA4) indicates that research competencies are largely confined to Research Methods and Project courses rather than being integrated throughout the curriculum. This may weaken graduates' abilities to conduct evidence-based practice, evaluate information services, and contribute to innovation within the profession.

Implications for the Relevance of LIS Graduates

The information profession has evolved from a predominantly resource-centred discipline to one that is increasingly user-centred, technology-driven, and knowledge-based. While the curriculum demonstrates reasonable alignment with Information Needs and User Services (FKA7) and Information and Communication Technologies (FKA3), the identified gaps suggest that graduates may not be fully prepared for the rapidly changing information landscape.

The limited emphasis on data literacy, digital literacy frameworks, media literacy, learning design, information policy, information governance, information ethics in digital environments; and, information architecture, information assurance and digital scholarship may reduce the relevance of graduates in modern libraries, digital repositories, research institutions, and knowledge organisations.

Contemporary information professionals are increasingly expected to support digital learning environments, manage research data, facilitate digital scholarship, and deliver virtual information services. Insufficient exposure to these competencies may create a mismatch between graduate skills and employer expectations.

Additionally, the moderate alignment in management-related competencies suggests that graduates may possess operational administrative skills but may be less prepared for leadership positions requiring strategic planning, organizational change management, innovation leadership, and performance management.

Implications for Global Competitiveness

The IFLA FKAs represent internationally recognized standards for LIS education and professional preparation. Therefore, gaps between the NBTE curriculum and the FKAs have direct implications for the global competitiveness of Nigerian LIS graduates. The low alignment in FKA8 (Literacies and Learning) and moderate alignment in FKA2 (Professional Foundations) may place graduates at a disadvantage when competing for international employment opportunities, postgraduate studies, professional certifications, and participation in global information initiatives.

Globally, LIS professionals are increasingly expected to demonstrate competencies in information literacy instruction, digital pedagogy, research support services, data management, Artificial Intelligence applications, Digital Curation, Open Science, Information Ethics, and Global Information Policy. The underrepresentation of these competencies may limit graduates' ability to function effectively in international professional environments and reduce the international recognition of the curriculum. Furthermore, weak emphasis on innovation and advanced research competencies may hinder graduates' capacity to contribute to global knowledge production and emerging areas of professional practice. This probably may be as a result of the confinement of graduates of NBTE-regulated institutions to middle level leadership roles rather than high level leadership.

Positive Implications of Contextual and Indigenous Components

Despite the identified gaps, the study also revealed several unique strengths within the NBTE curriculum. Courses such as Oral Archives and Indigenous Knowledge, Library Advocacy and Marketing, Entrepreneurship Education, Citizenship Education, and Students' Industrial Work Experience Scheme (SIWES) reflect local realities and national development priorities. These components provide graduates with contextual competencies that are not explicitly emphasized within the IFLA FKAs. The inclusion of indigenous knowledge management, in particular, strengthens graduates' ability to preserve, document, and promote African knowledge systems, thereby contributing to cultural sustainability and knowledge diversity. This is very important as studies such as Ilori, Imam, Adesanya and Adeyemi (2021), Chigwada and Ngulube (2023), Kaur (2023) and Adebayo & Adeyemo, (2017), Boyes (2025) and Lazarus, Unegbu, Opeke and Wusu (2019) have identified the critical roles that librarians play in the management of indigenous knowledge, when equipped with appropriate knowledge, skills and competencies. Similarly, entrepreneurship education and SIWES enhance employability, practical experience, and self-reliance among graduates. These contextual strengths align with the goals of establishing polytechnics and monotechnics in Nigeria, may improve graduates' relevance within the Nigerian labour market and support national development objectives.

Implications of Curriculum Overlaps

The analysis also revealed substantial overlap among courses relating to Cataloguing and Classification, Collection Development, Information Sources and Services, Library Types, Current Awareness Services, and Information Organization. While such overlaps reinforce mastery of core librarianship competencies, excessive concentration on traditional knowledge areas may reduce opportunities for introducing emerging competencies required in the digital information environment. The dominance of Information Resources Management (FKA5) suggests that curriculum space is heavily allocated to traditional professional functions. Although these remain important, curriculum review efforts may need to rebalance content to accommodate areas such as digital literacy, data management, research support, innovation, leadership, and information policy without compromising foundational competencies.

In summary, the findings suggest that the NBTE LIS curriculum possesses a strong foundation in traditional librarianship and information resource management, ensuring that graduates acquire essential professional competencies. However, significant gaps remain in areas associated with life-long learning and literacies, digital transformation, research and innovation, professional leadership. While the curriculum effectively addresses local and contextual needs through indigenous knowledge, entrepreneurship, and industrial training components, enhancing underrepresented IFLA competencies would improve the quality, relevance, employability, and global competitiveness of LIS graduates in Nigeria. Such improvements would position graduates to function effectively within both national and international information environments while preserving the curriculum's responsiveness to local realities.

Conclusion

This research work charted a course that has rarely been explored in Nigerian context, with the aim of exploring, through extant and current documentary sources, a comparative analysis of IFLA Foundational Knowledge Areas and the National Board for Technical Education Curriculum for Library and Information Science education in Nigeria. The limited availability of literature on such an important topic for the training and development of professional library and information service providers in Nigeria justifies the need for such a study at this time. While global LIS practice has become highly competitive due to the expansion of the information environment, global LIS increasingly requires

advanced competencies. The study, relying on a qualitative content analysis research design and anchored on the Constructive alignment Theory, revealed that the NBTE-regulated and supervised LIS schools in Nigeria, operate a curriculum that is heavily oriented toward traditional technical competencies, with insufficient emphasis on contemporary digital competencies and literacies, research and innovation, policy, and emerging professional skills required in highly competitive contemporary information ecosystems, even though there are evidence of local needs provisions. The findings of this study provide substantial support for Constructive Alignment Theory. The theory emphasizes the importance of ensuring consistency between curriculum content and expected professional competencies. The observed alignment between the NBTE LIS curriculum and the IFLA Foundational Knowledge Areas demonstrates that the curriculum reflects many internationally recognized standards. Nevertheless, the identified gaps indicate opportunities for further curriculum enhancement, particularly in areas relating to digital literacies, professional foundations, leadership, innovation, and information policy. At the same time, the presence of indigenous and contextual curriculum elements highlights the need to balance international best practices with local educational and developmental priorities. Therefore, the findings suggest that effective curriculum development should pursue both global relevance and contextual responsiveness. The implications of this are enormous for the quality of LIS graduates who are trained with this curriculum in terms of competency development and professional adaptability, employability, international mobility, competitiveness and visibility of LIS scholarship.

Recommendations

In the light of the findings of this study, the following are recommended:

i. Review and harmonization of the current NBTE curriculum to meet global standards, while retaining contextual and local needs. Since the last curriculum review whose product this study was based became operational (2020), emerging technologies such as blockchain technology, AI, big data, extended realities (Augmented, Mixed and Virtual realties) have become key technologies used in library services in the global North. Thus, this study underscores the need for a harmonised curriculum through a comprehensive curriculum review that aligns with global trends in innovative library and information services delivery.

ii. IFLA FKAs should provide a broader open framework, specifying not just the main FKAs, but the specific courses that are expected to be captured underneath. A wider provision of the course contents will also be vital to enable a better understanding and adaptation of the FKAs to local needs.

iii. IFLA FKAs should contain an open area for local needs, tagged Area 9, in addition to the current 8 areas in existence. This will help address local peculiar needs of library schools and regulatory bodies in different geographical locations.

iv. LIS Educators also need to be equipped with contemporary digital technology skills by undergoing robust training on emerging technology application to teaching and practice of LIS. If the students must be provided with the necessary skills for the contemporary information ecosystems, LIS educators must first acquire such skills in order to ensure efficient teaching of such competencies to students.

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A phenomenological Study on Professional Association Deficiencies in Nigeria: Librarianship in Focus

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Abstract

The phenomenological study examined the lived experiences of professional librarians on the association deficiencies in librarianship, with a focus on governance, regulatory ambiguity, contested authority, and professional identity. The study purposively sampled twelve librarians from Nigeria's six geopolitical zones to ensure diverse perspectives. Data were collected through a focus group discussion conducted online, facilitating dynamic dialogue and collective reflection on governance, leadership, regulatory structures, and professional engagement. Audio recordings were transcribed verbatim and analysed using a thematic approach. Trustworthiness was enhanced through member checking, reflexive note-taking, and thick contextual description. Findings revealed that weak governance, leadership disconnect, overlapping mandates between the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN), selective enforcement of ethical standards, and marginalisation of early-career and non-academic librarians contribute to fragmented professional identity, declining trust, and disengagement. Participants highlighted the need for transparent, merit-based leadership, clearer role demarcation, and inclusive professional engagement. The study concludes that addressing these structural and leadership deficiencies is essential for strengthening cohesion, advocacy, innovation, and the long-term sustainability of Nigerian librarianship. Therefore the study recommended that there should be a clear demarcation of responsibilities between regulatory and professional bodies, coupled with consistent enforcement of professional codes and ethical standards, which will reduce role ambiguity, contested authority, and professional insecurity.

Keywords: Nigerian librarianship, professional associations, governance, regulatory ambiguity, professional identity, trust, phenomenology

Introduction

Professional associations are widely recognised as critical institutions for regulating professional practice, shaping occupational identity, enforcing ethical standards, and advancing collective interests within society (Crafford et al., 2025). In Nigeria, established professions such as law, medicine, engineering, and accounting have historically relied on strong and clearly demarcated professional bodies to consolidate professional authority and public trust. Lawal (2025) emphaised that organisations such as the Nigerian Bar Association (NBA), the Medical and Dental Council of Nigeria (MDCN), the Council for the Regulation of Engineering in Nigeria (COREN), and the Institute of Chartered Accountants of Nigeria (ICAN) have developed relatively stable regulatory frameworks, defined professional boundaries, and institutional mechanisms for discipline and continuous professional development. Although these bodies face internal and external challenges, their professional mandates and identities remain largely coherent and widely acknowledged. In contrast, librarianship in Nigeria presents a more complex and fragmented professional landscape. Despite its foundational role in education, research, governance, and knowledge dissemination, librarianship has struggled to achieve the same level of institutional clarity and professional cohesion as other established professions (LIS Academy, 2024).

Nakaziba and Ngulube (2025) stated that librarianship operates within an environment characterised by overlapping mandates between regulatory and professional associations, contested leadership authority, limited enforcement capacity, and inconsistent engagement with practising librarians. These structural ambiguities have contributed to persistent debates regarding professional legitimacy, governance effectiveness, and the relevance of professional associations within Nigerian librarianship. Historically, the development of librarianship in Nigeria was closely tied to colonial educational structures, post-independence nation-building, and the expansion of academic and public library services. Professional associations emerged to promote standards, advocacy, and professional development; however, unlike professions such as medicine or law, librarianship has experienced recurrent institutional tensions, including disputes over regulatory authority, professional recognition, and membership obligations (Garcia & Barbour, 2018).

These challenges have intensified in the context of globalisation, digital transformation, and the increasing demand for specialised information services, thereby exposing underlying weaknesses within professional governance structures. One of the most profound consequences of these deficiencies is an emerging professional identity crisis among Nigerian librarians.

Professional identity, which encompasses shared values, roles, norms, and a sense of belonging, is essential for professional confidence and collective action (Cruess et al., 2019). In Nigerian librarianship, practitioners increasingly navigate conflicting expectations between traditional custodianship and digital innovation, between professional autonomy and institutional subordination, and between regulatory compliance and professional self-definition (Onyeisiijeh et al., 2025). Unlike other professions where professional roles and authority are clearly articulated and enforced, librarianship often appears marginalised within institutional hierarchies, thereby weakening professional self-concept and diminishing the perceived relevance of professional associations. These developments raise critical concerns that warrant systematic scholarly inquiry. Why do Nigerian librarianship Associations struggle to command legitimacy and sustained trust among their members? How do they interpret the overlapping roles and perceived deficiencies of their professional bodies? In what ways has the absence of a unified professional identity affected professional practice, cohesion, and ethical accountability? Why has librarianship, despite its strategic importance to national development, failed to achieve the level of professional clarity and authority evident in other Nigerian professions?

More fundamentally, how do these institutional and identity-related challenges shape the everyday experiences of practising librarians? Therefore, addressing these questions requires moving beyond formal policy analysis and organisational documentation to engage directly with the lived experiences of librarians themselves. Professional association deficiencies are not merely structural problems; they are experienced subjectively, negotiated socially, and interpreted emotionally within daily professional practice. Accordingly, this study adopts a phenomenological approach to explore librarians' lived experiences of professional association deficiencies in Nigeria, with the specific objectives to;

1. explore librarians' lived experiences of professional association governance and regulatory deficiencies within the Nigerian librarianship landscape;
2. examine how librarians perceive overlapping roles between professional and regulatory bodies in Nigerian librarianship; and

analyse the implications of librarians' lived experiences of professional association deficiencies for future development of librarianship in Nigeria,

Literature Review

Professional associations serve as critical mechanisms for regulating practice, shaping professional identity, and safeguarding occupational standards (Crafford et al., 2025). In librarianship, these bodies are expected to provide leadership, ensure ethical compliance, and foster professional development. However, empirical studies within the Nigerian context reveal persistent governance deficiencies that directly affect librarians' lived experiences. Saleh and Sagem (2019) and Igiamoh and Emwanta (2016) found that many Nigerian librarians perceive their professional associations as weak in accountability, transparency, and responsiveness to members' needs. Similarly, Anaeche (2025), in a survey of perception of leadership style and its impact on employees' job satisfaction and professional development in Nigerian private universities, reported widespread dissatisfaction with leadership effectiveness and decision-making processes within professional bodies. These findings suggest that governance challenges are not abstract institutional problems but are experienced subjectively by librarians in ways that shape their professional outlook and engagement. Building on these findings, Eklund (2022) empirically demonstrated that ineffective governance structures contribute to feelings of exclusion and marginalisation among practising librarians. The study revealed that librarians often experience professional associations as distant and elitist, reinforcing perceptions of institutional disconnect. Such lived experiences form the basis for how librarians interpret authority, legitimacy, and professional value, thereby linking governance deficiencies directly to broader professional challenges within the Nigerian librarianship landscape.

Closely related to governance deficiencies is the problem of role ambiguity and overlapping mandates among professional and regulatory bodies in Nigerian librarianship. Unlike professions such as law and medicine, where the functions of regulatory councils and professional associations are relatively distinct, librarianship in Nigeria has been characterised by blurred institutional boundaries (Yaya & Adeeko, 2015; Ogunmodede & Nwalo, 2015). Empirical evidence indicates that this ambiguity generates confusion among practitioners regarding compliance, allegiance, and professional authority. Omotoso and Igiamoh (2016) and Ayo (2023) reported that librarians often struggle to differentiate between regulatory enforcement and professional advocacy, leading to perceptions of power struggles rather than collaborative governance. This contested authority has significant experiential consequences. Librarians report uncertainty about whose directives carry professional legitimacy and how professional standards should be interpreted in practice (Hansson, 2017). Abbott's (1988) theory of professional jurisdiction suggests that unresolved boundary disputes weaken professional coherence and authority. In the Nigerian context, such disputes intensify

practitioners' frustration and erode confidence in professional institutions, thereby creating fertile ground for identity-related tensions.

Professional identity is constructed through shared values, institutional recognition, and sustained professional socialisation (Fitzgerald, 2020). When professional associations fail to provide clarity, recognition, and support, practitioners are likely to experience identity fragmentation. Few empirical studies in Nigeria increasingly point to an emerging identity crisis among librarians. Merga (2019) reported that many librarians perceive their profession as undervalued and poorly represented, particularly when compared with other established professions. This perception is reinforced by Vassilakaki and Moniarou-Papaconstantinou (2015), whose study found that librarians often occupy ambiguous roles within their institutions, oscillating between academic support staff and information technologists without clear professional recognition. Such identity instability weakens professional confidence and sense of belonging. Unlike professions where associations actively reinforce identity through licensing, public advocacy, and disciplinary authority, Nigerian librarianship lacks strong institutional mechanisms for identity consolidation (Ossai-Ugbah, 2013). As a result, professional association deficiencies become internalised as personal uncertainty and diminished professional pride. This identity crisis does not exist in isolation but directly influences librarians' willingness to engage with professional bodies, thereby linking identity erosion to declining participation and trust.

Trust is a foundational element of professional association effectiveness, influencing members' commitment, participation, and compliance (Liew, 2024). Nigerian empirical studies consistently demonstrate a decline in librarians' trust in professional associations. Hansson (2017) observed that many librarians engage with professional bodies primarily for credentialing or compulsory requirements rather than genuine professional commitment. Shittu and Odeyemi (2025) further found that perceptions of politicisation, exclusion from decision-making, and lack of tangible benefits discourage active participation. This erosion of trust has practical consequences for professional engagement. Liu et al. (2023) reported that librarians increasingly distance themselves from association activities, leading to low attendance, minimal contribution, and weakened collective advocacy. Importantly, these behaviours are rooted in lived emotional experiences of frustration, disillusionment, and resignation, which quantitative indicators alone cannot fully capture. As engagement declines, professional associations lose their capacity to function as cohesive platforms, reinforcing fragmentation within the profession.

The cumulative effects of governance deficiencies, role ambiguity, identity crisis, and declining trust have far-reaching implications for professional practice and the future of librarianship in Nigeria. Empirical evidence indicated that weak professional structures limit librarians' capacity for innovation, advocacy, and ethical leadership (Yaya & Kikelomo, 2015; Michalak & Ellixson, 2025). Freidson (2001) argues that professions lacking strong collective organisation struggle to assert autonomy and adapt to external pressures. In the Nigerian context, this vulnerability is particularly concerning given the rapid digital transformation of information services and increasing global competition. Studies indicate that professions with trusted and effective associations are better positioned to navigate technological change while preserving professional values (Gul & Bano, 2019; Lee, 2021). However, Nigerian librarianship risks professional stagnation if institutional deficiencies remain unresolved. These implications underscore the urgency of understanding professional association failures not merely as organisational shortcomings but as lived realities that shape practice, cohesion, and professional futures.

Literature Gap

Although existing studies provide valuable empirical insights into professional governance and identity, most rely on surveys, document analysis, or institutional critique. Such approaches, while informative, often fail to capture the depth of meaning through which librarians experience professional association deficiencies. A phenomenological approach addresses this gap by privileging lived experience as a source of knowledge. Therefore, exploring how librarians perceive, interpret, and make sense of governance failures, contested authority, identity tensions, and disengagement, this study responds directly to the limitations of existing literature and provides a human-centred foundation for rethinking professional association reform in Nigerian librarianship.

Theoretical Foundation of the Study

Understanding the persistent deficiencies of professional associations requires more than institutional description; it demands theoretical frameworks that explain how professions acquire authority, how that authority is sustained, and what happens when it weakens. This study is anchored on two complementary theories, Professional Jurisdiction Theory and Professional Identity Theory, both of which were propounded to address fundamental societal concerns about professional power, legitimacy, and cohesion. Professional Jurisdiction Theory, propounded by Abbott (1988), emerged in response to longstanding sociological questions concerning how professions claim, defend, and legitimise control over specialised areas of work. Before Abbott's intervention, professional dominance was often treated as static and unquestioned. Abbott challenged this assumption by demonstrating that professional authority is socially constructed, continuously negotiated, and vulnerable to disruption. His theory was intended to explain why some professions maintain coherence and societal trust, while others experience fragmentation and declining legitimacy.

At the heart of the theory is the concept of jurisdiction, defined as the socially recognised link between a profession and its work. Abbott (1988) argued that professions depend on clearly demarcated jurisdictions supported by law,

institutional authority, and public recognition to sustain professional coherence. When jurisdictions are ambiguous or contested, professions face weakened authority, internal conflict, and diminished capacity to regulate practice. Importantly, the theory was propounded to address broader societal concerns about regulatory confusion, declining professional standards, and public mistrust arising from overlapping professional mandates. This theoretical perspective is particularly relevant in contemporary societies where professional boundaries are increasingly blurred by technological change and regulatory overlap. In the context of this study, Professional Jurisdiction Theory provides a critical lens for examining how overlapping roles between regulatory and professional bodies in Nigerian librarianship have weakened institutional authority, generated confusion among practitioners, and undermined professional coherence.

While Professional Jurisdiction Theory explains how professional authority is structured externally, it does not fully account for how professionals experience such authority internally. This gap is addressed by Professional Identity Theory, which was advanced by scholars such as Cruess et al. (2019) and Fitzgerald (2020) to explain how individuals come to understand themselves as professionals within social and institutional contexts. The theory was propounded in response to growing concerns about professional alienation, declining commitment, and identity erosion in modern professions. Professional Identity Theory posits that professional identity is not merely acquired through formal qualifications but is constructed through socialisation, institutional recognition, shared values, and sustained engagement with professional communities. Its primary purpose was to explain why professionals remain committed to their occupations, uphold ethical standards, and engage in collective action even in the face of external pressures. However, when institutions fail to reinforce professional identity, practitioners experience uncertainty, diminished confidence, and weakened professional loyalty.

In an attempt to apply this theory to librarianship, scholars have shown that professional associations play a central role in shaping identity by articulating professional values, advocating for recognition, and providing platforms for professional interaction (Cruess et al., 2019; Fitzgerald, 2020; Russell & Bodine, 2026). Within the Nigerian context, however, governance deficiencies and contested authority have limited the capacity of librarianship associations to fulfil these identity-forming functions. As a result, many librarians navigate conflicting expectations between traditional custodianship and digital innovation, professional autonomy and institutional subordination, and advocacy and regulation, leading to identity fragmentation and reduced professional pride. Concurrently, Professional Jurisdiction Theory and Professional Identity Theory offer a comprehensive framework for understanding professional association deficiencies in Nigerian librarianship. Jurisdiction theory explains how structural ambiguities and contested authority weaken institutional legitimacy, while professional identity theory illuminates how these structural failures are internalised by practitioners, shaping trust, engagement, and professional self-concept. By strategically integrating these theories, this study moves beyond organisational critique to examine how institutional deficiencies translate into lived professional realities. Consequently, these theories collectively enable this study to interrogate not only why Nigerian librarianship associations struggle to command legitimacy and trust, but also how such struggles shape the everyday experiences, identities, and future orientations of practising librarians. In doing so, the study situates professional association deficiencies within a broader societal and theoretical context, offering a nuanced foundation for understanding professional reform in Nigerian librarianship.

Methodology

Design

This study adopted a phenomenological approach of qualitative research design to explore librarians' lived experiences of professional association deficiencies and the associated identity tensions within Nigerian librarianship. The phenomenological approach was considered appropriate because it enables an in-depth examination of how individuals perceive, experience, and interpret institutional and professional realities in their everyday practice (Creswell & Poth, 2018; van Manen, 2016). Rather than measuring institutional performance or policy effectiveness, the study sought to uncover the meanings librarians attach to professional governance, regulatory structures, and professional identity formation. This approach allowed for a nuanced understanding of how deficiencies in professional associations are experienced subjectively and negotiated socially within the Nigerian context. The qualitative orientation of the study was particularly suited to capturing the complex organisational, socio-professional, and emotional dimensions of librarianship, especially issues relating to trust, legitimacy, professional cohesion, and identity. By foregrounding practitioners' voices, the study provided rich insights into the structural and personal dynamics shaping librarians' engagement with professional associations and their implications for professional practice and development.

Population and Sampling

The population of the study comprised librarians working in academic, public and special libraries and library schools across Nigeria's six geopolitical zones: North-Central, North-East, North-West, South-East, South-South, and South-West. The study employed purposive sampling, a non-probability sampling technique widely used in qualitative and phenomenological research to identify participants who possess extensive knowledge, experience, and direct engagement with the phenomenon under investigation (Creswell & Poth, 2018; Patton, 2015). The selection process involved identifying professional librarians who met predetermined inclusion criteria. For the purpose of this study, an experienced professional librarian was defined as an individual who possessed a recognized professional qualification

in Library and Information Science, had a minimum of ten years of professional experience in an academic library, actively participated in professional library associations through membership, committee service, leadership roles, or regular professional engagements, and demonstrated substantial knowledge of governance, regulatory, and professional development issues within the Nigerian librarianship profession. These criteria were established to ensure that participants possessed the experiential and contextual knowledge necessary to provide rich and meaningful insights into the phenomenon being investigated. Potential participants were identified through professional association records, institutional directories, and professional networks. Following the principles of purposive sampling, participants were deliberately selected based on their capacity to provide information-rich accounts rather than to achieve statistical representativeness (Patton, 2015). One participant was selected from each of the six geopolitical zones, resulting in a total sample size of twelve participants. This strategy ensured geographical diversity while enabling the researcher to capture variations in professional experiences across different sociocultural and institutional contexts within Nigeria. The selection approach further reflects the principles of maximum variation purposive sampling, which seeks to capture diverse perspectives from participants operating in different settings while identifying common patterns across experiences (Creswell & Poth, 2018). By drawing participants from all six geopolitical zones, the study enhanced the breadth of contextual perspectives without compromising the depth of inquiry required in phenomenological research. Although the sample size was relatively small, its adequacy was determined by the concept of information power rather than numerical considerations. Malterud et al. (2016) argued that qualitative studies require fewer participants when the research aim is focused, the participants possess specific expertise, and the quality of dialogue is strong. The selected participants were considered information-rich cases whose extensive professional experience and involvement in professional association activities enabled an in-depth exploration of the lived realities of librarianship and professional association governance in Nigeria.

Data Collection Procedure and Instrument

Data were collected through a Focus Group Discussion (FGD), chosen for its effectiveness in facilitating shared reflection, dialogue, and collective meaning-making among participants. FGD are particularly valuable in phenomenological studies where professional experiences are shaped by shared institutional and social contexts. A structured discussion guide was developed to direct the conversation while allowing flexibility for probing and elaboration.

The discussion focused on the following thematic areas:

- ✓ Participants' experiences with professional associations and perceptions of institutional, governance, and regulatory deficiencies;
- ✓ Perceived impacts of these deficiencies on professional identity, trust, and day-to-day professional practice;
- ✓ Experiences of professional cohesion, marginalisation, or conflict within the profession; and
- ✓ Participants' views on professional reform, governance improvement, and the future of librarianship in Nigeria.

The FGD was conducted in July 12, 2025 and lasted approximately two hours and five minutes. Due to participants' geographical dispersion and professional commitments, the session was held online using Zoom, which facilitated participation across locations and ensured sustained engagement.

Ethical Considerations

Before data collection, participants were provided with detailed information about the purpose of the study, and informed consent was obtained electronically. Ethical principles of confidentiality, anonymity, and voluntary participation were strictly observed. Pseudonyms were used to protect participants' identities, and participants were informed of their right to withdraw from the study at any stage without penalty. Permission was granted to audio-record the session, and all data were securely stored and used solely for academic purposes.

Data Analysis and Trustworthiness

The audio recording was transcribed verbatim using Otter.ai (version 3.4) and manually cross-checked against the original recording to ensure accuracy. The transcript was read repeatedly to achieve immersion and familiarity with the data. Analysis followed a phenomenological thematic approach, involving line-by-line coding to identify significant statements, which were then clustered into meaning units and emergent themes reflecting participants' shared and divergent experiences. To enhance the trustworthiness of the findings, member checking was employed, with participants reviewing both the transcript and a summary of the emergent themes to confirm accuracy and resonance with their experiences. Reflexive notes were maintained throughout the research process to document analytical decisions and minimise researcher bias. Thick descriptions of the study context and participants were provided to support transferability, while a transparent audit trail ensured dependability and credibility of the findings.

Data Analysis and Presentation

1. Governance and Regulatory Deficiencies in Nigerian Librarianship

This section presents the lived experiences of twelve participants regarding governance and regulatory deficiencies within professional associations in the Nigerian librarianship landscape. Reflections from the FGD revealed that

governance challenges are deeply embedded in everyday professional life, shaping librarians' perceptions of legitimacy, trust, leadership credibility, and professional belonging. Participants repeatedly referenced key professional bodies such as the Nigerian Library Association (NLA), the Librarians' Registration Council of Nigeria (LRCN), and the National Association of Library and Information Science Educators (NALISE) as central to these experiences. The findings are organised into interconnected themes and narrated reflectively to capture the collective sense-making that emerged during the discussion.

Weak Governance Structures and Leadership Disconnect

Across the discussion, participants repeatedly returned to the issue of weak governance and ineffective leadership within professional bodies, especially the NLA. One participant opened the conversation by reflecting that leadership within the association often feels distant and ceremonial rather than functional. This sentiment resonated immediately with others, who described how major decisions such as conference locations, fee increases, or policy positions are frequently announced without prior consultation with members. Another participant added that even though the NLA constitution emphasises participatory governance, in practice, leadership appears insulated from the realities of practising librarians. As the conversation deepened, participants collectively reflected on leadership selection processes. Several noted that leadership positions within the NLA tend to circulate among a familiar group of senior academics and long-standing elites. One participant observed that elections often feel predictable, which discourages ordinary members from contesting or even voting. Others agreed, noting that this perceived recycling of leadership weakens accountability and reinforces the feeling that the association serves a select few rather than the profession as a whole. In these reflections, governance failure was not experienced abstractly but as a daily reminder that professional voices are largely unheard.

Overlapping Mandates and Regulatory Role Confusion (NLA–LRCN Tensions)

A particularly segment of the FGD centred on the persistent confusion surrounding the roles of the NLA and the LRCN. Participants described this overlap as one of the most destabilising features of Nigerian librarianship. One participant reflected that, as practising librarians, he's often unsure whether professional authority lies with the NLA as a professional association or with the LRCN as a regulatory body. Others quickly affirmed this confusion, noting that directives from both bodies sometimes overlap, contradict, or remain poorly communicated. The discussion revealed a shared perception that the relationship between the NLA and LRCN is characterised more by rivalry than collaboration. Participants expressed frustration that instead of presenting a unified front for professional advocacy, both bodies appear to compete for relevance and authority. One participant remarked that this tension leaves librarians caught in the middle, expected to comply with LRCN regulations while simultaneously paying dues and pledging loyalty to the NLA. Collectively, participants reflected that this ambiguity weakens professional coherence and undermines the legitimacy of both institutions in the eyes of practitioners.

Weak Enforcement of Professional Standards and Ethical Regulation

When the discussion shifted to professional standards and ethics, participants unanimously agreed that enforcement mechanisms remain largely ineffective. Several participants noted that while the LRCN has established codes of practice and ethical guidelines, enforcement is inconsistent and often selective. One participant reflected that ethical violations ranging from unprofessional conduct to credential misrepresentation are widely known within the profession, yet rarely attract meaningful sanctions. Others added that disciplinary structures exist mostly on paper. A participant remarked that when ethical breaches involve influential individuals or senior members of the NLA, cases tend to fade quietly without resolution. This observation prompted broader reflection among the group, with participants agreeing that selective enforcement sends damaging signals to early-career librarians. They collectively interpreted this as a breakdown of moral authority, where professional rules exist but lack credibility because they are not applied fairly or transparently.

Marginalisation and Exclusion from Decision-Making

Another deeply emotive theme that emerged was the marginalisation of practising librarians, particularly those outside academic institutions, from decision-making processes. Participants described the NLA as heavily dominated by academic librarians, often to the exclusion of professionals working in public, school, and special libraries. One participant reflected that policy discussions rarely consider the realities of under-resourced libraries or non-university settings. Others built on this reflection, noting that younger librarians and those at the grassroots level rarely have channels to influence professional discourse. A participant observed that even when feedback mechanisms exist, they are rarely acted upon. As the conversation unfolded, participants described this exclusion not merely as structural neglect but as an erosion of professional dignity. Feeling invisible within one's own profession was repeatedly described as emotionally draining and professionally demotivating.

Sentiment, Bias, Leadership Credibility, and Compromised Democratic Processes

A particularly emotive segment of the discussion centred on sentiment, personal bias, and leadership credibility, with specific reference to leadership elections within NALISE. Participants described this episode as emblematic of deeper character and integrity challenges within professional associations. One participant recounted how a highly credible and visionary candidate, widely recognised for competence and commitment, lost leadership support due not to a lack of capacity but because of personal sentiments, regional loyalties, and interpersonal disagreements. Another participant

reflected that many members openly admitted refusing to vote, not because they doubted the candidate's ability to move the association forward, but because of unresolved personal grievances and subjective perceptions. As the discussion unfolded, participants agreed that leadership decisions within NALISE were compromised by emotional bias rather than professional merit. One participant lamented that "we sacrificed competence on the altar of sentiment," a statement that resonated strongly across the group. The discussion further revealed that such behaviour is not unique to NALISE but reflects a broader leadership culture within Nigerian librarianship, where personal characteristics, popularity, and informal alliances often outweigh integrity, vision, and accountability. Participants agreed that this pattern damages institutional credibility and discourages capable professionals from offering themselves for leadership roles, thereby perpetuating mediocrity and stagnation.

Erosion of Trust and Declining Professional Engagement

The cumulative effect of governance failures, role ambiguity, and exclusion was most evident in participants' reflections on trust and engagement. All twelve participants acknowledged a gradual withdrawal from active participation in professional association activities. One participant candidly noted that attendance at NLA meetings or conferences is often driven by obligation rather than enthusiasm. Others echoed this sentiment, describing how membership dues are paid mainly for compliance or credentialing purposes, particularly in relation to LRCN requirements. As the discussion progressed, participants collectively reflected on how trust has been eroded over time. Broken promises, weak advocacy, and perceived self-interest among leaders were repeatedly cited. One participant remarked that professional associations no longer feel like safe spaces for collective growth but rather bureaucratic structures disconnected from members' needs. These reflections revealed how governance deficiencies translate into emotional responses, frustration, resignation, and apathy that ultimately weaken professional cohesion.

Regional Nuances in Governance Experiences

While participants agreed that governance deficiencies are widespread, the discussion also highlighted regional nuances in how these challenges are experienced. Participants from the North-East reflected on feelings of abandonment, noting that professional bodies rarely advocate effectively for librarians in regions with limited institutional support. In contrast, participants from the South-West and South-South spoke more about elitism and power concentration, observing that professional opportunities and leadership visibility tend to cluster around certain institutions and regions. These reflections did not contradict one another; rather, they reinforced a shared perception of inequity within professional governance. Participants collectively interpreted these regional differences as evidence of systemic imbalance rather than isolated problems, further deepening their sense of institutional disconnect.

The findings demonstrate that governance and regulatory deficiencies in Nigerian librarianship across the NLA, LRCN, and emerging bodies like NALISE are deeply lived and emotionally experienced realities. Weak leadership, regulatory ambiguity, poor ethical enforcement, exclusion from decision-making, sentiment-driven leadership choices, and compromised democratic processes have collectively eroded trust, fragmented professional identity, and weakened engagement. These insights underscore the urgent need for transparent, merit-based, and emotionally intelligent governance reforms that can restore credibility, rebuild trust, and reposition Nigerian librarianship for a sustainable professional future.

Discussion: The findings reveal that governance and regulatory deficiencies in Nigerian librarianship profoundly affect professional identity, trust, and engagement. Participants described leadership within the NLA, LRCN, and NALISE as distant, elitist, and unresponsive, with decision-making often occurring without member consultation. Leadership appointments were perceived as predictable and influenced by personal bias and regional loyalties, reinforcing the sense that associations serve a select few. Overlapping roles between the NLA and LRCN added confusion regarding authority and compliance, while inconsistent enforcement of codes of practice undermined ethical credibility, particularly for early-career librarians. Marginalisation of professionals outside academic institutions and in under-resourced regions further eroded engagement and confidence. These experiences align with prior literature documenting weak governance and fragmented professional identity in Nigerian librarianship (Saleh & Sagem, 2019; Igiamoh & Emwanta, 2016; Eklund, 2022; Shittu & Odeyemi, 2025). Abbott's (1988) Professional Jurisdiction Theory explains how contested authority and blurred institutional boundaries weaken legitimacy, while Professional Identity Theory (Cruess et al., 2019; Fitzgerald, 2020; Russell & Bodine, 2026) highlights how such structural weaknesses are internalised, reducing confidence, belonging, and professional pride. Collectively, the findings highlight the need for transparent, merit-based, and inclusive governance reforms to rebuild trust and strengthen the profession.

2. Perceptions of Overlapping Roles, Role Ambiguity, and Contested Authority in Nigerian Librarianship

This section examines how twelve participants collectively perceive and experience overlapping roles, role ambiguity, and contested authority among professional and regulatory bodies within Nigerian librarianship. Reflections from the Focus Group Discussion (FGD) reveal that librarians do not encounter these issues as abstract institutional arrangements; rather, they experience them as daily professional confusion, emotional strain, and weakened allegiance to professional structures. Conversations repeatedly returned to the blurred boundaries between the Librarians' Registration Council of Nigeria (LRCN) as a statutory regulatory body and the Nigerian Library Association (NLA) as

a professional association, as well as the implications of these blurred roles for authority, compliance, and professional identity. Participants' narratives were categorised into interrelated themes, presented below as reflective, flowing accounts of shared lived experience.

Blurred Institutional Boundaries and Role Confusion

Across the discussion, participants consistently expressed uncertainty about where the responsibilities of professional associations end and where regulatory authority begins. Rather than perceiving LRCN and NLA as complementary bodies, participants described an environment of blurred boundaries that generates confusion and frustration. One participant from the North-Central zone reflected that, in practice, "we are told LRCN is the regulator, and NLA is the professional body, but when it comes to directives, trainings, sanctions, and even professional identity, the lines are not clear." This sentiment was echoed by a participant from the South-East, who added that librarians often receive overlapping instructions from both bodies, sometimes with conflicting expectations: "You attend an NLA programme and hear one thing, then LRCN issues a circular that suggests something else. As practising librarians, we are left to interpret which one carries more weight." As the discussion unfolded, participants collectively agreed that this lack of clarity has become normalised within the profession. A participant from the South-West noted that younger librarians frequently ask senior colleagues basic questions about compliance, registration, and professional obligations, only to receive uncertain answers: "Even those of us who have been in the system for years sometimes don't know who has the final authority." This persistent ambiguity was described as eroding professional confidence and weakening librarians' sense of institutional order.

Contested Authority and Institutional Rivalry

Beyond confusion, participants perceived the relationship between professional and regulatory bodies as marked by subtle rivalry rather than collaboration. Several participants described situations where authority appeared contested, particularly between LRCN and NLA. A participant from the North-West observed that "instead of presenting a united front for the profession, it sometimes feels like power struggles are being played out behind the scenes." This perception was reinforced by another participant from the South-South, who noted that public disagreements, parallel programmes, and overlapping mandates often signal institutional competition rather than synergy. The discussion revealed that librarians experience this contested authority as professionally destabilising. One participant reflected that when bodies that are meant to protect and guide the profession appear divided, "it becomes difficult for us to take any of them seriously." Participants noted that, unlike professions such as law or medicine—where regulatory councils and professional associations have clearly defined and respected roles—librarianship in Nigeria appears fragmented. This fragmentation, participants agreed, weakens librarians' collective voice and diminishes the profession's public legitimacy.

Compliance Uncertainty and Professional Insecurity

Another recurring theme was uncertainty surrounding compliance and accountability. Participants described being unsure about whose directives are compulsory and whose are merely advisory. A participant from the North-East shared that many librarians comply with professional requirements not out of conviction but out of fear of sanctions: "Sometimes you're not sure if a directive is enforceable, but you comply anyway just to be safe." Others added that this uncertainty creates anxiety, particularly for early-career librarians who fear professional repercussions without fully understanding the rules. As the conversation deepened, participants linked compliance confusion directly to professional insecurity. A participant from the South-West remarked that "when rules are unclear, and authority is contested, professionalism becomes arbitrary." The group agreed that inconsistent enforcement, particularly when influential individuals appear exempt from sanctions, further complicates librarians' understanding of accountability. In this context, professional regulation was experienced as uneven and unpredictable rather than fair and developmental.

Leadership Conflicts, Sentiment, and Credibility Challenges

Participants also reflected on how leadership struggles and personal sentiments exacerbate role ambiguity and contested authority. Several participants recounted experiences within professional associations, including NLA and specialised bodies such as NALISE, where leadership credibility was questioned. A participant from the South-South explained that "there have been times when capable leaders were sidelined because of personal preferences, regional sentiment, or perceived alliances." Another participant added that in some leadership elections, members deliberately abstained from voting because they lacked confidence in the candidates presented: "People felt that the process was already compromised, so participation seemed meaningless." These reflections revealed that leadership flaws, such as perceived bias, lack of transparency, and personality-driven politics, intensify institutional confusion. Participants agreed that when leaders lack moral authority or professional credibility, institutional authority itself becomes contested. This dynamic, they noted, contributes to apathy and disengagement, as members no longer see leadership structures as legitimate drivers of professional progress.

Cultural and Religious Bias in Professional Authority

An emergent but powerful theme was the influence of cultural and religious bias on perceptions of authority and leadership within professional bodies. Participants acknowledged that, although rarely discussed openly, cultural affiliations and religious identity sometimes shape leadership selection and acceptance. A participant from the North-

Central zone reflected cautiously: "There are times when leadership decisions are interpreted through cultural or religious lenses, even when competence should be the main criterion." Another participant from the South-West added that these perceptions, whether real or assumed, deepen mistrust and reinforce divisions within the profession. The group agreed that such biases complicate already fragile governance structures. When professional authority is perceived as culturally or religiously skewed, it becomes harder for associations to command collective loyalty. Participants emphasised that these dynamics further weaken efforts to build a unified professional identity and exacerbate contested authority between institutional bodies.

Impact on Professional Identity and Collective Cohesion

As the discussion drew together, participants collectively reflected on the broader implications of overlapping roles and contested authority. They agreed that persistent ambiguity undermines professional identity formation. A participant summarised this sentiment succinctly: "When we don't know who truly speaks for the profession, it becomes difficult to know what it means to be a librarian." Participants noted that this identity uncertainty affects how librarians present themselves within their institutions and how they engage with professional development and advocacy. Ultimately, the FGD revealed that overlapping roles, role ambiguity, and contested authority are experienced as deeply personal and professional challenges. These issues shape librarians' trust, confidence, and willingness to engage with professional bodies such as LRCN and NLA. Rather than fostering cohesion, current institutional arrangements were perceived as reinforcing fragmentation, uncertainty, and disengagement. The findings demonstrate that librarians perceive overlapping mandates and contested authority among professional and regulatory bodies as a central weakness within Nigerian librarianship. Blurred institutional boundaries, leadership credibility challenges, cultural and religious biases, and inconsistent enforcement of authority collectively shape librarians' lived experiences of confusion, frustration, and professional insecurity. These reflections underscore the urgent need for clearer role demarcation, credible leadership, and collaborative governance between LRCN, NLA, and related professional bodies to restore trust, strengthen professional identity, and ensure the future cohesion of librarianship in Nigeria.

Discussion: The study findings indicate that Nigerian librarians experience overlapping roles, role ambiguity, and contested authority as persistent professional challenges that affect identity, trust, and engagement. Participants described blurred boundaries between the NLA as a professional association and the LRCN as a regulatory body, noting conflicting directives, unclear compliance expectations, and uncertainty about which body holds ultimate authority. These experiences mirror prior observations that ambiguous institutional mandates undermine professional coherence and legitimacy (Ogunmodede & Nwalo, 2015; Omotoso & Igiamoh, 2016). Participants further reported that leadership conflicts, personal sentiment, and perceived bias exacerbate these ambiguities, reducing confidence in institutional processes and discouraging active participation, consistent with Anaeche's (2025) findings on dissatisfaction with governance and leadership transparency. Cultural and religious considerations were also perceived to influence leadership selection and institutional acceptance, compounding mistrust and reinforcing divisions. These structural and social dynamics directly affect professional identity. Participants noted that uncertainty regarding authority and inconsistent enforcement of standards leads to professional insecurity and disengagement. Merga (2019) and Vassilakaki and Moniarou-Papaconstantinou (2015) similarly observe that unclear roles and institutional fragmentation erode professional identity and belonging. Abbott's (1988) Professional Jurisdiction Theory explains how contested authority and blurred boundaries weaken institutional legitimacy, while Professional Identity Theory (Cruess et al., 2019; Fitzgerald, 2020; Russell & Bodine, 2026) illustrates how such governance failures are internalised, reducing confidence, loyalty, and willingness to engage. Overall, the findings suggest that overlapping mandates and contested authority are central weaknesses in Nigerian librarianship, highlighting the urgent need for clear role demarcation, credible leadership, and collaborative governance to restore trust and strengthen professional identity.

3. Implications of Professional Association Deficiencies for the Future Development of Librarianship in Nigeria

This section interprets how deficiencies within professional associations shape librarians' perceptions of the future development of librarianship in Nigeria, as articulated by twelve participants during the FGD. Participants' reflections revealed that governance failures, leadership weaknesses, regulatory ambiguity, and declining trust are not only immediate challenges but also long-term threats to professional growth, relevance, and sustainability. At the same time, participants drew comparisons with international professional bodies such as the International Federation of Library Associations and Institutions (IFLA), the Association for Information Science and Technology (ASIS&T), and the Chartered Institute of Library and Information Professionals (CILIP), using these examples to imagine alternative professional futures for Nigerian librarianship.

Stagnation of Professional Growth and Innovation

Participants repeatedly expressed concern that unresolved governance deficiencies are contributing to professional stagnation. One participant reflected that Nigerian librarianship appears to be "moving in circles," with recurring debates about leadership, regulation, and legitimacy crowding out conversations about innovation, research, and emerging practice areas. Others agreed, noting that professional associations such as the NLA often spend more time managing internal disputes than articulating a clear strategic vision for the profession. In contrast, participants pointed to IFLA as an example of how strong governance enables forward-looking professional agendas. One participant observed that IFLA consistently foregrounds global issues such as digital inclusion, open access, artificial intelligence, and climate

action, thereby positioning librarianship as socially relevant and future-oriented. By comparison, participants felt that Nigerian professional bodies struggle to articulate coherent national priorities, leaving librarians ill-prepared to respond to technological and societal change. A counter-view was, however, offered by one participant who argued that the problem is not a lack of ideas but weak implementation capacity. According to this participant, "We have brilliant position papers and conference themes, but they rarely translate into sustained programmes." This reflection suggests that the future challenge lies less in intellectual deficit and more in institutional effectiveness.

Weak Professional Advocacy and Public Visibility

Another major implication discussed was the declining public visibility and policy influence of librarianship in Nigeria. Participants noted that professional associations have not been sufficiently effective in advocating for libraries within national development frameworks, education reform, or digital policy spaces. One participant remarked that librarians are often absent from policy conversations where information, knowledge management, and digital literacy should be central. Several participants contrasted this experience with CILIP in the United Kingdom, which they described as highly visible in national debates on information ethics, misinformation, and professional standards. According to one participant, "CILIP has managed to brand librarians as information professionals with authority. Here, we are still struggling to convince policymakers that libraries matter." At the same time, a dissenting voice cautioned against idealising international bodies. This participant noted that organisations like CILIP and ASIS&T operate within more stable political and economic systems, which makes advocacy easier. Nevertheless, the group agreed that Nigerian associations could still adopt elements of international best practice, such as strategic partnerships, consistent public communication, and evidence-based advocacy.

Fragmentation of Professional Identity and Future Workforce Confidence

Participants also reflected on how association deficiencies shape the future professional identity of librarians, particularly for early-career practitioners. Several participants expressed concern that young librarians increasingly view professional associations as irrelevant or burdensome, rather than as sources of inspiration and support. One participant observed that "new entrants are already cynical; they join associations because it is required, not because they believe in them." This sentiment was contrasted with experiences of international engagement. A participant who had attended ASIS&T conferences remarked that early-career professionals are actively mentored, visible, and encouraged to contribute intellectually. According to this participant, such inclusive professional cultures help sustain confidence and commitment to the field. In Nigeria, however, participants feared that persistent exclusion, politicisation, and sentiment-driven leadership decisions may discourage talented professionals from investing in the profession long-term. A counter-submission emerged when one participant suggested that adversity could also breed resilience. They argued that some Nigerian librarians are developing alternative professional identities through international networks, research collaborations, and online communities, thereby bypassing local institutional failures. While this view acknowledged individual agency, others cautioned that a profession cannot rely solely on personal resilience without strong collective institutions.

Risk of Continued Institutional Irrelevance

Participants collectively warned that if governance and trust issues remain unresolved, professional associations risk becoming administratively relevant but professionally hollow. One participant described a future in which associations exist mainly to collect dues, issue certificates, and organise routine conferences, without exerting meaningful influence on practice or policy. This concern was particularly strong in discussions about the relationship between the NLA and the LRCN, where unresolved role ambiguity was seen as undermining long-term institutional credibility. By contrast, participants noted that international bodies such as IFLA have managed to clearly separate regulatory, advocacy, and professional development functions through transparent governance structures and global accountability mechanisms. Participants agreed that Nigerian librarianship must move towards similar clarity if it is to remain relevant in an increasingly competitive information environment.

Reimagining the Future: Reform, Learning, and Possibility

Despite these concerns, the discussion did not end in pessimism. Participants emphasised that the future of Nigerian librarianship is not irreversibly bleak. Several participants expressed cautious optimism that governance reforms, leadership renewal, and learning from international models could reposition the profession. One participant reflected that "IFLA, ASIS&T, and CILIP did not become effective overnight; they evolved through deliberate reforms and difficult conversations." Another participant added that rebuilding trust, rather than merely restructuring institutions, should be central to future reforms. This involved transparent leadership, merit-based elections, consistent ethical enforcement, and genuine inclusion of diverse practitioner voices. Participants agreed that without addressing the emotional dimensions of trust, belonging, and professional pride, structural reforms alone would be insufficient. The findings indicate that participants interpreted professional association deficiencies as critical determinants of the future trajectory of librarianship in Nigeria. Weak governance, fragmented authority, and declining trust threaten innovation, advocacy, identity formation, and institutional relevance. However, comparative reflections on international associations such as IFLA, ASIS&T, and CILIP offered participants a vocabulary of possibilities, demonstrating that strong governance, inclusive leadership, and strategic vision can reposition librarianship as a dynamic and socially

relevant profession. The findings suggest that the future development of Nigerian librarianship will depend not only on policy reform but on rebuilding credible, trusted, and emotionally intelligent professional institutions capable of inspiring collective confidence and professional renewal.

Discussion: The study findings indicate that deficiencies within professional associations shape librarians' perceptions of the future development of Nigerian librarianship, with governance failures, regulatory ambiguity, and declining trust viewed as threats to professional growth, innovation, and relevance. Participants reported that weak leadership and unresolved internal disputes divert attention from strategic vision and innovation, leaving the profession ill-prepared to respond to technological and societal change. This aligns with Saleh and Sagem (2019) and Igiamoh and Emwanta (2016), who note that weak institutional structures limit professional advancement, while Freidson (2001) suggests that professions lacking strong collective organisation struggle to assert autonomy and adapt. Comparisons with international bodies such as IFLA, ASIS&T, and CILIP highlighted how transparent governance and strategic advocacy strengthen professional visibility, identity, and public influence, underscoring gaps in Nigerian professional associations. Participants also observed that ongoing exclusion, politicisation, and sentiment-driven leadership threaten the professional identity and confidence of early-career librarians, reinforcing patterns of disengagement documented by Merga (2019) and Vassilakaki and Moniarou-Papaconstantinou (2015). Nevertheless, some participants suggested that engagement in international networks and research collaborations demonstrates potential for resilience, though collective institutional reform remains essential. Abbott's (1988) Professional Jurisdiction Theory explains how blurred mandates and contested authority weaken institutional credibility, while Professional Identity Theory (Cruess et al., 2019; Fitzgerald, 2020; Russell & Bodine, 2026) illustrates how governance failures are internalised, influencing confidence, loyalty, and professional commitment.

Conclusion

In conclusion, the study demonstrates that deficiencies within professional associations significantly undermine the practice and development of librarianship in Nigeria. Weak governance, leadership disconnect, overlapping mandates, and inconsistent enforcement of ethical standards create professional confusion, erode trust, and fragment professional identity. Librarians experience marginalisation, particularly early-career professionals and those outside academic institutions, while contested authority between the Nigerian Library Association and the Librarians' Registration Council of Nigeria exacerbates compliance uncertainty and diminishes institutional legitimacy. These structural and leadership weaknesses not only hinder active engagement and professional cohesion but also threaten the long-term relevance, innovation, and advocacy capacity of the profession. Addressing these challenges through transparent, merit-based, and inclusive institutional reforms is critical for restoring trust, strengthening professional identity, and securing the sustainable future of Nigerian librarianship.

Recommendations

Based on the study findings, the following recommendations are proposed:

1. Professional associations should implement transparent, merit-based leadership selection processes, ensure equitable participation across all regions and career levels, and foster ethical, accountable decision-making to rebuild trust and credibility.
2. There should be a clear demarcation of responsibilities between regulatory and professional bodies, coupled with consistent enforcement of professional codes and ethical standards, which will reduce role ambiguity, contested authority, and professional insecurity.
3. Associations should engage all members, particularly early-career and non-academic, in professional programs, advocacy initiatives, and strategic decision-making, ensuring the profession remains innovative, relevant, and socially impactful.

Suggestion for Further Studies

1. Future research could explore the effectiveness of specific governance reform strategies in Nigerian librarianship, including comparative analyses of regional and international professional associations.
2. Additionally, studies could investigate the experiences of early-career librarians and practitioners in under-resourced regions to understand how targeted interventions in leadership, inclusion, and ethical enforcement impact professional identity, trust, and engagement over time.

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Academic Libraries and Democratic Awareness among University Students in Nigeria: Evidence from University of Nigeria, Nsukka

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Abstract

Democracy depends on an informed citizenry that understands their rights, responsibilities, and governance processes. Academic libraries play a key role in supporting democratic awareness by providing access to credible and accurate information and promoting information literacy for enhanced civic education among university students. The study examines academic libraries and democratic awareness among university students in Nigeria, with a focus on University of Nigeria, Nsukka. It was guided by four (4) specific objectives, and a null hypothesis. It adopted a mixed-method approach within a descriptive survey research design. The population of the study consisted of 300 undergraduate students, selected using simple random sampling technique. Data were collected with structured questionnaire. The data were analysed using descriptive statistics of frequency counts, mean scores, standard deviation and inferential statistics of Pearson Product Moment Correlation (PPMC) coefficient for answering the research questions and testing the null hypothesis. The finding of the study revealed that academic libraries play a significant role in promoting democratic awareness through the provision of access to credible and reliable information resources and services such as user education programmes, information literacy training, and civic-oriented services. It indicated a high level of awareness among the students regarding democratic values such as freedom of expression, rule of law, and civic responsibilities, which are largely influenced by academic library services. It identified inadequate funding, limited access to up-to-date digital resources, poor user engagement, and insufficient awareness programmes as the constraints to academic library contributions toward democratic awareness among students. The study concluded that there is a significant positive relationship between academic library services and students' democratic awareness in the University of Nigeria, Nsukka. It recommended, among other measures that government should provide adequate funding to academic libraries for enhanced democratic awareness activities, while University of Nigeria, Nsukka should strengthen library awareness programmes for improved students' democratic awareness in Nigeria.

Keywords: Academic Libraries, Democracy, Democratic Awareness, University Students, University of Nigeria, Nsukka.

Introduction

Democracy is widely regarded as one of the most acceptable systems of government in the modern world, as it promotes participation, accountability, transparency, and the protection of fundamental human rights. However, the success and sustainability of any democratic system depend on the level of awareness, knowledge, and active involvement of its citizens. Democratic awareness entails citizens' understanding of their rights and responsibilities, governance processes, electoral systems, and public policies. Without adequate awareness, citizens may be unable to make informed decisions or effectively participate in democratic processes.

In Nigeria, democratic governance has evolved over time, particularly since the return to civilian rule in 1999. Despite this progress, the country continues to face several challenges such as political apathy, misinformation, electoral irregularities, and low levels of civic participation. These issues highlight the need for effective mechanisms to educate and inform citizens about democratic values and practices. One of the key institutions that can facilitate this process are the academic libraries.

Academic libraries are integral parts of higher educational institutions, established to support teaching, learning, and research (Amadi et al., 2020; Akwang et al., 2024). Beyond these traditional roles, they serve as centres for information dissemination and knowledge development, while providing opportunities for information literacy training. By providing access to a wide range of information resources, including books, journals, government documents, and digital media, academic libraries contribute to the intellectual development of students and promote their critical thinking ability. These functions are essential in building an informed citizenry capable of engaging meaningfully in democratic governance.

Moreover, academic libraries play a significant role in promoting information literacy, which involves the ability to identify information needs, locate, evaluate, and use information effectively and ethically (Udoh & Okafor, 2022). In an era characterized by information explosion and the spread of misinformation, information literacy becomes crucial

for democratic awareness. This implies that university students who are information literate are better equipped to assess the credibility of information, make informed choices, and participate actively in civic life.

More so, the integration of information and communication technologies (ICT) in academic libraries has further enhanced the capacity of promoting democratic awareness among students. Through digital libraries, online databases, and institutional repositories, students can access current and relevant information on governance, elections, human rights, and public affairs from both local and global perspectives. This expanded access strengthens the role of academic libraries as agents of democratic education.

Statement of the Problem

Democracy thrives on an informed citizenry that possesses adequate knowledge of their civic rights, responsibilities, governance processes, and access to reliable information. In Nigeria, there is growing concern about the level of democratic awareness among citizens, especially among students in higher institutions. In fact, it is observed that despite the expansion of educational opportunities, many citizens, including students still exhibit limited understanding of democratic principles, political participation, and civic engagement. To achieve this, academic libraries, including University of Nigeria Nsukka (UNN), are expected to play a critical role in addressing this gap by providing access to credible and relevant information resources and services, supporting research, and promoting information literacy. Meanwhile, it appears that the potential of academic libraries in promoting democratic awareness among users is not fully realized, and this could be partly attributed to issues of inadequate funding, outdated or insufficient information resources, poor awareness of available library services, low information literacy levels of users, and limited integration of civic education programmes into the services of the academic libraries. In addition, preliminary observation shows that there is there is limited empirical evidence on how academic libraries at the University of Nigeria, Nsukka, contribute to democratic awareness among students. Thus, this study investigates academic libraries and democratic awareness among university students with a focus on University of Nigeria Nsukka.

Research Objective

This study examines academic libraries and democratic awareness among university students in Nigeria, with evidence from University of Nigeria, Nsukka. The specific objectives are;

1. To examine how academic libraries promote democratic awareness among students in the University of Nigeria, Nsukka.
2. To identify library resources that support democratic awareness in University of Nigeria, Nsukka library.
3. To assess the influence of academic library services on students' democratic awareness in University of Nigeria, Nsukka.
4. To ascertain challenges affecting library contributions to democratic awareness in University of Nigeria, Nsukka.

Hypothesis

A single null hypothesis was formulated and tested at 0.05 level of significance.

H_0: There is no significant relationship between academic library services and students' democratic awareness in the University of Nigeria, Nsukka.

Literature Review

Concept of Academic Libraries

Academic libraries are essential units in tertiary institutions that support teaching, learning, and research through the provision of information resources and services. According to Aina (2022), academic libraries serve as intellectual centres that provide access to both print and electronic resources necessary for academic development and knowledge creation. They serve as the hubs for intellectual development that are strategically established to foster democratic awareness through the provision of access to books, journals, digital resources, and civic education materials.

In recent studies, academic libraries are increasingly viewed as digital knowledge hubs that support not only academic work but also societal development, including civic engagement, democratic participation and citizenship education (Akwang et al., 2024; Ocholla & Bothma, 2022). Taiwo and Sulyman (2022) further noted that academic libraries fill two integral needs, namely: helping the school's curricula, and supporting the research of the university, faculty and students. Academic libraries are essentially well-known knowledge centres set up to support of the mission of their parent institutions by enhancing the creation of knowledge, equipping users, including students with the knowledge to serve the general public and advancing the prosperity of humanity (Oyegunle, as cited in Taiwo & Sulyman, 2022). Dei and Asante (2022) emphasized that academic libraries contribute to Sustainable Development Goals (SDGs) by ensuring equitable access to information and promoting lifelong learning. Sawyerr and Ibe (2023) argued that academic libraries act as agents of democratic engagement by providing access to government publications, civic education resources, and platforms for intellectual discussions. In institutions such as University of Nigeria Nsukka, academic libraries play a critical role in supporting students' access to governance-related information and civic education materials, which enable them to engage in democratic processes.

Concept of Democratic Awareness

Democratic awareness refers to the understanding of democratic principles such as rule of law, political participation, human rights, accountability, and civic responsibilities. Igbinovia and Popoola (2023) defined democratic awareness as the ability of individuals to understand governance systems and actively participate in democratic processes. Democratic awareness is particularly important due to issues of political apathy, misinformation, and low civic engagement among youths (Umar & Tukur, 2024). Academic libraries can support democratic awareness by empowering their patrons through a variety of programmes, activities and services, as well as offering space for public use. They can also play catalytic role in cultivating healthy democratic communities and political participation. Democratic awareness is equally promoted by the academic libraries through training of citizens and students to develop their abilities for informed and democratic consciousness.

Information Literacy and Democracy

Information literacy is a fundamental skill and ability of finding, evaluating, and ethically utilizing information in making informed decisions (Osiebe, et al., 2023; Udoh & Okafor, 2022). Association of College and Research Library (ACRL) Framework (2023) suggested that information literacy enables individuals, including students to locate, evaluate, and use information effectively in decision-making processes. Information literacy is the bedrock of a functional democracy, promoting informed and democratically conscious citizens who are able to think critically and act responsibly when it comes to comparing diverse views, making evidence-based decisions, and actively participating in civic engagements. Buschman (2023) underscores the importance of information literacy in democracy by pointing out that information literacy is a building block of informed citizenship. This follows the position of Wolin, as cited by Buschman (2023), which underpinned the well-established connection between information literacy and democracy, serving as a political and civic reasons in democratic societies. Information literacy is an essential ingredient of democracy, fostering citizenship, participation, empowerment and civic engagement, while countering misinformation and fake news in the society (American Library Association, 2020). Issa et al. (2022) found that information literacy training in academic libraries empowers students to critically evaluate political information and resist misinformation. It helps students as members of the society to promote societal resilience against misinformation and deliberate disinformation campaigns (Lupien & Rourke, 2021). Information literacy particularly empowers students to recognize biases, question sources, verify facts, as well as exercise their democratic rights such as voting in elections and positively engaging of governance discourse.

Review of Empirical Studies

Recent literature highlights that academic libraries contribute significantly to democratic awareness by providing access to credible and reliable information and promoting information literacy skills. Vedra et al. (2025) investigated political awareness and engagement in relation to voting behaviour among college students. The study showed high political awareness, moderate engagement, and high positive voting behaviour, with significant positive correlations between both awareness and engagement with voting behaviour. It indicated that political awareness and engagement together significantly predict voting behaviour of the students. It concluded that strengthening political awareness and providing genuine engagement opportunities are essential for fostering informed and responsible voting among the college students. The study recommended that educational institutions sustain civic education and platforms for balanced political discourse to enhance democratic participation.

Similarly, Inobemhe (2025) examined political awareness in the digital era with a focus on how social media drives community engagement for development in Nigeria. The study showed greater access to SM platforms among Nigerians, including students, with political information as one of the most prominent contents. It indicated that social media disseminated political information creates awareness as youth and students with greater access become interested in political matters on account of their exposure to such information across platforms. It also revealed that community engagement is enhanced by virtue of the use of social media for political awareness creation, noting that the capacity of social media as platforms for awareness creation drives community engagement and development in Nigeria. It concluded that social media driven political awareness creation supports informed citizens capable of making decisions from an informed perspective toward the development of society in the current digital era.

Ajani et al. (2025) observed that academic and public libraries contribute to “knowledge democratization” by ensuring equitable access to information, especially in the digital era where information access influences civic participation and decision-making. Kajang et al. (2024) explored the provision of library and information services for political development and stability by academic libraries in Nigeria. It emphasized the need for academic libraries and librarian to provide regular community information services as a strategy for political development and stability in Nigeria, as well as suggesting the need for adequate funding of academic libraries, adequate support of academic libraries by parent institutions and training and re-training of librarians on community information services delivery.

Olawale and Kehinde (2024) also identified inadequate funding, poor publicity of library services, poor awareness of library programmes, limited digital access, and low student participation in library programmes as limiting factors to the effectiveness of academic libraries in promoting democratic awareness.

A recent study also showed that students with strong information literacy skills are more likely to engage in informed political discussions and civic participation (Adekannbi & Adeniran, 2023). This aligns with Onuoha and Subair (2023) who found that frequent use of academic library resources influences students' academic performance and awareness levels positively, including civic knowledge. Similarly, Igbinovia and Popoola (2023) established that academic libraries support civic engagement by providing access to reliable political and governance-related information.

Despite their importance, academic libraries face several challenges that hinder their effectiveness, which according to Ocholla and Bothma (2022) include inadequate funding, outdated resources, and lack of technological infrastructure. Additionally, the rapid spread of misinformation on social media platforms poses a challenge, as many students rely more on informal sources than verified library resources (Issa et al., 2022). A study by Ezeani and Ezema (2021) showed that academic libraries in Nigeria are increasingly integrating digital literacy and media literacy training to help students navigate misinformation in the digital environment. Mamman and Hundu (2017) also studied libraries in democratic governance and national development in Nigeria, and discovered that libraries are very valuable in democratic governance and national development, thereby advocating for adequate funding of academic libraries by organisations and governments for enhanced awareness programmes on democratic processes.

Methodology

This study adopted a mixed-method approach within a descriptive survey research design to examine academic libraries and democratic awareness among university students in Nigeria with a focus on University of Nigeria, Nsukka. The population consisted of undergraduate students, from which a sample of 300 respondents was selected using a simple random sampling technique. Data were collected using a structured questionnaire designed to capture respondents' views on library resources, services, and democratic awareness. The instrument was validated by three research experts and tested for reliability using the Cronbach alpha method, on 30 undergraduate students at the Federal University of Technology, Owerri, (FUTO), Imo State, Nigeria, which yielded a coefficient of 0.85. Data collection was carried out through direct distribution of questionnaires. The data collected were analysed using descriptive statistics of frequency counts, percentage, mean of 2.50 criterion mean and inferential statistics of Pearson Product Moment Correlation (PPMC) at 0.05 level of significance. Ethical considerations such as confidentiality and voluntary participation were also maintained in the study.

Results and Discussion of Findings

The data were analysed using frequency counts, percentages, mean scores, standard deviation, and Pearson Product Moment Correlation (PPMC) to answer research questions and test hypotheses. A criterion mean of 2.50 was used as the benchmark for agreement. This implies that items with more than 2.50 were considered as agreement while items with less than 2.50 were deemed to be disagreement.

Table 1: Questionnaire Distribution and Response Rate

Response Category	Frequency	Percentage (%)
Returned	276	92%
Not Returned	24	8%
Total	300	100%

The data in Table 1 shows that a total of 300 copies of questionnaire were distributed, and out of it, 276 copies representing 92% response rate were completed and retrieved with useful and valid information, while 24 copies representing 8% were lost. Thus, this response rate was adequate for statistical analysis and for use in making generalization about the respondents' opinion and perception on academic libraries and democratic awareness in University of Nigeria Nsukka.

Research Question 1: How do academic libraries promote democratic awareness among students?

Table 2: Mean and standard deviation responses on how academic libraries promote democratic awareness among students (n = 276)

Items	N	Mean	Std. Dev	Decision
Academic libraries provide access to political information for students	276	3.18	0.84	Agreed
Academic libraries support civic education programmes for students	276	3.05	0.90	Agreed
Academic libraries provide voter education materials for students	276	3.02	0.88	Agreed
Grand mean		3.08	0.87	Agreed
Criterion mean		2.50		

Source: Researchers' Field Survey, 2026

Data in Table 2 reveals the mean and standard deviation on how academic libraries promote democratic awareness among students. It specifically indicates that academic libraries promote democratic awareness by providing access to political information for the students (3.18, 0.84); supporting civic education programmes for the students (3.05, 0.90), and providing voter education materials for the students (3.02, 0.88). The overall result was affirmed with a higher grand mean of 3.08 against the criterion mean of 2.50 to ascertain the degree to which academic libraries promote democratic awareness among the students of University of Nigeria, Nsukka.

Research Question 2: What are the library resources that support democratic awareness in University of Nigeria, Nsukka library?

Table 3: Mean and standard deviation responses on the library resources that support democratic awareness in University of Nigeria, Nsukka library (n = 276)

Items	N	Mean	Std. Dev	Decision
Books on governance and politics	276	3.25	0.81	Agreed
Internet access for political information and discourse	276	3.30	0.79	Agreed
Newspapers and journals on governance and political developments	276	3.20	0.83	Agreed
Grand mean		*3.25*	*0.81*	*Agreed*
Criterion mean		*2.50*		

Source: Researchers' Field Survey, 2026

The data in Table 3 reveals the m*ean and standard deviation responses on the library resources that support democratic awareness in University of Nigeria, Nsukka library. The result indicates that* Internet access for political information and discourse with a mean of 3.30 and standard deviation value of 0.79, books on governance and politics (3.25, 0.81), and newspapers and journals on governance and political developments (3.20, 0.83) were perceived by the respondents to highly support democratic awareness among the university students. The result also reveals a higher grand mean of 3.25 against the 2.50 criterion mean to buttress the extent to which these resources support democratic awareness and consciousness of the students in the university.

Research Question 3: What is the influence of academic library services on students' democratic awareness in University of Nigeria, Nsukka?

Table 4: *Mean and standard deviation responses on the* influence of academic library services on students' democratic awareness in University of Nigeria, Nsukka (n = 276)

Items	N	Mean	Std. Dev	Decision
Academic library services help in increasing political awareness among students	276	3.22	0.80	Agreed
Academic library services help in improving civic participation among students	276	3.15	0.85	Agreed
Academic library services help in encouraging informed voting behaviours among students	276	3.18	0.83	Agreed
Grand mean		3.18	0.83	Agreed
Criterion mean		2.50		

Source: Researchers' Field Survey, 2026

The data in Table 4 reveals t*he* influence of academic library services on students' democratic awareness in University of Nigeria, Nsukka. It specifically indicates that academic library services help in increasing political awareness among the students with a mean of 3.22 and standard deviation value of 0.80; encouraging informed voting behaviours among the students; and improving civic participation among the students (3.15, 0.85). The result showed a higher grand mean of 3.18 against the criterion mean of 2.50, which affirms that academic library services have a strong positive influence on students' democratic awareness in the University of Nigeria, Nsukka.

Research Question 4: What are the challenges affecting academic library contributions to democratic awareness in University of Nigeria, Nsukka.

Table 5: Mean and standard deviation responses on the challenges affecting academic library contributions to democratic awareness among students in University of Nigeria, Nsukka (n = 276)

Items	N	Mean	Std. Dev	Decision
Poor funding affects academic library contributions toward democratic awareness programmes	276	3.35	0.78	Agreed

Inadequate ICT infrastructure militates against academic library contributions to democratic awareness	276	3.28	0.82	Agreed
Lack of adequately trained librarians affect academic library contributions to democratic awareness creation	276	3.10	0.87	Agreed
Grand mean		*3.24*	*0.82*	*Agreed*
Criterion mean		*2.50*		

Source: Researchers' Field Survey, 2026

The data in Table 5 shows the m*ean and standard deviation responses on the challenges affecting academic library contributions to democratic awareness among students in University of Nigeria, Nsukka. It reveals that p*oor funding (3.35, 0.78), inadequate ICT infrastructure (3.28, 0.82); and lack of adequately trained librarians (3.10, 0.87) are the challenges affecting academic library contributions toward democratic awareness programmes. The result shows a higher grand mean of 3.24 against the criterion mean of 2.50, indicating high negative effects on the capacity of academic libraries to carry out democratic awareness among students in University of Nigeria, Nsukka.

Test of Hypothesis

The single null hypothesis was tested using Pearson Product Moment Correlation (PPMC) at 0.05 level of significance.

H0: There is no significant relationship between academic library services and students' democratic awareness in University of Nigeria, Nsukka.

Table 6: PPMC coefficient of the relationship between academic library services and students' democratic awareness in University of Nigeria, Nsukka

Variables	N	R-value	Sig. (p-value)
Academic library services and democratic awareness	276	0.68	0.000

Decision Rule:

- If $p < 0.05$, reject H0
- If $p > 0.05$, accept H0

Decision: Since p-value (0.000) < 0.05, the null hypothesis is rejected, and the alternate hypothesis accepted. Thus, there is a strong positive and significant relationship ($r = 0.68$) between academic library services and students' democratic awareness in University of Nigeria, Nsukka. This implies that as academic library services improve, democratic awareness among students also increases.

Discussion of the Findings

The finding of the study revealed that academic libraries promote democratic awareness by providing access to political information for the students, supporting civic education programmes for the students, and providing voter education materials for the students. This finding is partly in agreement with Ajani et al. (2025), which revealed that academic libraries contribute to knowledge democratization by ensuring equitable access to information, especially in the digital era where information access influences civic participation and decision-making. The finding equally corroborates Igbinovia and Popoola (2023), which found that academic libraries support civic engagement by providing access to reliable political and governance-related information.

On the *library resources that support democratic awareness in the University of Nigeria, Nsukka library, the finding of the study showed that* Internet access for political information and discourse, books on governance and politics, and newspapers and journals on governance and political developments were perceived as highly supporting democratic awareness among the university students. This finding aligns with Onuoha and Subair (2023) who found that frequent use of academic library resources influences students' academic performance and awareness levels positively, including civic knowledge.

On the influence of academic library services on students' democratic awareness in University of Nigeria, Nsukka, the finding of the study indicated that academic library services help in increasing political awareness among the students, encouraging informed voting behaviours among the students; and improving civic participation among the students. It showed that academic library services have a strong positive influence on students' democratic awareness in the University of Nigeria, Nsukka. This finding aligns with Ezeani and Ezema (2021), which found that academic libraries are increasingly integrating digital literacy and media literacy training as library services to help students navigate misinformation in the digital environment. it also agrees with Mamman and Hundu (2017), which discovered that

libraries are very valuable in democratic governance and national development, enhancing awareness programmes on democratic processes.

The finding of the study discovered *p*oor funding, inadequate ICT infrastructure, and lack of adequately trained librarians as the challenges affecting academic library contributions toward democratic awareness programmes. These challenges have high negative effects on academic library contributions toward democratic awareness programmes for students in University of Nigeria, Nsukka. This finding gives credence to a previous study by Olawale and Kehinde (2024), which identified inadequate funding, poor publicity of library services, poor awareness of library programmes, limited digital access, and low student participation in library programmes as limiting factors to the effectiveness of academic libraries in promoting democratic awareness. It also aligns with Ocholla and Bothma (2022), which found inadequate funding, outdated resources, and lack of technological infrastructure as the challenges of academic libraries in contributing effectively toward democratic awareness of university students.

Finally, the study revealed that there is a strong positive significant relationship between academic library services and students' democratic awareness in University of Nigeria, Nsukka. This agrees with Vedra et al. (2025), which found that political awareness and civic engagement together significantly predict voting behaviour of the students.

Conclusion

Academic libraries play a meaningful but constrained role in promoting democratic awareness among university students. The role of the academic libraries in promoting democratic awareness is clearly dependent on the available library resources and level of institutional support in the form of financial resources, skilled librarians and other essential facilities. This study indicated that academic libraries promote democratic awareness by providing access to political information for the students, supporting civic education programmes of the students, and providing voter education materials for the students. This help in increasing political awareness among the students, encouraging informed voting behaviours, and improving civic participation. However, the study concluded that academic library services have a strong positive significant relationship with students' democratic awareness in University of Nigeria, Nsukka. This implies that students can engage more in democratic processes and civic responsibilities if the academic libraries can maximize their contributions through improved provision of access to information resource and services on democratic governance and participation.

Recommendations

Based on the findings of the study, the following recommendations are made:

i. Management of University of Nigeria, Nsukka should increase university library's ICT budget allocation in order to expand access to governance-related digital databases.
ii. Management of the University of Nsukka's library should sensitize their students on available governance-related information resources and services in order to enable them enhance their democratic consciousness, awareness, participation and engagement in democratic activities.
iii. Management of the University of Nigeria, Nsukka's library should organize regular training and capacity building programmes to enable librarians acquire and/or improve their skills related to information dissemination on democratic processes and civic education.
iv. Management of the University of Nigeria, Nsukka library should continuously update their collections with current books, journals, newspapers, and online resources focusing on governance, democracy, and political participation.
v. Management of the University of Nigeria, Nsukka library should organize seminars, workshops, and outreach programmes to sensitize students on democratic participation and civic responsibilities.
vi. Management of the University of Nigeria, Nsukka library should collaborate with government agencies, Non-Governmental Organizations (NGOs) and civil society organizations to promote democratic education and information accessibility for enhanced governance participation.

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ADOPTION OF ARTIFICIAL INTELLIGENCE IN STRENGTHENING UTILIZATION OF MEDICAL INFORMATION RESOURCES AND SERVICES BY HEALTH INFORMATION PROFESSIONALS IN NIGERIA

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Abstract

This paper reviews existing literature on the adoption of AI in strengthening medical library resources and health information services. Specifically, it examines the level of awareness of AI technologies among medical librarians and health information professionals, identifies the various AI technologies adopted in medical libraries, explores the extent of AI utilisation in managing library resources and health information services, assesses the benefits of AI adoption, and investigates the challenges affecting its implementation. The review reveals growing awareness and acceptance of AI technologies among information professionals, Common AI applications identified include chatbots, machine learning systems, natural language processing tools, expert systems, recommendation systems, and robotic process automation. Findings further revealed that AI enhances information retrieval, personalized services, resource management, user engagement, and evidence-based healthcare decision-making. However, challenges such as inadequate infrastructure, insufficient funding, lack of technical expertise, data privacy concerns, and resistance to technological change continue to hinder widespread adoption. The study concludes that AI has significant potential to improve medical library operations and health information services when supported by appropriate policies, capacity building, and technological investments.

Keywords: Adoption, Artificial Intelligence, Informationresources Services, medical Information.

Introduction

The rapid advancement of Information and Communication Technology (ICT) has transformed the way information is created, organised, stored, retrieved, and disseminated across various sectors, including healthcare and librarianship. In recent years, Artificial Intelligence (AI) has emerged as one of the most significant technological innovations with the potential to revolutionise information management and service delivery. Artificial Intelligence refers to computer systems and algorithms capable of performing tasks that normally require human intelligence, such as learning, reasoning, decision-making, natural language processing, pattern recognition, and problem-solving (Russell & Norvig, 2021). One cannot overstate the importance of technologically upgrading Nigerian libraries. Libraries must change to be effective in serving their communities in a time when knowledge is becoming more and more digitalised and easily available. AI and ML can help Nigerian libraries optimise resource management, simplify operations, and enhance user experiences (Tolulope, 2024). This modernisation is not only a luxury but also a necessity to guarantee that libraries remain important hubs of knowledge sharing and learning in the digital age. Adoption of Artificial Intelligence (AI) has emerged as a transformative technology capable of revolutionizing information management and service delivery in libraries, particularly medical libraries that support healthcare education, research, and clinical practice.

However, medical libraries are under increasing pressure to provide timely, accurate, and user-centered health information in a rapidly evolving digital environment. This is largely due to challenges such as inadequate technical expertise, insufficient funding, poor infrastructure, and lack of clear implementation policies. Consequently, many medical libraries struggle to meet the growing and complex information needs of healthcare professionals and researchers efficiently. These challenges collectively create a gap between the potential benefits of AI and its practical application in strengthening medical library resources and health information services.

Medical libraries play a crucial role in supporting healthcare delivery, medical education, and research by providing timely access to reliable and evidence-based health information resources. Healthcare professionals, researchers, students, and policymakers rely heavily on medical libraries for accurate information that supports clinical decision-making and patient care. However, the increasing volume of medical information, coupled with the growing demand for instant access to relevant resources, has created significant challenges for traditional library services. Consequently, medical libraries are increasingly exploring innovative technologies such as Artificial Intelligence to enhance service efficiency and resource management.

The adoption Artificial Intelligence technologies have demonstrated immense potential in improving medical library operations through automated cataloguing, metadata generation, intelligent information retrieval, recommendation systems, virtual reference services, chatbots, predictive analytics, and personalized information services (Cox et al., 2019). AI-powered search engines and machine learning algorithms can assist users in locating relevant medical literature more efficiently, thereby reducing information overload and improving access to quality health information. Additionally, AI applications can support librarians in managing digital collections, indexing resources, and delivering

user-centered services tailored to the information needs of healthcare professionals. The healthcare sector has also witnessed significant adoption of AI technologies in clinical decision support systems, disease diagnosis, health data management, and patient care services. Consequently, medical libraries must align their services with emerging technological trends to remain relevant and effectively support healthcare institutions. The integration of AI into medical information resources and services can facilitate improved knowledge discovery, evidence-based practice, and research productivity among healthcare professionals.

Despite the numerous benefits associated with AI adoption, several challenges continue to hinder its effective implementation in medical libraries, particularly in developing countries such as Nigeria. These challenges include inadequate technological infrastructure, insufficient funding, lack of technical expertise, limited awareness of AI applications, data privacy concerns, and resistance to organizational change. Understanding the factors influencing AI adoption and its implications for medical library services is therefore essential for enhancing healthcare information delivery and maximizing the benefits of digital transformation. Therefore, there is a need to investigate how AI can be effectively adopted to overcome these barriers and improve service delivery. This study therefore addresses the gap by examining how the adoption of AI can strengthen medical library resources and improve health information service delivery.

Objectives of the Study

The main objective of this study is to examine the adoption of Artificial Intelligence (AI) in strengthening medical library resources and health information services.

The specific objectives are to:

i. determine the level of awareness of Artificial Intelligence technologies among medical librarians and health information professionals.

ii. identify the various Artificial Intelligence technologies adopted in medical libraries.

iii. examine the extent of AI utilization in the management of medical library resources and health information services.

iv. assess the benefits of Artificial Intelligence adoption in enhancing medical library resources and health information services.

v. identify the challenges affecting the adoption of Artificial Intelligence in medical libraries.

Literature Review

Awareness of Artificial Intelligence technologies among health information professionals.

Awareness is a critical prerequisite for the successful adoption of any emerging technology. In the context of medical libraries, awareness of Artificial Intelligence encompasses knowledge of AI concepts, applications, benefits, and implications for library services. Recent studies indicate that awareness of AI technologies among librarians has increased significantly due to digital transformation initiatives and professional development programs (Asemi & Asemi, 2018). According to Cox et al. (2019), librarians across various sectors increasingly recognize the potential of AI to transform information services through automation, intelligent retrieval systems, and personalized user support. Similarly, Okolo and Ezeani (2023) found that health information professionals in developing countries demonstrate moderate to high awareness of AI technologies, particularly chatbots, machine learning applications, and automated indexing tools. Medical librarians are becoming more exposed to AI through professional conferences, workshops, online training platforms, and scholarly publications. However, awareness levels differ according to educational background, years of professional experience, institutional support, and technological infrastructure (Kaushik et al., 2022). While awareness is generally increasing, many professionals still possess limited practical knowledge regarding AI implementation and management in library environments.

Type Artificial Intelligence technologies adopted in medical libraries.

Several AI technologies have been adopted to improve medical library operations and healthcare information delivery. One of the most widely adopted technologies is Machine Learning (ML), which enables systems to learn from data and improve information retrieval processes without explicit programming (Russell & Norvig, 2021). Natural Language Processing (NLP) has also gained prominence in medical libraries. NLP facilitates the interpretation of human language and improves search accuracy, document classification, metadata generation, and automated indexing of medical literature (Wang et al., 2023). AI-powered chatbots are increasingly used to provide virtual reference services, answer users' queries, and offer 24-hour information support to healthcare professionals and researchers (Cox et al., 2019). Recommendation systems represent another important AI application. These systems analyze users' information-seeking behaviors and recommend relevant journals, databases, books, and research articles. Expert systems are similarly utilized to assist healthcare practitioners in locating evidence-based information for clinical decision-making (Yu et al., 2018). Additionally, robotic process automation (RPA) is being deployed to automate repetitive library tasks such as cataloguing, circulation management, acquisitions, and inventory control. Optical Character Recognition (OCR) technologies enhanced by AI are also used in digitizing medical records and archival materials, thereby improving accessibility and preservation of health information resources (Kaushik *et al.,*2022).

Extent of AI utilization in the management of medical health information services

The extent of AI utilization in medical libraries varies significantly across developed and developing countries. Advanced healthcare institutions increasingly integrate AI into their digital library systems to support information discovery, collection development, and user services (Wang et al., 2023). Research by Asemi and Asemi (2018) indicates that AI is commonly utilized for cataloguing, indexing, metadata generation, information retrieval, and virtual reference services. AI-powered search engines assist users in retrieving precise and relevant medical information from large databases such as PubMed and MEDLINE. Furthermore, AI is employed in collection management through predictive analytics, which helps librarians forecast resource demand and optimize collection development decisions. Personalized information services powered by AI algorithms are increasingly enabling libraries to tailor information delivery to individual users' needs (Cox et al., 2019). Despite these advancements, studies indicate that AI utilization remains relatively limited in many African medical libraries due to technological and financial constraints. In Nigeria and other developing countries, AI adoption is still at an emerging stage, with most institutions utilizing only basic forms of automation rather than advanced AI applications (Okolo & Ezeani, 2023).

Benefits of Artificial Intelligence adoption in enhancing resources and health information services

The adoption of AI offers numerous benefits for medical libraries and health information services. One major benefit is improved efficiency in information retrieval. AI-powered systems can process large volumes of medical literature rapidly, thereby reducing search time and improving access to relevant information (Yu et al., 2018). AI also enhances service personalization by analyzing users' preferences and information needs. Personalized recommendation systems increase user satisfaction and improve access to specialized medical resources (Wang et al., 2023). Another significant benefit is automation of routine tasks. Automated cataloguing, indexing, and circulation management reduce librarians' workload and allow professionals to focus on higher-value activities such as information literacy training and research support (Cox et al., 2019).AI additionally supports evidence-based healthcare by providing healthcare professionals with accurate and timely information for diagnosis, treatment planning, and clinical decision-making. Improved data management and knowledge discovery contribute significantly to healthcare research and patient outcomes (Yu et al., 2018). Furthermore, AI enhances accessibility through virtual assistants and chatbots that provide continuous information services regardless of time and location. This capability is particularly valuable in healthcare environments where timely information access is critical (Kaushik et al., 2022).

Challenges affecting the adoption of Artificial Intelligence in medical libraries.

One of the most critical challenges is inadequate funding and high implementation costs. AI technologies require substantial financial investment for infrastructure, software acquisition, maintenance, and continuous upgrades. Many medical libraries, especially in developing countries, operate under limited budgets, making it difficult to allocate sufficient resources for AI adoption. Çakmak & Eroğlu, 2024; Yusuf *et al.,* (2022) Studies show that funding constraints remain one of the most frequently cited barriers to AI implementation in libraries which attributed to the following:

Poor ICT Infrastructure and Technological Limitations: Another major challenge is poor ICT infrastructure and technological limitations. Effective AI systems depend on robust digital infrastructure, including high-speed internet, cloud computing, and data storage capabilities. In many regions, particularly in developing countries like Nigeria, inadequate infrastructure limits the ability of medical libraries to deploy and sustain AI technologies. Additionally, interoperability issues between AI systems and existing library or hospital systems create technical barriers to integration.

Lack of Skilled Personnel and Technical Expertise: The lack of skilled personnel and technical expertise also significantly hinders AI adoption. Implementing and managing AI systems require specialized knowledge in data science, machine learning, and information technology. However, many librarians and healthcare professionals lack the necessary training and skills to effectively use AI tools. These skills gap often leads to resistance, underutilization, or improper implementation of AI technologies.

Resistance to change and organizational culture: Closely related is the issue of resistance to change and organizational culture. Traditional library practices and reluctance among staff to adopt new technologies can slow down AI integration. Some librarians may perceive AI as a threat to their professional roles, leading to reduced motivation and acceptance. Organizational barriers such as poor leadership, lack of strategic planning, and insufficient institutional support also contribute to slow adoption.

Data-Related Issues: Another significant challenge is data-related issues, including data quality, availability, and standardization. AI systems rely heavily on large volumes of high-quality data for training and operation. However, medical data are often fragmented, unstructured, and inconsistent across different systems, making it difficult to develop reliable AI models. Poor data quality can lead to inaccurate outputs and reduce trust in AI systems.

Data Privacy, Confidentiality, And Security: Ethical and legal concerns also pose serious barriers to AI adoption. Issues such as data privacy, confidentiality, and security are particularly critical in medical libraries, where sensitive patient information is involved. There is also uncertainty regarding accountability and liability in cases where AI systems

produce incorrect or harmful outcomes. The absence of clear regulatory frameworks and ethical guidelines further complicates the adoption process.

Lack of Trust and Transparency in AI: Additionally, the lack of trust and transparency in AI systems is a major concern. Many AI models, particularly deep learning systems, operate as "black boxes," making it difficult for users to understand how decisions are made. This lack of explainability undermines confidence among librarians and healthcare professionals, limiting their willingness to rely on AI tools

Conclusion

Artificial Intelligence is rapidly transforming medical libraries and health information services by improving information retrieval, resource management, user engagement, and evidence-based healthcare support. The literature demonstrates increasing awareness of AI technologies among medical librarians and health information professionals, alongside growing adoption of tools such as machine learning, natural language processing, chatbots, recommendation systems, and robotic process automation. Although AI offers substantial benefits in enhancing efficiency, personalization, and service quality, its implementation remains constrained by infrastructural, financial, technical, ethical, and organizational challenges. To fully realize the transformative potential of AI, medical libraries must invest in capacity building, technological infrastructure, policy development, and strategic partnerships that support sustainable implementation.

Recommendation

In view of the findings and conclusions of this study, the following recommendations are:

1. Medical libraries should organize continuous training and professional development programmes to enhance AI literacy and technical competencies among librarians and health information professionals.
2. Healthcare institutions should invest in modern digital infrastructure, including high-speed internet, cloud computing facilities, and AI-enabled library management systems.
3. Government agencies and institutional management should provide adequate funding for AI acquisition, deployment, maintenance, and staff development.
4. Library schools and information science departments should integrate AI-related courses into their curricula to prepare future professionals for technology-driven environments.
5. Medical libraries should develop clear policies and ethical guidelines addressing data privacy, security, transparency, and responsible AI use.

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ADOPTION OF SMART TECHNOLOGIES BY LIBRARIANS IN REDESIGNING MODERN ACADEMIC LIBRARIES IN HIGHER INSTITUTION LIBRARIES IN KEBBI STATE, NIGERIA.

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Abstract

Smart technologies are rapidly transforming higher education and reshaping the services, infrastructure, and operations of academic libraries. This research was conducted to examine the adoption of smart technologies by librarians in redesigning modern academic libraries in higher institution libraries in Kebbi State, Nigeria. Drawing on an extensive review of existing literature, policy documents, and global best practices in library and information science, the study examines the evolution of libraries from traditional and automated systems to digital, hybrid. The paper analyzes key smart technologies like artificial intelligence, Internet of Things (IoT), big data analytics, cloud computing, and digital knowledge platforms, and explores how their integration enhances information access, research support, teaching and learning, and scholarly communication. The study further highlights the changing roles of librarians as smart information professionals equipped with advanced ICT competencies. Challenges associated with smart library adoption, such as infrastructure deficits, skills gaps, funding constraints, and ethical concerns, are critically discussed. The paper proposes a ***conceptual framework*** *for the sustainable implementation of smart libraries as strategic enablers of knowledge creation, innovation, and academic excellence. It concludes that the effective adoption of smart technologies positions academic libraries as intelligent knowledge hubs capable of supporting institutional competitiveness and lifelong learning in the global knowledge economy. It was recommended that Academic libraries should expand the adoption of smart technologies beyond RFID systems and AI-powered chatbots to include advanced technologies such as IoT-enabled library spaces, Library management and institutional authorities should sustain and strengthen the use of smart technologies that have demonstrated positive impacts on service delivery, adequate funding should be provided for the acquisition, maintenance, and upgrading of ICT infrastructure and regular training and capacity-building should be organized for librarians and other library personnel.*

Keywords: ***Smart Technologies, Smart Libraries, Academic Libraries, Knowledge Advancement.***

1. Introduction

Academic libraries have historically functioned as the intellectual nucleus of higher education institutions, serving as centers for knowledge creation, dissemination, and preservation. Traditionally, these libraries focused on collecting, organizing, and providing access to print resources, supporting teaching, learning, and research activities. However, the rapid advancement of digital technologies in the 21st century has fundamentally altered the ways in which information is created, stored, accessed, and shared. Digital transformation, coupled with the emergence of Industry 4.0 technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing, and big data analytics, has reshaped information ecosystems, compelling libraries to reconsider their roles, services, and infrastructures (Schwab, 2024).

Institutions now operate within a knowledge-driven economy characterized by data-intensive processes, global connectivity, and innovation-led competitiveness. This paradigm shift has heightened the demand for libraries to provide seamless, technology enabled access to information and research resources. Consequently, academic libraries must transition from traditional service models toward smart, adaptive, and user-centered environments that leverage technology to enhance operational efficiency, service quality, and user satisfaction.

In the Nigerian context, as well as in other African countries, the adoption of smart technologies in academic libraries is both a strategic necessity and a challenge. Nigerian higher education institutions are increasingly striving to improve research output, international visibility, and global competitiveness, all of which require efficient information management and innovative library services (Aina, 2019). Yet, many academic libraries face infrastructural, financial, and human resource constraints that hinder the effective implementation of modern technologies. Issues such as limited ICT infrastructure, irregular power supply, inadequate funding, and insufficient digital skills among library staff present significant barriers to the full realization of smart library initiatives.

Despite these challenges, the potential benefits of smart technologies in academic libraries are substantial. Automation of routine tasks, AI-driven virtual reference services, smart repositories, and data analytics for decision-making can transform libraries into intelligent knowledge hubs that are responsive to the evolving needs of students, researchers, and faculty members. Moreover, smart libraries have the capacity to facilitate remote access to resources, enhance research visibility, improve user engagement, and support evidence-based decision-making within universities.

Statement of the Problem

Academic libraries are at the forefront of knowledge dissemination and research support in higher education. However, the rapid evolution in digital technologies has challenged contemporary library systems, compelling them to adopt smart technologies to remain relevant. Despite the recognized benefits of smart library systems, such as enhanced service efficiency, improved user satisfaction, and streamlined resource management, many academic libraries, particularly in developing countries like Nigeria, continue to face significant obstacles in technology adoption.Key challenges include inadequate ICT infrastructure, limited funding, inconsistent power supply, low digital literacy among library staff, and resistance to change. These issues hinder the full utilization of smart technologies, resulting in gaps in service delivery, reduced access to digital resources, and sub-optimal support for teaching, learning, and research activities.

Moreover, while previous studies have explored library automation and digital libraries, there is a noticeable lack of research on the comprehensive redesign of academic libraries into smart environments within the Nigerian context. Without empirical evidence and strategic frameworks, academic libraries risk falling behind global standards, thereby limiting their effectiveness in supporting institutional goals.

This study therefore seeks to examine the adoption of smart technologies in academic libraries, identify the challenges affecting their implementation, and propose strategies for sustainable integration to enhance service delivery and user satisfaction.

Objectives of the Study

1. Examine the types of smart technologies currently adopted in academic libraries.
2. Assess the impact of smart technologies on library service delivery.
3. Identify the challenges associated with the implementation of smart technologies in academic libraries.
4. Determine the strategies that can enhance the sustainable adoption of smart technologies in academic libraries?

Research Questions

1. What types of smart technologies are currently being adopted in academic libraries?
2. What are the impacts of smart technologies on library service delivery in academic libraries?
3. What challenges hinder the effective implementation of smart technologies in academic libraries?
4. What strategies can enhance the sustainable adoption of smart technologies in academic libraries?

2. Literature Review

Conceptual Framework

The concept of smart technologies in academic libraries derives from the broader idea of smart systems and smart environments that leverage Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, big data analytics, and automation to enhance efficiency and user experience. Smart libraries integrate intelligent systems into traditional library operations to improve access, personalization, and service delivery.

According to scholars in digital librarianship, a smart library goes beyond automation; it creates an interactive, user-centered environment where services are data-driven and adaptive. Technologies such as RFID-enabled circulation systems, AI-powered chatbots, digital repositories, mobile library applications, and smart surveillance systems are redefining academic library operations.

The transformation of academic libraries can be categorized into four phases: traditional, automated, digital, and smart libraries. Traditional libraries relied heavily on print collections and manual cataloguing systems. The automation era introduced Integrated Library Systems (ILS) and Online Public Access Catalogues (OPAC). Digital libraries expanded access to electronic databases and institutional repositories (Lynch, 2017). Smart libraries represent the current stage, characterized by intelligent systems capable of predictive services and real-time analytics (Shen, 2020). In Africa, progress has been uneven due to infrastructural limitations and funding constraints (Ocholla & Bothma, 2007).

Theoretical Framework

The adoption of smart technologies in libraries can be explained through the **Technology Acceptance Model (TAM)** and the **Diffusion of Innovation Theory (DOI)**. The Technology Acceptance Model posits that perceived usefulness and perceived ease of use influence individuals' acceptance of new technologies. In the context of academic libraries, both librarians and users must perceive smart technologies as beneficial and user-friendly for successful adoption.

Diffusion of Innovation Theory explains how innovations spread within organizations over time. Factors such as relative advantage, compatibility, complexity, trialability, and observability influence technology adoption in libraries.

These theories provide a foundation for understanding the behavioral and organizational factors affecting smart technology implementation.

Smart Technologies Currently Used in Academic Libraries

Recent literature highlights several smart technologies transforming academic libraries:

- **Artificial Intelligence (AI):** Used for chatbots, virtual reference services, recommendation systems, and predictive analytics.
- **RFID Technology:** Facilitates automated circulation, self-check systems, and inventory management.
- **Internet of Things (IoT):** Enables smart lighting, space management, environmental monitoring, and security systems.
- **Cloud Computing:** Supports digital repositories, integrated library systems (ILS), and remote access services.
- **Big Data Analytics:** Assists in understanding user behavior and improving collection development decisions. Studies show that libraries in developed countries have widely embraced these technologies, while developing nations, including Nigeria, are gradually integrating them due to infrastructural and financial constraints.

Key Smart Technologies in Academic Libraries

Artificial Intelligence (AI) enhances cataloguing, virtual reference services, and personalized recommendations (Cox et al., 2019). AI-powered chatbots provide 24/7 assistance, improving user engagement. The Internet of Things (IoT) supports RFID-enabled smart shelves, space management, and environmental monitoring. Big data analytics assists in research performance measurement and decision-making (Zhang & Gourley, 2019). Cloud computing ensures scalability, cost-effectiveness, and remote accessibility. In Nigeria, cloud adoption is growing, though limited bandwidth and cybersecurity concerns remain significant challenges (Adeleke & Olorunsola, 2020).

Impact on Teaching, Learning, and Research

Smart libraries enhance teaching through integration of Learning Management Systems (LMS) and digital repositories. They provide data management planning, plagiarism detection tools, bibliometric services, and open access publishing support (Corrall, 2018). In Nigerian universities, institutional repositories have improved research dissemination, though sustainability remains a concern. Smart analytics enable evidence-based collection development and user-centered service innovation.

Changing Roles of Librarians

The professional identity of librarians has evolved significantly. Librarians are now digital curators, data managers, research consultants, and ICT specialists (Bawden & Robinson, 2012). In Africa, capacity-building initiatives are essential to bridge digital skills gaps. Continuous professional development in AI literacy, metadata standards, cyber-security, and research data management is imperative for sustainable transformation.

Proposed Conceptual Framework

The proposed framework integrates five pillars: technological infrastructure, institutional policy support, staff competency development, sustainable funding, and user-centered design. Strategic partnerships with ICT firms, phased implementation strategies, and government support mechanisms are recommended. A hybrid model combining physical and virtual services is particularly suitable for African universities.

Implications for Policy and Practice

Policy makers must prioritize digital infrastructure funding within tertiary education budgets. National research and education networks (NRENs) should be strengthened to improve connectivity. Library schools in Nigeria should revise curricula to incorporate AI, data science, and digital librarianship modules. Performance evaluation metrics should also reflect smart service outcomes and research impact.

Impact of Smart Technologies on Library Service Delivery

Empirical studies reveal that smart technologies enhance:

- Efficiency in circulation and cataloguing processes
- 24/7 remote access to resources
- Personalized user services
- Improved research support services
- Enhanced security and resource tracking

AI-driven tools, for example, have reduced response time in virtual reference services. Digital repositories have increased institutional research visibility and global accessibility. However, some scholars caution that technological integration without adequate training may reduce service effectiveness.

Challenges associated in the Adoption of Smart Technologies

The adoption of smart technologies in academic libraries offers numerous benefits; however, several challenges continue to hinder their effective implementation, particularly in developing countries such as Nigeria. These challenges affect the sustainability, efficiency, and overall success of technology-driven library services.

One of the major challenges is inadequate funding. The acquisition, installation, maintenance, and upgrading of smart technologies such as Radio Frequency Identification (RFID) systems, artificial intelligence (AI) applications, cloud computing platforms, and Internet of Things (IoT) devices require substantial financial investment. Many academic libraries operate under limited budgets, making it difficult to procure and sustain these technologies. Insufficient funding also affects staff training, software licensing, and system maintenance, thereby limiting the full utilization of smart technologies.

Another significant challenge is poor Information and Communication Technology (ICT) infrastructure. The successful implementation of smart technologies depends on the availability of reliable computer systems, internet connectivity, servers, networking equipment, and technical support services. In many academic institutions, inadequate ICT infrastructure constrains the deployment and effective operation of smart library systems. Poor infrastructure often results in system failures, slow service delivery, and reduced user satisfaction.

Irregular power supply remains a critical obstacle to technology adoption in many Nigerian institutions. Smart technologies require a stable electricity supply for uninterrupted operation. Frequent power outages can disrupt library services, damage technological equipment, increase maintenance costs, and discourage the effective use of digital systems. As a result, libraries are often compelled to rely on alternative power sources, which may increase operational expenses.

The adoption of smart technologies is also affected by limited digital skills among librarians and library personnel. The operation and management of emerging technologies require specialized technical competencies. However, some librarians may lack the necessary knowledge and skills to effectively utilize advanced digital tools, AI applications, data analytics systems, and automated library management platforms. This skills gap can reduce the effectiveness of technology implementation and limit the potential benefits of smart library initiatives.

Resistance to change is another challenge frequently reported in the literature. Some library staff may be reluctant to embrace new technologies due to fear of job displacement, lack of confidence in using digital systems, or attachment to traditional methods of library service delivery. Such resistance can slow down the adoption process and create barriers to organizational transformation. Effective change management strategies and continuous professional development are therefore essential for successful technology integration.

Furthermore, data privacy and cybersecurity concerns have become increasingly important with the growing use of digital technologies in libraries. Smart technologies often involve the collection, storage, and processing of users' personal information and usage data. Without adequate security measures, libraries may be vulnerable to cyberattacks, unauthorized access, data breaches, and privacy violations. Consequently, academic libraries must establish robust cybersecurity frameworks and data protection policies to safeguard information resources and maintain user trust.

In the Nigerian context, these challenges are compounded by broader environmental and infrastructural constraints. Unstable electricity supply, inadequate broadband connectivity, high costs of technological equipment, and limited institutional support continue to impede the transformation of traditional libraries into smart libraries. Addressing these challenges requires increased funding, investment in ICT infrastructure, continuous staff training, supportive policies, and strategic partnerships with technology providers. Such measures are necessary to ensure the sustainable adoption and effective utilization of smart technologies in academic libraries.

Research Gaps

Although numerous studies have examined library automation and digital libraries, limited research focuses specifically on the holistic redesign of academic libraries into fully smart environments, particularly in developing countries. There is also insufficient empirical evidence on sustainability frameworks for smart library systems. This study therefore contributes to existing literature by providing a contextualized analysis of smart technology adoption and proposing strategic models for sustainable implementation.

3. Research Methodology

Research Design

This study adopted a descriptive survey research design. The survey approach is suitable for investigating the adoption of smart technologies in academic libraries, assessing their impact on service delivery, and identifying challenges. The design allows for the collection of both quantitative and qualitative data from a wide range of respondents, providing a comprehensive understanding of the subject matter.

Population of the Study

The population of this study comprises academic librarians and library staff from Tertiary Institutions in Kebbi State Nigeria. These participants were directly involved in the management, implementation, and use of library technologies.

Sample and Sampling Technique

A purposive Random sampling technique was employed to select participants who are knowledgeable about library automation and smart technology adoption. This ensures that responses reflect the experiences of professionals directly involved in library technological services. A sample size of 100 respondents drown from 5 selected government owned tertiary institutions were targeted, with 20 respondents per institution.

Instrument of Data Collection

Data were collected using a structured questionnaire, divided into four sections:

- Section A: Demographic information of respondents (gender, age, qualification, years of experience).
- Section B: Types of smart technologies adopted in academic libraries.
- Section C: Impact of smart technologies on library service delivery and user satisfaction.
- Section D: Challenges of adopting smart technologies and strategies for sustainable integration.
- Section E: Strategies that can enhance the sustainable adoption of smart technologies in academic libraries.

The questionnaire used a 5-point Likert scale for rating responses, ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Validity and Reliability

The questionnaire was reviewed by two library science experts to ensure content validity. A pilot test was conducted with 10 library staff from one university not included in the main study. The reliability of the instrument was confirmed using Cronbach's Alpha, yielding a coefficient of 0.82, indicating high reliability.

Method of Data Analysis

Data collected were analyzed using descriptive statistics (frequency counts, percentages, mean scores) to summarize respondents' views. Tables were used to present quantitative data clearly, while qualitative responses were summarized to highlight patterns and trends. The mean score interpretation follows:

- 1.00–1.49 = Strongly Disagree (SD)
- 1.50–2.49 = Disagree (D)
- 2.50–3.49 = Neutral (N)
- 3.50–4.49 = Agree (A)
- 4.50–5.00 = Strongly Agree (SA)

4. Data Presentation and Analysis

Table 1: Demographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Gender		
Male	60	60%
Female	40	40%
Total	100	100%
Qualification		
Bachelor's Degree	30	30%
Master's Degree	50	50%
PhD	20	20%
Total	100	100%

Source: field survey, 2026

The results show that 60% of respondents were male, while 40% were female, indicating a relatively balanced gender distribution, though males slightly dominate. This suggests that both genders are actively involved in library and information services, aligning with the findings of Aina (2014), who noted that librarianship in developing countries is gradually achieving gender balance.

Regarding educational qualifications, the majority (50%) hold a Master's degree, followed by Bachelor's degree holders (30%) and PhD holders (20%). This indicates a highly educated workforce capable of understanding and implementing smart technologies. This finding supports Ezeani and Igwesi (2012), who emphasized that higher academic qualifications enhance librarians' ability to adopt emerging technologies effectively.

Table 2: Types of Smart Technologies Adopted

Technology	SA	A	N	D	SD	Mean	Decision
RFID-enabled circulation	30	50	10	5	5	4.05	Adopted
AI-powered chatbots	25	40	20	10	5	3.65	Adopted
Cloud-based repositories	20	45	25	5	5	3.65	Adopted
IoT-enabled library spaces	15	35	30	15	5	3.25	Neutral

Source: field survey, 2026

The findings reveal that RFID-enabled circulation (Mean = 4.05), AI-powered chatbots (Mean = 3.65), and cloud-based repositories (Mean = 3.65) are widely adopted, while IoT-enabled library spaces (Mean = 3.25) remain less adopted.

This suggests that libraries prioritize technologies that directly improve service efficiency and user interaction. The lower adoption of IoT technologies may be due to cost and infrastructure requirements. These results are consistent with Hassan (2020), who found that African libraries tend to adopt cost-effective and user-focused technologies before more complex systems like IoT.

Similarly, Asemi and Asemi (2018) noted that cloud computing and AI tools are among the most rapidly adopted innovations in modern libraries due to their scalability and accessibility.

Table 4: Impact of Smart Technologies on Library Service Delivery

Impact Statement	SA	A	N	D	SD	Mean	Decision
Improved circulation efficiency	40	45	10	3	2	4.15	Agreed
Enhanced user satisfaction	35	40	15	5	5	3.85	Agreed
Increased access to digital resources	45	35	10	5	5	4.05	Agreed
Support for research and learning	38	42	12	5	3	3.95	Agreed

Source: field survey, 2026

The results indicate that smart technologies significantly improve library services, particularly in circulation efficiency (Mean = 4.15), access to digital resources (Mean = 4.05), research support (Mean = 3.95), and user satisfaction (Mean = 3.85).

This demonstrates that technology adoption positively transforms service delivery, making it more efficient and user-centered. These findings are in agreement with Kumar (2021), who found that automation and digital tools enhance access, speed, and quality of library services.

Similarly, Aina (2014) highlighted that ICT integration in libraries leads to improved information dissemination and user engagement, which is evident in this study.

Table 3: Challenges of Adopting Smart Technologies

Challenge	SA	A	N	D	SD	Mean	Decision
Inadequate ICT infrastructure	50	30	10	5	5	4.15	Agreed
Insufficient funding	45	35	10	5	5	4.05	Agreed
Low digital skills among staff	40	35	15	5	5	3.95	Agreed
Irregular power supply	35	30	20	10	5	3.70	Agreed

Source: field survey, 2026

The major challenges identified include inadequate ICT infrastructure (Mean = 4.15), insufficient funding (Mean = 4.05), low digital skills (Mean = 3.95), and irregular power supply (Mean = 3.70).

These findings highlight systemic barriers common in developing countries. Inadequate infrastructure and funding are particularly critical constraints, limiting the successful deployment of smart systems. This aligns with Okiy (2014), who reported that poor infrastructure and funding are persistent obstacles in Nigerian libraries.

Additionally, Issa, Amusan, and Daura (2022) emphasized that insufficient digital skills among staff hinder effective technology utilization, reinforcing the importance of capacity building.

Table 5: Recommended Strategies for Sustainable Adoption

Strategy	SA	A	N	D	SD	Mean	Decision
Training and capacity building for staff	50	35	10	3	2	4.25	Agreed
Adequate funding and ICT infrastructure	48	37	8	4	3	4.20	Agreed
Development of policy and strategic framework	45	40	10	3	2	4.15	Agreed
Collaboration with tech partners and vendors	42	38	12	5	3	4.00	Agreed

Source: field suvey, 2026

Note: Mean scores ≥3.50 indicate agreement that the item is significant or adopted.

The respondents strongly agreed on key strategies such as training and capacity building (Mean = 4.25), improved funding and infrastructure (Mean = 4.20), policy development (Mean = 4.15), and collaboration with technology partners (Mean = 4.00).

This indicates that successful adoption of smart technologies requires a multi-dimensional approach involving human capacity, financial investment, and institutional support. These findings are supported by Ezeani (2011), who emphasized continuous training as essential for technology integration in libraries.

Furthermore, Olorunsola (2019) stressed that partnerships with technology vendors and proper policy frameworks are critical for sustainable digital transformation in libraries.

Summary of the Major Findings

The study indicates that majority of respondents were male (60%), while females made up 40%, showing a slight gender imbalance in library staff. It also shows that most the respondents had a Master's degree (50%), followed by Bachelor's (30%) and PhD (20%), indicating a well-qualified sample and Respondents had varied experience, providing a broad perspective on library technology adoption.

On the Types of Smart Technologies Adopted, it was indicated that RFID-enabled circulation systems and AI-powered chatbots were among the most adopted technologies, indicating that libraries are prioritizing automation and user assistance, followed by Cloud-based repositories which were moderately adopted, showing progress in digital resource management. IoT-enabled library spaces had lower adoption levels, suggesting infrastructural or financial constraints in implementing advanced technologies.

Result of the Challenges of Adopting Smart Technologies revealed that Inadequate ICT infrastructure was identified as the most significant challenge (Mean = 4.15), highlighting limitations in hardware, network, and software availability. Insufficient funding and low digital skills among staff were also major barriers (Mean = 4.05 and 3.95, respectively) as well as Irregular power supply (Mean = 3.70) remains a notable challenge, particularly in Nigerian universities, affecting consistent technology usage.

On the Impact of Smart Technologies on Library Service Delivery, Libraries reported significant improvements in circulation efficiency (Mean = 4.15), user satisfaction (Mean = 3.85), access to digital resources (Mean = 4.05), and support for research and learning (Mean = 3.95). This shows that smart technologies have positively transformed library operations and enhanced the user experience, though some areas may still require optimization.

For Strategies for improvement, Training and capacity building for staff received the highest support it was indicated (Mean = 4.25), emphasizing the importance of skill development. Adequate funding and improved ICT infrastructure (Mean = 4.20) and policy/strategic frameworks (Mean = 4.15) were also strongly recommended and there should be collaboration with technology partners (mean = 4.00) which was considered a practical approach to overcoming resource and expertise gaps.

5. Summary of the study

This study examined the adoption of smart technologies in redesigning modern academic libraries, with particular focus on their impact on service delivery, user satisfaction, and library operations. The study explored various types of smart technologies, including Artificial Intelligence (AI), Internet of Things (IoT), RFID systems, cloud computing, and big data analytics and evaluated their role in enhancing library efficiency, accessibility, and user-centered services.

The research highlighted the significant benefits of integrating smart technologies in academic libraries, such as automated circulation, improved resource management, personalized user support, and increased research visibility. However, the study also identified major challenges hindering successful adoption, including inadequate ICT infrastructure, insufficient funding, irregular power supply, limited digital skills among librarians, and resistance to change.

Through a conceptual analysis and literature review, the study underscored the need for strategic policy formulation, capacity building, sustainable funding, and robust ICT infrastructure to ensure the effective implementation and sustainability of smart library systems. The research also emphasized the importance of monitoring and evaluation frameworks, ethical compliance, and collaborative partnerships in driving innovation and continuous improvement in library services.

In essence, this study contributes to knowledge by providing a comprehensive understanding of the adoption of smart technologies in academic libraries, identifying critical challenges, and offering actionable recommendations to guide librarians, policymakers, and educational institutions in transforming traditional libraries into efficient, smart, and user-centered knowledge hubs.

6. Conclusion

This study examined the adoption of smart technologies by librarians in redesigning modern academic libraries in higher institutions in Kebbi State, Nigeria. The findings revealed that academic libraries have made considerable progress in adopting smart technologies, particularly RFID-enabled circulation systems, AI-powered chatbots, and cloud-based repositories, which have contributed to the modernization of library operations and services. However, the adoption of more advanced technologies such as IoT-enabled library spaces remains relatively low.

The study further established that smart technologies have positively influenced library service delivery through improved circulation efficiency, enhanced user satisfaction, increased access to digital resources, and better support for teaching, learning, and research activities. These findings demonstrate that smart technologies are essential tools for transforming academic libraries into responsive and user-centered information environments.

Despite these benefits, the study identified several challenges hindering effective adoption, including inadequate ICT infrastructure, insufficient funding, low digital competencies among library personnel, and irregular power supply.

These constraints limit the full realization of the benefits associated with smart technologies in academic libraries. The study concludes that the sustainable redesign of modern academic libraries in Kebbi State depends largely on continuous investment in technological infrastructure, staff capacity development, adequate funding, and institutional policies that support innovation. Addressing these challenges will enhance the effective adoption and utilization of smart technologies, thereby improving the quality and efficiency of library services.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Academic libraries should expand the adoption of smart technologies beyond RFID systems and AI-powered chatbots to include advanced technologies such as IoT-enabled library spaces in order to enhance automation, resource management, and user experience.
2. Library management and institutional authorities should sustain and strengthen the use of smart technologies that have demonstrated positive impacts on service delivery, particularly in improving circulation efficiency, access to digital resources, user satisfaction, and support for research and learning activities.
3. Higher institutions and government agencies should provide adequate funding for the acquisition, maintenance, and upgrading of ICT infrastructure required for effective implementation of smart technologies in academic libraries.
4. Regular training and capacity-building programmes should be organized for librarians and other library personnel to improve their digital competencies and ensure effective utilization of emerging smart technologies.

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ADVERTISING LIBRARY SERVICES USING GOOGLE OUTCOME

By

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Abstract

The rapid advancement of technology has been both a boon and a burden to libraries. While libraries are lucky to have many new tools available which make their work more effective and efficient, we have reached a point where libraries even those at academic institutions are no longer the sole source for information resources. Now a day, libraries have come to terms with this fact in many ways and have begun adjusting their services in the face of widespread competition from Google, Amazon, and the rest of the World Wide Web. This paper presents the overview of Google Inc., about their journey to be in the apex position in this web world. It also discusses about timeline of Google products, services, and categorisation of Google products. How these products can be utilised to improve library services is also explained by this paper.

Key words: Google, Google products, Google services, Libraries, Library services, Information.

Introduction

The explosion of information in this digital era has brought an urgent need to find specific information needs of users and provide the information services to the users wherever they may be found. The efficient provision of the information resources and services ensures maximum utilisation of the numerous information and information services generated. So for you to meet the information needs of users, advertising is essential for creating awareness of the available information resources and services. You can define advertising of information services as all the activities you carry out that connect information services to users in your environment and the outside world who can use, buy, sell, or benefit from such services offered. Advertising is not just about developing and promoting new services and products, but it includes bringing awareness to clients of existing services and products, which determines their appropriateness (Sharma and Bhardwai 2009).

The information service you can advertise to your services includes book reservation services, reference service selective dissemination of information (SDI), literature search, consultancy service, reprographics services, translation services, inter-library loan and document delivery service and current awareness services. The marketing of library services has evolved significantly with the rise of digital technologies, particularly search engines such as Google. "Google outcomes" broadly refer to measurable results obtained from tools such as Google Ads, Google Analytics, and search engine optimization (SEO), including visibility, click-through rates, and user engagement. Recent literature emphasizes a shift from traditional promotional approaches to data-driven, outcome-based advertising strategies in libraries (Chen et al., 2023; Ali et al., 2023). In today's networked world, Google is synonymous with web search. In the last two decades, the World Wide Web has seen the tremendous growth of Google search, as well as the introduction of new products, acquisitions, and mergers.

Overabundance of information has resulted in a world where there is too much information everywhere. It is difficult for librarians to find essential information in an ocean of data. To keep up with technological advancements, librarians must begin working with current technology. In today's Google environment, working with hundreds of Google products and incorporating them into libraries and information centers is a must as observed by Tawalbe (2025). For information resource discovery and access, today's digital library users and even established researchers increasingly rely on Google, or its new products Google Scholar and Google Book. Libraries play an essential role in keeping up with technologically advanced services.

According to Russel and Novig (2021), Google requires that any institutional presence be tied to an individual. Thus, creating a Google page for a library is a task that must be tied to an individual. Although ownership of pages can be reassigned as needed, this is one more activity that must be monitored. Depending on the volatility of a library's staffing, this could progress into a maintenance issue. Including this task into a social media plan and regular procedures is vital. Despite some flaws, a library that uses Google to provide a significant amount of its technology infrastructure or whose patrons appear to be heavy users of Google may find Google to be an excellent choice for a marketing tool (Disilvestro, 2012).

Concept of Advertising in Libraries

The need to market library services to users has increased because libraries face many competitors in this era of the computer age. Advertising of library services is a process through which librarians showcase their information resources and services to their users.

Advertising of library service is the process by which the librarian creates a link between the library information resources and services and the library user—getting the library users, including you, to know that the library exists and the services the library can offer to users for the satisfaction of the user's information needs. Advertising of library services aims to reach out to users that need information, telling them where to identify, locate, and retrieve the information they need.

According to Sharma and Bhardwai (2009), advertising of services is not just developing and promoting new services and products; it includes creating awareness to clients of existing services and products and their appropriateness. So the library services provided to users should be advertised to create awareness and promote the introduction of new services and enhance utilization. The library services sold to users should include the arrival of new books, non-books materials, reference services, referral services, access to the library database, guides on how to use the library, inter-Library Loan services, selective dissemination of information, use of OPAC, indexing and abstracting services etc.

1. Use of Google services in library advertising

Google is an is an attempt to leverage Google's massive user base in to coordinated identity service by using social features to knit together the existing Google product line. For example, Google events connect the video chat service Hangouts with Google calendar and Google photos. Google now supports broadcast Hangouts, communities (topical groups), organize contacts into circles, sharing Google drive files, photos and videos from You Tube.

Google products users will find value from the integration of services they already use with the social features. Thus, for library users who already use Google, getting content from a library via Google.

Google allows users to organise their contacts into circles in an effort to replicate the way that real life social networks function. Librarians can play a vital role in organizing their followers into circles based on their relationship to the library; for example 'library staff' and patrons" or story time attendees. Similarly, librarians can also use Google+ Hangouts, a form of video conferencing to conduct reference interviews and one on one interactions with library patrons.

2. Brief Overview of Google

Recent studies highlight that libraries have embraced digital marketing channels due to technological advancements and changing user behaviour. A 2025 review of African university libraries shows that digital platforms, including web-based tools and mobile technologies, are now central to library promotion efforts (Ahmad et al, 2023). Google story started way back at Stanford University at 1995 by Larry Page and Sergey Brin, graduation school students as the assignment. They built a search engine named Backrub which is used to retrieve each and every link on the World Wide Web. They tried to give importance to each and every page within the internet. The name was renamed as Google with a mission to organise the world's information and make it universally accessible and useful. From last few years we are witnessing how Google has caught the attention of academic community along with Silicon Valley investors, Google product (2017).

In 1998, Sun Microsystems co-founder Andy Bechtolsheim invested on the search engine developed by Larry and Sergey for $100,000 and Google Inc. was officially born with clunky desktop computers, a ping pong table and bright blue carpet in a Garage. The first was started in 1998 with a Google logo in colourful colour. The first doodle was stick figure in the logo for Burning Man Festival in 1998 itself. Company expanded rapidly and moved to its current headquarters (Googleplex) in Mountain View, California very next year with the spirit of doing things differently. Emerging literature identifies Google Ads as a strategic tool for promoting library services. Studies indicate that targeted advertising improves awareness and accessibility of library resources, especially among remote users (Wahyuni et al, 2024).

Recent developments (2024–2026) emphasize the importance of search engine optimization (SEO) and the emerging concept of Generative Engine Optimization (GEO). GEO focuses on improving visibility in AI-driven search systems, which are rapidly expanding (Wang et al, 2025).

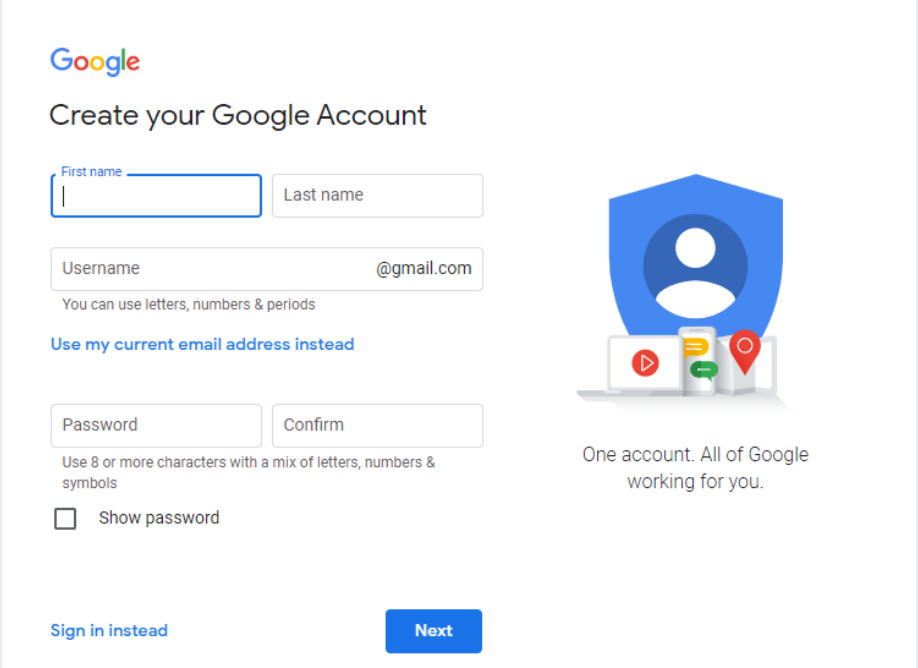
For libraries, this means:

- Optimizing metadata and digital repositories
- Enhancing discoverability of institutional resources
- Adapting to AI-powered search environments

3. Creating Google Account

Libraries have several options for establishing accounts. As mentioned above, there has to be a real person using her real or commonly accepted name already using Google. Per the Google Names Policy, "Pages require a personal profile to act as administrator of the page, though the administrator may remain anonymous to those interacting with the Google page" (Google 2011). Once one or more individuals have been designated to set up accounts, Google account can be created through the following steps:

1. Go to www.gmail.com
2. Click create account



3. Enter your name
4. In the "User name" field, enter a user name
5. Enter and confirm your password
6. Click next. Optional: Add and verify a phone number for your account.
7. You will receive a text message from Google with verification code
8. Enter your personal information such as name, date of birth, etc.
9. Click next.

3. Google Services

Google (2013) provides many web based services in search, advertising, developing categories. It can be classified as:

A. Net-based services

1. Search Tools: Google Search

Google Search is the main core product by Google which receives more than 3 billion queries per day and provides its service in 189 regional level domains.

Characteristics of Google search

i. It uses Hummingbird algorithm for query analysis. This helps to search related searches with respect to search term. Link analysis is done by Page rank link analysis algorithm. Google search uses Snapshot mechanism for indexing word documents, portable documents.

ii. Google came with new idea that an online author can have topical authority within Google Search Results by providing Google author ranking.

iii. Google Search includes Boolean logical operators, wildcards, and more, to help users refine their searches. Google search supports multiple language interfaces.

iv. Google Alerts provides email notification service, which sends alerts based on chosen search terms, whenever there are new results. Alerts include web results, Groups results news, and video.

v. Google's advanced search provides experimental Search options for testing new interfaces while searching with Google, including Timeline views and keyboard shortcuts.

vi. Google Custom Search allows the user to create his own customized search experience for his/her own website.

vii. Google Groups helps user to create like-minded groups on web and allow email discussion service and Usenet archive. Users can join a group, make a group, publish posts, track their favourite topics, write a set of group web pages updatable by members and share group files.

viii. Google Patent Search, an interface for millions of patents, each result with its own page, including drawings, claims and citations.

ix. Google Hotel Finder, Google Flight Search, Google Image search, Language Tools where it allows users to translate text or web pages from one language to another, and another that allows searching in webpages

located in a specific country or written in a specific language. Google News an automated news aggregator and compiler provide aggregated news for more than 20 languages.

x. Google Scholar search interface for the scholarly literature across an array of publishing formats and scholarly fields. The index includes virtually all peer-reviewed journals available online.

xi. Google Recipe View – lets you narrow your search results to show only recipes, and helps you choose the right recipe amongst the search results by showing clearly marked ratings, ingredients and pictures.

2. *Promotion Services*

AdMob, Google AdSense, Google display Planner, Google AdWords, Adwords Express , Google Certification Program , DoubleClick, Google Ad Grants, Google Think Insights are some advertising management and advertisement serving technology for business purposes.

3. *Publishing and Communication Tools*

i. Google Cultural Institute helps to explore collections from around the world. Google Art Projects, cultural collections and stories are presented in innovative way.

ii. Google Cloud Search is a smart search engine that allows G Suite business customer users to search across G Suite products, including Google Drive, Gmail, Sites, Google Calendar, Docs, Contacts and more.

iii. Google Classroom is a content management system for schools that aids in distribution and grading of assignments and providing in-class communication.

iv. Blogger/Weblog is weblog publishing tool by Google where users can create custom, hosted blogs with features such as photo publishing, comments, group blogs, blogger profiles and mobile-based posting with little technical knowledge.

v. Google Business Solutions is collection of services offered by Google specifically directed at web masters and businesses.

vi. Google Calendar is free online calendar, includes Gmail integration, calendar sharing, and a "quick add" function that allows inserting events using natural language input.

vii. Google Drive is an online backup service and storage space. This service is connected with Google Docs.

viii. Google Hangouts is an instant messaging and video chat platform by unified replacement for Google Talk, Google+ Messenger, and Hangouts, the video chat system present within Google+.

B. Development Tools

1. Security tools covers developer tools such as Google App Engine, Google Developers , Google's site for developers , Dart , Go (programming language),Open Social , Google Page Speed Tools, Google Swiffy Google Web Toolkit , Google Search Console ,Translator Toolkit, Security tools, re CAPTCHA are specially designed for web developers.
2. Map-related products are Google Maps, Google Street View, Google Street View Inside Trusted, Google My Maps, Google Maps Gallery, Google Mars, Google Sky, Google Transit etc.
3. Statistical products include Google Analytics, Google Consumer Surveys, Google Correlate, Freebase, Google Fusion Tables, Google Ngram Viewer, Google Public Data Explorer, TensorFlow, Trendalyzer, Google Trends, Zeitgeist, Google Activity Report

C. *Operating systems* include Android, Chrome OS, Android Wear, Android Auto, Google Glass OS etc.

D. *Desktop applications* Google provides many products for desktops including Google Chrome, Google Earth, Google Toolbar, Android Studio, Google Web Designer, Google Drive – Client software.

E. *Mobile applications* Most of the Google products are designed for mobile web applications and mobile standalone applications.

a. Google Apps for Enhancing Learning and Information Dissemination in Libraries

Easy use and financial factors might compel the libraries to use Google apps and try for the benefits for building a more collaborative learning environment. Acharya and Vagdal, (2023). argues that, these benefits potentially include peer review of academic work and the ability to observe and participate in the creation of scholarly material. Today's learners are generally comfortable sharing content and collectively generating knowledge. The Google Apps helps in communication and file storage provides a set of tools and an infrastructure to make this happen. By leveraging student interest in and use of such tools, libraries might be able to encourage more experimentation with collaborative learning. Google Apps also facilitates sharing of information and it offers an easy way to publish work. Google Apps allows learner to forget about the tools and focus on creative ways to use technology in their disciplines.

Similarly, contemporary research stresses that libraries must transit from input-based metrics (e.g., number of collections) to outcome-based metrics e.g., user engagement, search visibility (Chen, 2023). In this IT enabled competitive word libraries are the entry points for traditional as well as digital world. There is ample of opportunities

for librarians to enhance their service quality by applying technological implications. McIntosh (2013) noted that, Google provides more than 100 products which can be implied in library activities. The following table provides list of Google apps along with the application of same on libraries as put forward by Ingram, (2012).

Google App	**Usage in Libraries**
Get Answers for Queries	
Search	Google Search is boon to layman in this technological world. Google search provides instant answers on the web and on over phone. Libraries can provide customized Google search within library website. Instant queries can be handled using Google search. Google helps to keep track of important days/ special days so as to mark them in calendar of events of library.
Chrome	Google chrome is a web browser which appeals to many users with faster, safer and easier sophisticated technology.
Maps	Maps helps in GPS navigation, traffic alerts, traffic directions. The library can register for its location on Google Map so that novice user can easily find the direction. Navigation is eased using google maps
Translate	Google translate helps to Speak, scan, type or draw to translate in over 100 languages. Many libraries provide translation services in local and international languages by hiring experienced language translators. Google translate is a single interface which provide translation service in more than 100 languages without spending much money and time.
Audio visual	
YouTube YouTube appeals user to Discover, watch and share their favourite videos and music.	Libraries can use YouTube as promotional tool. Small videos on library orientation, book talks, promoting reading habits can be uploaded in YouTube and can make reflect them in library webpage. World's largest medical library, The National Library of Medicine has its own YouTube channel where it posts videos of database training, exhibitions, public service announcements, lectures and more. One can browse through keyword search or subscribe to the channel to receive regular updates on particular channel.
Play music	Google play music provides access to millions of songs on demand and are usually ad-free. This app can have relevance in music libraries.
Chromecast	App aids in streaming movies and music from phone to TV. It can be aid for media libraries.
Communication Tools	

Gmail	Separate Library Gmail account can be used for sending and receiving emails for communication. Correspondence with the vendors can be established by using Gmail. Book reminders can be sent through the mail. Photos, Videos, other official documents with digital signature can be communicated through gmail.
Google Allo	Instant smart messaging app that helps to make like minded readers group so that SDI and CAS services can be provided. This app provides google assistant for smart messaging. The app is secures messages by providing end to end encryption.
Google Duo	It is one to one video calling app designed with simple interface with high quality video and audio calling facilities. It can be used foe tele and video conferencing sessions.
Google+	Google plus is an interest based social networking site where the user can add students, build communities, can share their views using photos, music, videos, animations and text documents. Google + can be used as promoting tool.
Information Organization	
Google Photos	Google photos can be great stuff to organise photos of library activities, programs.
Contacts	Contacts help to organise users contact information.
Organize your schedules and share events	Google calendar organises libraries day to day activities. It is a collaboration tool where one can share your meetings with others and the fact that it syncs up all popular mobile platforms which in turn eases access. Google calendar can be used to organise calendar of events of libraries where special and important days can be added. The librarian can inform the student about schedule of library week, book exhibitions to be conducted through google calendar.
Keep	Keep app helps librarian to save the thoughts as notes, lists and voice memos. Keep helps in organising and keeping track of day to day library transactions, reminders, meeting schedules, voice notes etc.

For Online Smart work	
Slides	Portable stories with presentations can be created easily anywhere and can be carried everywhere by remembering just Google account mail id and password.
Drive	A safe place for all of library files. Google drive provides 15GB free storage where one can deposit all the documents, spread sheets, photos, scanned copies of documents on cloud and provides easy access. The Google drive can be linked with web pages, Google forms etc. Library professionals can deposit the syllabus copies, curriculum, notices, old question papers
Google Books	Google books helps librarian to go through rare titles, desired books required by the users on non-availability of physical books. Review option is book helps to know the quality, context of the book. It is very useful for techno-savvy librarians. This is one of the biggest projects that Google has ever undertaken and involves scanning as many books as Google can get their hands on and making them indexable in their search engines.
Google Forms	Google forms help to do a survey on various library issues such as collect feedback on library activities and services, receive book suggestions etc.
Google class room	A content Management module can help the users to attend scheduled information literacy programmes.
Google Sites	Allows to create libraries webpages easily and quickly without the knowledge of programming.
Google Scholar	A gateway for scholarly literature. Abstracting and Indexing services can be provided for users on request.
Google News	Google news works on aggregation algorithm which combines news from various news channels websites and aggregates many traditional media on daily basis. Helps in providing Current Awareness Service.

Recent research confirms that digital marketing—including analytics and targeted advertising—positively impacts:

- Library visibility
- User satisfaction
- Resource utilization

For example, social media and analytics-based campaigns have been shown to significantly increase engagement and awareness of library services (Tomar, 2024). Google-based advertising extends this impact by reaching users through search behaviour, making it more intent-driven and measurable.

4. Conclusion

Despite high adoption rates, the effectiveness of these strategies remains inconsistent due to lack of infrastructure, policy, and expertise. This underscores the need for analytics-driven approaches, such as those provided by Google tools, to evaluate outcomes. As mentioned, one of the significant weaknesses attached to using Google account is that, it requires all content, even content meant to represent institutions or businesses be tied to specific people. This introduces the opportunities for inadvertent cross-posting of content as well as significantly decreasing individual privacy by forcing the connection between an individual's personal and professional identities. However, with the aim of organising the world's information, and make it universally accessible and useful, Google is providing various services and products. Alexa, a company that monitors commercial web traffic, lists Google.com as the most visited website in the world. Several other Google services also figure in the top 100 most visited websites, including YouTube and Blogger. Google has been the second most valuable brand in the world for 4 consecutive years. So these powerful products/services by Google can be used in libraries for the benefit of users. Libraries can attract users in the virtual world by using Google apps for providing ready reference services to the users.

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ADVOCACY AND MARKETING PRACTICES IN NATIONAL LIBRARY OF NIGERIA, KADUNA BRANCH

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Abstract

The National Library of Nigeria, Kaduna State Branch, serves as an important information institution that supports education, research, literacy development, and access to knowledge resources. However, effective utilization of its services depends largely on advocacy and marketing activities that create awareness and attract users. This paper systematically reviews literature on advocacy and marketing practices in the National Library of Nigeria, Kaduna State Branch. The study examines the concepts of advocacy and marketing, identifies key advocacy and marketing strategies, explores their outcomes, and highlights challenges affecting implementation. Findings reveal that the library engages in reading promotion programmes, user education, stakeholder engagement, exhibitions, public relations, and digital communication strategies to enhance visibility and service utilization. The review further indicates that these practices lead to improved awareness, increased patronage, strengthened stakeholder relationships, and enhanced literacy promotion. However, challenges such as inadequate funding, poor ICT infrastructure, low public awareness, insufficient staff training, and limited government support hinder effective implementation. The study concludes that advocacy and marketing remain critical for improving the visibility and relevance of the National Library of Nigeria, Kaduna Branch. It recommends increased funding, digital transformation, staff capacity development, and stronger institutional collaboration to enhance service delivery.

Keywords: Advocacy, Marketing, National Library of Nigeria, Kaduna State Branch, Library Services.

INTRODUCTION

Libraries are essential institutions that support education, research, and national development through the provision of information resources and services. The National Library of Nigeria (NLN), as the apex library institution in the country, plays a central role in coordinating library development and ensuring access to information resources. The Kaduna Branch of the National Library of Nigeria serves as a regional extension that facilitates access to library services within the northern region. However, with the increasing dominance of digital information sources and alternative knowledge platforms, libraries face challenges in attracting and retaining users. This has made advocacy and marketing critical components of modern library practice. Advocacy and marketing are essential for increasing public awareness, attracting users, and securing institutional support. Therefore, understanding how these practices are implemented and the challenges involved is necessary for improving library service delivery.

OBJECTIVES OF THE STUDY

The main objective of this study is to systematically review advocacy and marketing practices in the National Library of Nigeria, Kaduna Branch.

The specific objectives are to:

1. Identify advocacy practices employed by the National Library of Nigeria, Kaduna Branch.
2. Examine marketing strategies adopted by the National Library of Nigeria, Kaduna Branch.
3. Determine the outcomes of advocacy and marketing practices on library service delivery.
4. Identify challenges affecting the effective implementation of advocacy and marketing practices.

CONCEPT OF ADVOCACY

Advocacy involves intentional actions directed at influencing decision-makers, stakeholders, and the public in support of a cause, program, or institution. In librarianship, advocacy refers to efforts aimed at promoting the value and importance of library services to governments, funding agencies, and users. Library advocacy activities include awareness campaigns, stakeholder engagement, community outreach, media engagement, and professional participation. The primary goal is to secure funding, recognition, and policy support for library development. Mngutyo et al. (2020) note that advocacy serves as an effective public relations strategy that highlights the contribution of libraries to education and societal development.

CONCEPT OF MARKETING

Marketing in librarianship involves identifying user needs and promoting services that satisfy those needs effectively. It focuses on creating awareness of library resources and encouraging their utilization. Library marketing includes advertising, exhibitions, public relations, social media engagement, user orientation, newsletters, and digital communication. Modern library marketing integrates digital technologies to enhance visibility and accessibility of information services.

THEORETICAL FRAMEWORK

This study is anchored on Relationship Marketing Theory developed by Berry (1983). The theory emphasizes the development and maintenance of long-term relationships between organizations and their stakeholders. In the context of libraries, advocacy and marketing activities aim to build sustainable relationships with users, government agencies, educational institutions, and community stakeholders. Effective relationship management enhances trust, service utilization, and institutional support.

METHODOLOGY

This study adopted a systematic literature review approach to examine advocacy and marketing practices in the National Library of Nigeria, Kaduna Branch. Literature published between 2020 and 2025 was retrieved from Google Scholar, African Journals Online (AJOL), institutional publications of the National Library of Nigeria, and peer-reviewed journals in Library and Information Science.

The inclusion criteria consisted of scholarly publications related to library advocacy and marketing within the Nigerian context, written in English and published between 2020 and 2025. Excluded were publications not relevant to the study objectives or outside the specified period. Data were analyzed thematically based on the study objectives to identify advocacy practices, marketing strategies, outcomes, and challenges.

LITERATURE REVIEW (2020–2025)

Mngutyo et al. (2020) examined advocacy and lobbying as public relations tools in Nigerian libraries and found that advocacy significantly improves awareness and stakeholder support.

The National Library of Nigeria Strategic Plan (2020–2024) emphasizes literacy promotion, digital transformation, stakeholder engagement, and improved access to information resources.

Idogbe and Philip (2020) highlighted libraries as critical institutions for sustainable national development through information access and literacy promotion.

Areo et al. (2023) reported that marketing improves awareness and utilization of library services, although inadequate funding remains a challenge.

Oguntoye et al. (2024) emphasized digital marketing strategies such as social media and user-centered approaches for enhancing library visibility.

Ifaka (2025) identified inadequate publicity as a major barrier to effective library service utilization in the National Library of Nigeria.

FINDINGS AND DISCUSSION

Advocacy Practices

The review shows that advocacy practices in the National Library of Nigeria, Kaduna Branch include reading promotion programmes, stakeholder engagement, public awareness campaigns, educational outreach, and professional participation. These practices enhance visibility and strengthen stakeholder support. Mngutyo et'al. (2020) confirm that advocacy improves awareness and institutional recognition of libraries.

Marketing Strategies

Marketing strategies include user orientation, social media engagement, exhibitions, public relations, promotion of information services, and community-based programmes.

These strategies enhance access and utilization of library services. This aligns with Areo et al. (2023), who found that marketing increases awareness and patronage of library services.

Outcomes of Advocacy and Marketing

The review indicates that advocacy and marketing lead to improved awareness, increased patronage, stronger stakeholder relationships, enhanced literacy promotion, and improved institutional visibility.

These outcomes demonstrate the importance of strategic communication in library service delivery.

Challenges

Key challenges include inadequate funding, poor ICT infrastructure, low public awareness, insufficient staff training, weak government support, poor internet connectivity, and competition from digital platforms.

These challenges limit effective implementation of advocacy and marketing initiatives in the library system.

RECOMMENDATIONS

1. Government should increase funding for advocacy and marketing programmes.
2. The library should strengthen digital marketing and social media engagement.
3. Staff should receive regular training in public relations and marketing.
4. Partnerships with schools, universities, and media organizations should be strengthened.
5. Community outreach programmes should be expanded.
6. Modern ICT infrastructure should be improved.
7. Continuous evaluation of marketing strategies should be conducted.

CONCLUSION

Advocacy and marketing are essential components of modern library administration. The National Library of Nigeria, Kaduna State Branch, employs various strategies to improve awareness, utilization, and stakeholder engagement. Despite existing challenges, these practices significantly enhance library visibility and relevance. Strengthening advocacy and marketing through funding, technology, and capacity building will further improve service delivery and support national development goals.

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ADVOCACY FOR FUNCTIONAL CORPORATE LIBRARIES IN NIGERIA: IMPLICATIONS FOR LIBRARIANS' RELEVANCE AND PROFESSIONAL VISIBILITY

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Abstract

The increasing complexity of organizational knowledge ecosystems in the digital era underscores the need for structured information systems that enhance decision-making, innovation, and competitiveness. However, corporate libraries remain underdeveloped in Nigeria, leading to fragmented knowledge systems, inefficient information use, and limited professional visibility for librarians. This study examines advocacy for functional corporate libraries in Nigeria and its implications for librarians' relevance in a knowledge-driven economy. Anchored on Diffusion of Innovation Theory, Knowledge Management Theory, and the Resource-Based View, corporate libraries are conceptualized as strategic knowledge assets that support organizational efficiency and competitive advantage. The study adopts a qualitative exploratory approach, drawing on documentary evidence and empirical insights from banking, oil and gas, government institutions, and emerging private knowledge service providers. Findings reveal persistent challenges, including low awareness, weak policy frameworks, inadequate technological integration, and marginal involvement of librarians in corporate decision-making. Evidence shows that while fragmented information services exist across sectors, they remain uncoordinated, underfunded, and underutilized. A key paradox is the preference for external knowledge investments through corporate social responsibility initiatives while neglecting internal corporate knowledge systems. The study proposes a multi-dimensional advocacy framework integrating policy reform, corporate engagement, professional capacity development, and artificial intelligence-driven knowledge systems. It concludes that repositioning librarians as strategic knowledge managers is essential for organizational performance, innovation, and knowledge retention, and that corporate libraries are critical to strengthening Nigeria's knowledge economy and aligning with global best practices.

Keywords: Advocacy, corporate libraries, librarianship, information services, Nigeria, qualitative study

Introduction

The library from inception always plays significant role in organizations' growth and development, serving as an information hub supporting the parent institution information needs in different paradigm. This is more than just stocking information resources but also to its usage, accessibility and impact measure on the organization. Every organization work and need information to survive. Their information needs are non-sacrosanct as it prepares, boost and support the organization operations. The concept of special library emanated from the emergence of the need to have specialized information for a particular group of individuals or profession to enable them solve a particular problem (Mundi, 2022). The cooperate also called special libraries include libraries in institutions such as financial institution, oil companies, research institutes and government agencies providing tailored information services to staff. These libraries are crucial for supporting corporate decision-making, research and employee training by offering specialized databases, reports and industry-specific journals/articles, contribute to the development and research efforts of the organization.

Corporate libraries have been playing significant roles in enhancing organizational performance through knowledge management and storage, strategic decision support, support for innovation and research. Technology innovation, human resource development. They optimize productivity by providing tailored digital resources, research and other information services. The corporate libraries are characterized with collections that is limited to one subject area and the users are limited to people who have a deep interest in certain subject. They provide information whether for immediate or future utilization which bring together users and information in various formats and are presented in the most effective medium to their users (Mommoh & Egbunu, 2019). These no doubt increasing their productivity when proper provided and managed. However, despite these enormous roles and significant; just as any other institutions in Nigeria, cooperate libraries operations have been hindered by several challenges. Mommoh and Emmanuel (2019) Danbaki, Gao and Ndams (2018), Madu and Chris-Israel (2019) inadequate funding, Emezie and Nwaohiri (2017) ICT tools and incorporations.

The corporate library just like any others in Nigeria is being engulfed with enormous challenges. Onwubiko (2020) states that despite all the importance of information management and provision in public institutions it is disheartening to state that it was observed that most of the expected roles of special libraries are not carried out as a result of identified challenges. The libraries are only seen as units of the institutions and not as information centres that can mastermind the

transformation of these institutions for effective and optimal service delivery to its user. To a larger extent too, the persistent weaknesses and limited effectiveness of the Nigeria Library Associations and bodies across several states further undermine the functionality of corporate libraries in Nigeria by weakening coordinated advocacy efforts and reducing the profession's capacity to mobilize funding and strategic support from philanthropists, development agencies, and other stakeholders.

It is therefore important for a strong advocacy for functional corporate libraries in Nigeria so as to serve as an essential repositioning centre for information resources and managers whose adequacy, efficiency, relevance and expertise enhances organizational decision-making, strengthens knowledge management systems of corporate libraries or information centres.

Research Objectives

The main objective of this study is to examine advocacy for functional corporate libraries in Nigeria and its implications for librarians' relevance and professional visibility in a knowledge-driven economy. Specifically, the study seeks to:

1. assess the current status and level of development of corporate libraries in selected Nigerian organizations, with a focus on banking, oil and gas, government-affiliated institutions, and emerging private knowledge service providers.
2. examine the awareness, perception, and understanding of corporate libraries among organizational stakeholders and information professionals in Nigeria, particularly regarding their strategic value in organizational knowledge management.
3. identify the key challenges hindering the establishment, functionality, and sustainability of corporate libraries in Nigeria, including policy, funding, technological, staffing, and institutional barriers.
4. analyze the extent to which librarians are integrated into corporate decision-making and knowledge management processes within Nigerian organizations and how this affects their professional visibility and relevance.
5. evaluate existing advocacy strategies and frameworks used in promoting library and information services in corporate environments, and determine their effectiveness in influencing organizational adoption.
6. examine the role of emerging technologies, particularly artificial intelligence and digital knowledge systems, in enhancing the functionality of corporate libraries in Nigeria.
7. propose a comprehensive advocacy framework for the establishment and strengthening of functional corporate libraries in Nigeria as strategic assets for organizational performance and national development.

Theoretical Framework

This study is anchored on a multi-theoretical foundation to provide a robust explanation of how corporate libraries can be adopted, institutionalized, and sustained within Nigerian organizations. The framework integrates Diffusion of Innovation Theory (DOI) as the anchor theory, supported by Knowledge Management Theory (KMT) and Resource-Based View (RBV) of the firm.

Diffusion of Innovation Theory, 1962 (Anchor Theory)

Originally proposed by Everett Rogers, Diffusion of Innovation Theory explains how new ideas, practices, or technologies spread within a social system over time. In the context of this study, the establishment of corporate libraries is conceptualized as an organizational innovation.

Digital Object Identifier identifies five key attributes that influence adoption:

- **Relative Advantage:** The perceived benefits of corporate libraries (e.g., improved decision-making, efficiency, and knowledge retention)
- **Compatibility:** Alignment with existing organizational culture and workflows
- **Complexity:** Ease of understanding and implementing library systems
- **Trialability:** Opportunity to pilot corporate library initiatives
- **Observability:** Visibility of outcomes and benefits to stakeholders

Knowledge Management Theory (Supporting Theory)

Knowledge Management Theory developed by several influential theorists and organizational experts throughout the 1970, 1980 and 1990s with early propounded such as Peter Drucker and Paul Strassmann in emphasizes the systematic creation, capture, storage, sharing, and utilization of organizational knowledge to achieve strategic objectives.

Corporate libraries function as central nodes in the knowledge management cycle, enabling:

- Knowledge acquisition through curated resources
- Knowledge storage via repositories and databases
- Knowledge dissemination through information services
- Knowledge application in decision-making and innovation

In Nigerian organizations, the absence of structured knowledge systems leads to:

- Knowledge loss
- Inefficiencies in information retrieval
- Reduced organizational learning

Thus, KMT provides the justification for positioning corporate libraries as critical infrastructure for knowledge optimization.

Resource-Based View (RBV) of the Firm

The Resource-Based View posits that organizations achieve competitive advantage through valuable, rare, inimitable, and non-substitutable resources.

In this context:

- Information and knowledge are **strategic assets**
- Corporate libraries serve as capability enablers that transform raw information into actionable intelligence
- Librarians act as knowledge intermediaries, enhancing the value of organizational resources

By adopting corporate libraries, firms can develop unique knowledge capabilities that are difficult for competitors to replicate, thereby strengthening their competitive position.

The integration of DOI, KMT, and RBV provides a comprehensive lens for this study:

i. **DOI** explains *how* corporate libraries can be adopted
ii. **KMT** explains *why* they are essential for organizational effectiveness
iii. **RBV** explains *how they create competitive advantage*

Together, these theories support the argument that corporate libraries are not merely support services but strategic organizational assets. This integrated framework also informs the proposed advocacy strategies by linking awareness, value creation, and competitive positioning.

Literature Review

The Need for Advocacy

Promoting corporate libraries is essential in their strong service provision and support to the organization. This has more attributed to public libraries but its high time the corporate libraries too key into it. As demand for information increases even in organization, same should be the needs for your library. According to Lucidea (2018) post, library marketing delivers four main benefits: increase value to organization, higher usage, educated users, changed perceptions. This helps to communicate library values more through strategic planning and gives room for broader windows for partnership and supports (Scott, 2017). Successful strategies on advocacy of library value to leadership, philanthropist, investor in library facilities, resources provide an enhanced opportunities for collaboration across the nation; linking strategic initiatives, innovation, scholarship, grants and supports for the library as a strategic resource worthy of investment and engagements in the 21st century.

Fiscal Note (2026); a global leader in AI-driven policy intelligence, delivering deep expertise in legislative tracking, regulatory analysis and stakeholder engagementhighlighted advocacy strategies best practices with a 13 advocacy strategies for running a successful campaign: determining a clear objective, do your research, focus on building relationships, drive change through social media, master email marketing, use digital tools, educate members on how to communicate with investors in the case of a library, develop a grass root strategy, use data to your advantage, make national issues a local one, choose which issues are most important, incorporate stories about policies impacts and know your audience.

Impact on Librarians' Relevance

Corporate functioning libraries can redefine the roles of librarians through shifting their focus from traditional custodian duties to a more digitally inclined or strategic technology-driven roles that act as catalysts for knowledge creation, innovation and competitive advantage. In this digital age, a functioning corporate library can redefine roles of librarians by opening for new avenues of virtual library and online collections, information literacy and digital skills initiatives, critical thinkers and discerning consumers of online content with users' access to extensive collections of books, journals, and multimedia resources from anywhere, at any time (Bhalani & Rajeshri, 2024).

Murari, & Verma (2018), highlighted key skills and competencies for librarian in the corporate settings just as any other modern library which include Professional skills (foundation of the profession, organization of recorded knowledge and information, references and user services, information resources, administration and management), Technical skills (email, internet, web and search strategies, computer hardware troubleshooting and networking, library automation, blog, social networking, RSS feeds and Soft skills (listening, communication, writing skill, public relation, interpersonal skills, customer service, leadership and teamwork, negotiating skills).

Nigerian Empirical Evidence of Librarians' Relevance and Professional Visibility in some selected Corporate Libraries

1. Banking Sector Knowledge Systems (Chartered Institute of Bankers of Nigeria – CIBN)

The Chartered Institute of Bankers of Nigeria (CIBN) represents one of the most structured examples of a corporate-style knowledge hub in Nigeria's financial sector. The institute maintains a specialized library that serves banking professionals, researchers, and policy actors within the financial ecosystem. Its core mandate includes supporting professional certification, continuous learning, and access to curated financial and economic literature, positioning it as a critical enabler of knowledge-driven banking practice in Nigeria (CIBN, 2023). Beyond its physical and digital collections, the CIBN library provides information brokerage services that support evidence-based decision-making within the banking profession. It facilitates access to regulatory publications, monetary policy documents, and financial research outputs that are essential for maintaining industry standards (Aina, 2020). In doing so, it functions as a semi-corporate knowledge infrastructure bridging academia, regulation, and practice.

However, despite its effectiveness, the CIBN model remains largely sector-specific and does not extend into private banking institutions as embedded corporate libraries. Most commercial banks in Nigeria still rely on fragmented digital subscriptions or informal knowledge-sharing systems, limiting consistency in knowledge accessibility across institutions (Nkanu & Okon, 2022). From an analytical standpoint, the CIBN case demonstrates that structured knowledge systems are feasible and impactful in Nigeria. However, its confinement to a professional body rather than widespread corporate adoption underscores the need for advocacy to scale such models across industries (IFLA, 2021).

2. Bank Libraries in Northern Nigeria (Kano and Kaduna Studies)

Empirical studies conducted in selected banking institutions in Kano and Kaduna reveal that some form of library or documentation unit exists within certain financial organizations. These units typically manage internal reports, regulatory documents, and customer service information, though they remain largely administrative rather than strategic in function (Nkanu & Okon, 2022). Despite their existence, these information units suffer from structural limitations such as inadequate funding, lack of professional staffing, and outdated collections. Most are not digitized and lack integration into broader organizational knowledge systems, reducing their effectiveness in supporting decision-making (Ajibade, 2021).

Another key issue is low utilization by staff. Employees often rely on informal networks or external online sources rather than internal repositories, reflecting a weak organizational knowledge culture (Oke & Fernandes, 2020). This undermines institutional learning and efficiency. Overall, these findings highlight a gap between the existence of library-like units and their functional relevance. While partial structures exist, they are not strategically embedded within corporate workflows, reinforcing the need for structured advocacy and institutional redesign (Taylor, 2021).

3. Oil and Gas Sector Knowledge Management Gaps

The oil and gas sector in Nigeria represents a highly knowledge-intensive industry requiring structured access to technical, regulatory, and operational data. However, studies show that most organizations in this sector lack centralized corporate library systems, resulting in fragmented information storage across departments (Olatokun & Ajagbe, 2021). This fragmentation leads to inefficiencies in document retrieval, compliance reporting, and technical documentation management. In high-risk and highly regulated industries, such inefficiencies significantly affect productivity and decision-making processes (World Bank, 2022). Although some organizations have adopted enterprise systems, these are not always structured as integrated knowledge management frameworks. The absence of information professionals in strategic roles further weakens organizational knowledge governance (Brown, 2023). This case demonstrates that even technologically advanced industries in Nigeria operate without structured corporate libraries, reinforcing the need for institutionalized knowledge systems as strategic assets rather than administrative tools.

4. Government-Affiliated Knowledge Systems (Centre for Management Development – CMD)

The Centre for Management Development (CMD) operates a hybrid knowledge system that supports both public and private sector capacity building. Its library provides access to management literature, policy documents, research outputs, and training materials, integrating knowledge services directly into governance processes (CMD, 2023). Unlike traditional libraries, CMD embeds information services within training and policy development functions, ensuring that knowledge is actively applied in institutional decision-making (UNESCO, 2023). This integration enhances organizational learning and cross-sectoral collaboration. However, CMD remains an exception within Nigeria's institutional landscape. Most organizations lack similar embedded systems, limiting their ability to leverage structured knowledge for development outcomes (IFLA, 2021). The CMD model demonstrates the potential of hybrid knowledge systems that combine library science with policy and management functions. It provides a scalable model for corporate library development in both public and private sectors.

5. Corporate Social Responsibility (CSR) Library Interventions

Corporate Social Responsibility initiatives by major Nigerian corporations, particularly in the oil and gas sector, have led to the establishment of community-based libraries. Companies such as Chevron and NNPC have funded libraries equipped with ICT infrastructure and digital learning resources (World Bank, 2022). These initiatives contribute positively to literacy development and digital inclusion in host communities. They also support educational access by providing infrastructure that is otherwise unavailable in underserved regions. However, these investments are externally focused and rarely integrated into internal corporate knowledge systems. This creates a disconnect between external

CSR initiatives and internal knowledge management needs (Aina, 2020). This pattern reflects a misalignment between corporate recognition of library value and internal implementation. It highlights the need for advocacy to shift from external CSR-driven library support toward embedded corporate knowledge systems.

6. **Emerging Private Knowledge Service Providers**

Nigeria has witnessed the emergence of private firms offering specialized knowledge and information services, including research consultancy, digital libraries, and data analytics platforms (Brown, 2023). These firms reflect growing demand for structured knowledge solutions in both public and private sectors. These providers offer services such as document management, digital archiving, and research support, filling gaps left by underdeveloped corporate libraries. Their growth indicates increasing awareness of the importance of structured information systems. However, most operate as external consultants rather than embedded organizational units. This limits their integration into daily corporate workflows and reduces long-term institutional knowledge building (Oke & Fernandes, 2020). Nonetheless, their emergence signals a growing knowledge economy in Nigeria and presents opportunities for hybrid corporate library models that integrate internal systems with external expertise.

Recommendations for Stakeholders

Based on the findings, theoretical grounding, and empirical evidence presented in this study, a multi-level set of recommendations is proposed to guide the successful advocacy, establishment, and institutionalization of corporate libraries in Nigeria.

1. National policy intervention and regulatory support.

First, there is a critical need for **national policy intervention and regulatory support.** Government agencies in charge of information management, education, and labour development should collaborate with professional bodies such as the Nigerian Library Association (NLA) to develop a clear national framework for corporate libraries. Such a policy should define minimum standards for corporate information services, outline the role of librarians in corporate environments, and provide incentives for organizations that establish structured knowledge systems. This will help formalize corporate libraries as recognized components of organizational infrastructure rather than optional services.

2. Corporate organizations should integrate libraries into their strategic management structures.

Second, **corporate organizations should integrate libraries into their strategic management structures.** Rather than treating information services as administrative support units, firms in banking, oil and gas, telecommunications, and manufacturing should establish internal corporate libraries or knowledge centres managed by qualified information professionals. These units should be embedded within decision-making processes to support research, innovation, compliance, and strategic planning. Organizations should also allocate dedicated budgets for staffing, digitization, and continuous upgrading of knowledge systems to ensure sustainability and relevance.

3. Library professionals must adopt proactive advocacy and repositioning strategies

Library professionals must adopt proactive advocacy and repositioning strategies to enhance their visibility in corporate environments. Librarians should move beyond traditional roles and actively demonstrate their value as knowledge strategists, data curators, and information analysts. Professional associations should intensify capacity-building programmes that equip librarians with skills in data analytics, artificial intelligence tools, digital knowledge management systems, and corporate communication. This will enable them to align more effectively with the evolving needs of modern organizations and strengthen their professional relevance outside academic settings.

4. Technology integration should be prioritized as a core driver of corporate library development.

Technology integration should be prioritized as a core driver of corporate library development. Nigerian organizations should leverage emerging technologies such as artificial intelligence, machine learning, cloud computing, and digital repositories to modernize knowledge management systems. AI-powered search tools, automated classification systems, and predictive analytics can significantly improve information retrieval, decision-making, and organizational learning. Partnerships with ICT firms and knowledge service providers should be encouraged to accelerate the development of scalable and efficient corporate library infrastructures.

5. Public-private partnerships (PPPs) should be established to support corporate library development and sustainability. Collaboration between government institutions, private corporations, and international development agencies such as UNESCO and IFLA can provide technical expertise, funding support, and global best practices. These partnerships can also facilitate pilot corporate library projects in key sectors such as banking, oil and gas, and telecommunications, which can later serve as scalable models for other industries.

Finally, **continuous research and monitoring should be encouraged to strengthen evidence-based implementation.** Academic institutions and LIS researchers should conduct longitudinal and sector-specific studies to assess the impact of corporate libraries on organizational performance, innovation, and productivity. Data-driven evaluations will provide empirical justification for policy expansion and institutional adoption. Furthermore, case documentation of successful corporate library models within Nigeria and comparable economies should be promoted to support knowledge sharing and best practice development.

Conclusion

This study set out to examine the role of advocacy in promoting the establishment of corporate libraries in Nigeria as strategic instruments for knowledge management and professional visibility of librarians. Drawing from theoretical perspectives such as Diffusion of Innovation Theory, Knowledge Management Theory, and the Resource-Based View, the study establishes that corporate libraries are not merely support structures but strategic knowledge assets capable of enhancing organizational efficiency, innovation, and competitiveness. The Nigerian evidence reviewed across banking, oil and gas, government institutions, and emerging private knowledge services demonstrates that while fragments of corporate library functions exist, they remain largely unstructured, underutilized, and insufficiently integrated into organizational strategy.

Empirical findings further reveal a consistent pattern of weak institutional awareness, limited policy support, and inadequate embedding of librarians within corporate decision-making processes. Even in sectors where information systems exist, such as banking and oil and gas, these systems are often administrative rather than strategic, resulting in fragmented knowledge flows and reduced organizational learning capacity. The study also highlights a significant paradox: while corporations invest in external knowledge infrastructures through CSR initiatives, they rarely internalize such systems to strengthen their own knowledge ecosystems. This disconnect underscores a missed opportunity for leveraging information as a core competitive resource.

The study therefore argues that the absence of corporate libraries in Nigerian organizations is not due to a lack of relevance, but rather a lack of structured advocacy, institutional policy frameworks, and technological integration. The integration of artificial intelligence, digital repositories, and modern knowledge management systems presents a transformative opportunity to reposition corporate libraries as dynamic, data-driven knowledge hubs. When properly implemented, these systems can enhance decision-making, support innovation, and improve organizational memory across sectors. In this regard, librarians must evolve from custodians of information to strategic knowledge managers who actively contribute to organizational intelligence and performance.

In conclusion, the establishment of corporate libraries in Nigeria is both a strategic necessity and an achievable reform within the evolving knowledge economy. However, this transformation requires deliberate advocacy at professional, institutional, and policy levels. Stakeholders including library associations, corporate leaders, and policymakers must collaborate to develop enabling frameworks that support the integration of corporate libraries into organizational structures. Ultimately, repositioning libraries within corporate environments will not only enhance organizational effectiveness but also elevate the professional identity of librarians as indispensable actors in Nigeria's knowledge-driven development agenda.

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AI Behind the Scenes: Student Attitudes Toward Declaring Generative AI Use in Academic Writing in Nigerian Library Schools

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Abstract

This study examines students' attitudes toward declaring the use of generative artificial intelligence (GenAI) in academic writing within Nigerian library schools. A cross-sectional survey design was adopted, and data were collected through a structured questionnaire administered to 374 library and information science students across selected Nigerian universities. Descriptive statistics and non-parametric tests, including Mann–Whitney U, Kruskal–Wallis, and Spearman correlation, were used for data analysis. The findings reveal widespread use of GenAI tools, particularly conversational AI systems, for various academic writing tasks. However, students exhibited generally weak attitudes toward declaring AI use and demonstrated low and inconsistent levels of disclosure, often declaring only when explicitly required. Awareness of institutional policies was also limited, and no significant relationship was found between policy awareness and attitudes toward declaration. Key factors influencing disclosure included fear of academic penalties, lecturer expectations, unclear guidelines, and concerns about negative judgment. The study concludes that while GenAI tools are deeply integrated into students' academic writing practices, transparency in their use remains limited due to ambiguity, fear, and insufficient institutional guidance. It recommends that universities develop clear AI policies, integrate disclosure requirements into assessment practices, and provide structured training to promote ethical and transparent AI use.

Keywords: Generative AI, academic writing, AI declaration, student attitudes, academic integrity

Introduction

It is undeniable that Generative Artificial Intelligence (GenAI) tools have significantly changed how students approach academic tasks, particularly in higher education, where writing, research, and knowledge synthesis are central. Increasingly, students rely on GenAI tools to generate ideas, draft assignments, and enhance their learning processes. While these technologies offer substantial benefits in terms of efficiency and accessibility, they also introduce complex concerns related to academic integrity, transparency, and ethical scholarship. A critical issue that has recently gained attention is whether students are willing to declare their use of GenAI in academic work and how their attitudes shape such decisions. This issue is especially pertinent within library and information science education in Nigeria, where students are trained to uphold strong ethical standards in information use and dissemination.

Student attitudes toward GenAI use represent a key area in understanding their academic behavior. Attitudes encompass students' beliefs, perceptions, and predispositions toward a phenomenon, which in turn influence their actions and decision-making. Emerging evidence suggests that students often demonstrate mixed attitudes toward GenAI tools, simultaneously acknowledging their usefulness while expressing concerns about ethical implications and potential misuse (Adnan, 2025; Adžić et al., 2024). These ambivalent attitudes can influence how students perceive the necessity of declaring GenAI use. For instance, students who view GenAI as a legitimate academic aid may consider disclosure unnecessary, whereas those who perceive ethical risks may be more inclined to support transparency. Such variations highlight the importance of examining attitudes as a determinant of disclosure behavior.

Closely related to attitudes is the extent and nature of GenAI use among students. GenAI tools are utilized for a range of purposes, including brainstorming, summarizing, paraphrasing, and generating full academic responses. The diversity of these uses often creates uncertainty about what constitutes acceptable practice and when disclosure is required. Studies have shown that students frequently navigate a grey area between appropriate and inappropriate use of AI, which contributes to inconsistent practices and confusion regarding academic expectations (Farinosi & Melchior, 2025a; Nelson et al., 2025). When students perceive certain forms of GenAI use as minor or equivalent to traditional study aids, they may be less motivated to declare such use. This suggests that patterns of GenAI use are closely intertwined with attitudes toward disclosure, reinforcing the need to examine both variables together.

The act of declaring GenAI use is another major construct in this study, rooted in the broader framework of academic integrity. A declaration involves explicitly acknowledging the use of AI tools in the production of academic work, thereby promoting transparency and accountability. However, as GenAI technologies are relatively new, norms around disclosure are still evolving, and many students remain uncertain about expectations. Evidence indicates that non-compliance with AI disclosure requirements is becoming a concern in higher education, with some students deliberately withholding such information due to fear of penalties or negative judgment (Gonsalves, 2025). In other cases, students may fail to declare GenAI use simply because they are unaware of institutional requirements. These dynamics suggest that attitudes toward declaration are shaped not only by ethical considerations but also by perceived risks and institutional enforcement.

Awareness and knowledge of GenAI policies further influence how students approach disclosure. Students who are well-informed about institutional guidelines are more likely to develop positive attitudes toward transparency and

compliance. Conversely, limited awareness or unclear policies can foster indifference or resistance to declaring GenAI use. Research has demonstrated that students' awareness of AI tools and their ethical implications varies significantly across contexts, affecting how they interpret and respond to academic norms (Akça et al., 2025). This indicates that awareness functions as a mediating factor, shaping both attitudes and behaviors related to GenAI use and disclosure.

The context of Nigerian library schools adds a critical dimension to this discussion. Library and information science students are being prepared for professional roles that emphasize ethical information practices, intellectual honesty, and responsible knowledge management. Their attitudes toward GenAI use and disclosure are therefore not only relevant to their current academic practices but also to their future professional responsibilities. As the information landscape continues to evolve with the integration of AI technologies, these students are expected to model ethical engagement and guide others in responsible information use. Understanding their attitudes toward declaring GenAI use provides insight into how effectively current educational practices are fostering these competencies. This study, therefore, focuses on student attitudes toward declaring GenAI use in Nigerian library schools, examining how these attitudes are shaped by their use of GenAI, awareness of institutional policies, and perceptions of academic integrity. By linking these variables, the study provides a comprehensive understanding of the factors influencing disclosure behavior in the context of emerging AI technologies. Such insights are essential for developing clear policies, effective instructional strategies, and ethical guidelines that promote responsible and transparent use of GenAI in higher education.

Problem Statement

The increasing integration of Generative Artificial Intelligence (GenAI) tools into higher education has created new opportunities for learning, academic writing, and knowledge production. However, this adoption of GenAI has also introduced significant challenges related to academic integrity, transparency, and ethical scholarship. While institutions are beginning to develop policies that require students to declare their use of GenAI in academic work, compliance with such expectations remains uncertain. Existing evidence suggests that students' engagement with GenAI is widespread and often shaped by convenience, perceived usefulness, and academic pressures, yet their willingness to disclose such use is inconsistent and poorly understood (Farinosi & Melchior, 2025a; Nelson et al., 2025). The disconnect between use and disclosure raises critical concerns about the integrity of academic outputs and the effectiveness of emerging institutional guidelines.

A growing body of research has examined students' attitudes, awareness, and usage patterns of GenAI across different educational contexts. These studies consistently showed that students hold complex and sometimes conflicting perceptions of GenAI, recognizing its benefits for learning while expressing uncertainty about its ethical implications (Adnan, 2025; Adžić et al., 2024; Akça et al., 2025). In particular, students often operate within ambiguous boundaries regarding acceptable and unacceptable uses of AI, which can lead to inconsistent practices and varied interpretations of academic norms (Farinosi & Melchior, 2025b). Despite these insights, current scholarship has largely focused on general perceptions and usage behaviors, with limited attention to the specific issue of disclosure. As a result of this trend, there is insufficient empirical understanding of how students approach the declaration of GenAI use in academic writing, and what factors influence their decisions to comply or not comply with such expectations.

The issue of non-disclosure has already begun to attract concern within higher education, particularly as institutions seek to uphold academic integrity in the face of rapidly evolving technologies. Evidence indicates that some students intentionally avoid declaring their use of AI tools due to fear of academic penalties, perceived stigma, or uncertainty about institutional policies (Gonsalves, 2025). Others may fail to disclose simply because they lack awareness of the requirement or do not consider certain forms of AI assistance significant enough to warrant acknowledgment. These patterns suggest that non-compliance is not solely a matter of misconduct but is also influenced by attitudes, perceptions, and contextual factors. However, empirical studies that systematically examine these dynamics, particularly in relation to disclosure behavior, remain scarce.

More importantly, there is a notable paucity of research focusing on this issue within the context of library and information science education, especially in developing countries such as Nigeria. Library school students occupy a unique position as future information professionals who are expected to uphold and promote ethical information practices, including proper attribution, transparency, and responsible use of digital tools. Despite this, there is little to no empirical evidence examining how these students perceive and practice the declaration of GenAI use in their academic writing. Existing studies have not sufficiently addressed whether students in this discipline align their use of emerging technologies with the ethical standards embedded in their professional training. This represents a critical gap in the literature, as the attitudes and behaviors of these students have implications not only for their academic integrity but also for their future roles as custodians of information ethics. Given these gaps, there is a clear need for empirical research that specifically investigates student attitudes toward declaring GenAI use, with particular attention to library and information science students in Nigeria. This study responds to this need by examining how students perceive the requirement to declare GenAI use, the extent to which they comply with such expectations, and the factors that influence their behavior. By focusing on a population that is both academically and professionally oriented toward ethical information use, this research offers a novel contribution to the growing discourse on GenAI in higher education. It moves beyond general discussions of usage and perception to address the critical and underexplored issue of disclosure,

thereby providing evidence that can inform policy development, curriculum design, and the promotion of academic integrity in the age of artificial intelligence.

Objectives of the Study

The objectives of this study are:

1. To identify the types of Generative Artificial Intelligence tools used for academic writing by students in Nigerian library schools.
2. To examine the types of academic writing tasks undertaken using Generative Artificial Intelligence tools by students in Nigerian library schools.
3. To examine the attitudes of students in Nigerian library schools toward declaring the use of Generative Artificial Intelligence for academic writing.
4. To determine the extent to which students in Nigerian library schools declare their use of Generative Artificial Intelligence in academic work.
5. To assess the students' level of awareness of institutional policies on GenAI use in Nigerian library schools.
6. To identify the factors influencing students' decisions to declare or not declare the use of Generative Artificial Intelligence in academic writing.

Hypotheses

The following null hypotheses have been formulated and tested at 0.05 level of significance:

1. There is no significant difference between male and female students' in theirattitudes toward declaring GenAI use in Academic writing in Nigerian Library Schools
2. There is no significant difference in attitudes toward GenAI declaration across academic levels
3. There is no significant relationship between students' attitudes toward GenAI declaration and their awareness of institutional policies

Literature Review

Types of Generative Artificial Intelligence Tools Used by Students for Academic Writing

Empirical evidence indicates that students' use of Generative Artificial Intelligence (GenAI) tools for academic writing is neither uniform nor random, but shaped by perceived usefulness, ease of use, and task-specific needs. Across studies, tools such as ChatGPT and similar large language models dominate student engagement, particularly for functions such as summarisation, clarification, and content generation. The pattern of use suggests a functional orientation, where students selectively deploy GenAI tools to enhance efficiency in academic tasks rather than as a complete substitute for independent work (Farinosi & Melchior, 2025a; Alsaeed et al., 2025). This selective engagement aligns with technology acceptance frameworks, where perceived usefulness and ease of use consistently predict adoption (Adnan, 2025; Sallam et al., 2024).

However, the nature of GenAI use extends beyond mere task execution to include cognitive augmentation. Students increasingly rely on these tools for brainstorming, structuring arguments, and refining written output, indicating a shift from traditional support tools to co-creative systems (Alsaeed et al., 2025). This aligns with findings that GenAI tools are evaluated based on their ability to support specific academic goals, suggesting that tool selection is context-dependent rather than generalized (Heil et al., 2025). At the same time, variations in usage patterns reflect differences in digital and AI literacy levels, with distinct user profiles ranging from novice to enthusiastic adopters (Beckman et al., 2025). These differences highlight that engagement with GenAI tools is mediated by prior experience and competence, rather than mere availability.

Despite widespread use, there is a consistent tension between utility and risk. Students acknowledge the efficiency gains associated with GenAI while expressing concerns about over-reliance, reduced critical thinking, and ethical implications (Adnan, 2025; Aksoy & Kursun, 2024). This duality suggests that GenAI tools are embedded within a broader negotiation between academic enhancement and integrity preservation. Importantly, usage is also influenced by behavioural and cognitive factors, including perceived risks, anxiety, and social influence, reinforcing the idea that technological adoption is socially constructed rather than purely individual (Sallam et al., 2024). Overall, the literature converges on the view that students' use of GenAI tools for academic writing is strategic, differentiated, and shaped by both technological affordances and contextual constraints.

Extent to Which Students Declare Their Use of Generative Artificial Intelligence in Academic Work

The extent to which students declare their use of GenAI in academic work remains inconsistent and context-dependent, reflecting a gap between actual usage and transparent reporting. While GenAI use is increasingly normalized, disclosure practices lag, often influenced by ethical ambiguity and perceived risks. Empirical findings suggest that students engage in both partial and non-disclosure, with some selectively acknowledging use only when it is substantial or explicitly required (Qu et al., 2025). The extent of declaration is further complicated by students' perceptions of academic integrity and detection mechanisms. While some students recognize non-disclosure as dishonest, others differentiate between types of AI use, considering certain forms (e.g., minor editing) as not warranting disclosure (Nelson et al., 2025). This selective ethical reasoning contributes to inconsistent declaration practices. Moreover, psychological mechanisms such

as the "AI ghostwriter effect," where responsibility for authorship is externalized, reduce the likelihood of disclosure by distancing students from the output (Qu et al., 2025).

The literature also suggests that ethical intention plays a significant role in determining compliance with disclosure norms. Students who demonstrate stronger ethical commitment are more likely to align their behaviour with institutional expectations, whereas weaker ethical orientation correlates with lower disclosure rates (Fang & Cai, 2025). Nevertheless, the moderate importance attached to ethical considerations among students indicates that ethical awareness alone may not translate into consistent declaration behaviour (Tsaryk & Frick, 2025). Taken together, these findings suggest that the extent of GenAI disclosure is shaped by a complex interplay of ethical judgment, perceived consequences, and cognitive framing, resulting in varied and often inconsistent practices.

Awareness of Institutional Policies on Generative Artificial Intelligence Use Among Students

Students' awareness of institutional policies on GenAI use appears to be uneven and often limited, which significantly affects their compliance and ethical decision-making. While general awareness of AI technologies is relatively high among students, this does not necessarily translate into a clear understanding of institutional guidelines governing their use (Akça et al., 2025). This disconnect between awareness and comprehension suggests that familiarity with AI tools does not equate to policy literacy. Studies indicate that institutional communication and training play a critical role in shaping awareness levels. Where institutions provide structured guidance and ethical frameworks, students demonstrate better understanding of acceptable practices and are more inclined to engage responsibly (Adnan, 2025; Alsaeed et al., 2025). Conversely, ambiguous or poorly communicated policies contribute to confusion and inconsistent behaviour, reinforcing the need for clarity and accessibility in policy design. The call for culturally sensitive and comprehensive frameworks further implies that awareness is not merely informational but also contextual (Adnan, 2025).

Some studies have also indicated that awareness is also influenced by individual and experiential factors. Students with prior exposure to AI technologies or formal training exhibit higher levels of understanding, suggesting that awareness is cumulative and experience-driven (Ayyoub et al., 2025). However, the persistence of basic-level knowledge among many students indicates that current educational interventions may be insufficient in developing deep policy awareness (Akça et al., 2025). Additionally, institutional culture and norms play a significant role in shaping how students perceive and internalize ethical expectations, often more than demographic factors (Tsaryk & Frick, 2025). Overall, the literature suggests that awareness of GenAI policies is fragmented and contingent on both institutional efforts and individual competencies.

Factors Influencing Students' Decisions to Declare or Not Declare the Use of Generative Artificial Intelligence in Academic Writing

Students' decisions to declare or not declare GenAI use are influenced by a multifaceted set of factors that extend beyond simple awareness or ethical considerations. One of the most prominent influences is the perceived risk of academic consequences. Fear of penalties, coupled with uncertainty about enforcement, often discourages disclosure, particularly when policies are ambiguous or inconsistently applied (Gonsalves, 2025). This indicates that institutional context significantly shapes behavioural outcomes. Social and psychological factors also play a critical role. Peer influence and subjective norms can either encourage or discourage disclosure, depending on prevailing practices within student communities (Gonsalves, 2025; Hsiao & Tang, 2025). At the same time, individual cognitive processes, such as perceived usefulness and enjoyment of GenAI tools, indirectly influence disclosure decisions by shaping overall engagement with the technology (Hsiao & Tang, 2025). The interplay between technological and social factors highlights the complexity of decision-making in this context.

Ethical orientation and personal responsibility further contribute to disclosure behaviour. While many students express a desire to act responsibly, their ethical concerns are often outweighed by practical considerations such as efficiency and performance outcomes (Kahl, 2025; Nelson et al., 2025). The tendency to undervalue ethical implications, as observed in comparative studies with instructors, suggests a gap between ethical ideals and actual practice (Tsaryk & Frick, 2025). Additionally, externalization of authorship through AI tools reduces perceived responsibility, thereby lowering the likelihood of disclosure (Qu et al., 2025). In addition, technological experience and competence also shape disclosure decisions. Students with greater familiarity and confidence in using GenAI tools are more likely to integrate them into their academic work, which may either increase or decrease disclosure depending on their ethical orientation (Adžić et al., 2024; Singh & Paiva, 2025). Furthermore, broader concerns about academic integrity, including issues of plagiarism, bias, and misinformation, contribute to the complexity of decision-making (Aksoy & Kursun, 2024). Generally, the literature indicates that disclosure behaviour is the outcome of interacting institutional, social, ethical, and technological factors, making it a highly contextual and dynamic process.

Theoretical Framing

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Viswanath Venkatesh and colleagues in 2003 as a comprehensive model for explaining user acceptance and usage behaviour of information systems (Venkatesh et al., 2003). The theory synthesizes elements from earlier models such as the Technology Acceptance Model, Theory of Planned Behaviour, and Diffusion of Innovation, thereby providing a unified perspective on technology adoption. UTAUT was designed to explain users' behavioural intention to use a technology and

subsequent actual usage behaviour, particularly in organizational and educational contexts. Importantly, UTAUT is built on four key constructs, including performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to the degree to which an individual believes that using a technology will enhance performance or productivity. Effort expectancy captures the perceived ease associated with the use of the technology. Social influence reflects the extent to which individuals perceive that important others believe they should use the technology. Facilitating conditions refer to the degree to which an individual believes that organizational and technical infrastructure exists to support the use of the technology. These constructs are further moderated by factors such as gender, age, experience, and voluntariness of use, which shape adoption behaviour in different contexts.

The applicability of UTAUT has been widely demonstrated in library and information science research, particularly in studies examining the adoption of digital technologies and electronic services (Awwad & Al-Majali, 2015; Parhamnia, 2022; Mensah & Onyancha, 2021; Yoon, 2016). Collectively, these studies demonstrate the robustness of UTAUT in explaining technology-related behaviours in academic and library environments. The relevance of UTAUT to the present study lies in its ability to explain students' engagement with Generative Artificial Intelligence (GenAI) tools and their subsequent behavioural decisions, including the declaration of such use in academic writing. Students' use of GenAI tools can be understood through performance expectancy, as many perceive these tools to enhance efficiency and academic output. Effort expectancy is also evident, as the ease of interacting with GenAI platforms encourages widespread adoption. Social influence plays a role in shaping students' attitudes and behaviours, particularly as peer practices and lecturer expectations influence decisions regarding disclosure. Facilitating conditions, including institutional policies, guidelines, and training, are critical in determining whether students are aware of and comply with expectations for declaring GenAI use.

Furthermore, UTAUT provides a useful lens for interpreting the gap between GenAI use and its declaration. While the theory primarily explains technology adoption, its constructs can be extended to understand compliance behaviour. For example, unclear facilitating conditions, such as ambiguous institutional policies, may hinder proper disclosure. Similarly, social influence may either promote or discourage declaration depending on prevailing norms among students. The interplay of these factors helps to explain why students may adopt GenAI tools readily but remain inconsistent in declaring their use. By applying UTAUT, this study is able to move beyond descriptive analysis and offer a theoretically grounded explanation of students' attitudes toward declaring GenAI use, thereby contributing to both theory and practice in the evolving landscape of AI in higher education.

Methodology

Research Design

This study adopted a cross-sectional survey design. A cross-sectional approach is appropriate for examining prevailing behaviours, perceptions, and practices within a defined population at a specific point in time (Creswell & Creswell, 2017; Setia, 2016). The design was considered suitable because the study sought to examine students' attitudes toward declaring the use of Generative Artificial Intelligence (GenAI), their level of awareness of institutional policies, extent of declaration, and the factors influencing such behaviour within Nigerian library schools during a defined period.

Population and Study Area

The population of the study comprised undergraduate students enrolled in Library and Information Science (LIS) programmes in selected Nigerian universities. To ensure national representation across the six geopolitical zones of Nigeria, six universities offering LIS programmes were purposively selected. These include the University of Abuja, FCT (North Central), Federal University Oye, Ekiti State (South West), Federal University of Technology, Ikot Abasi, Akwa Ibom State (South South), Enugu State University of Science and Technology, Agbani (South East), Ahmadu Bello University (North West), and the University of Maiduguri, Borno State (North East). The inclusion of institutions across all geopolitical zones enhanced geographical representativeness and minimized regional bias in the responses.

Sampling Technique and Sample Size

A convenience sampling technique was employed for this study. The questionnaire was administered online through academic colleagues in the selected universities who facilitated its distribution to LIS students. This approach enabled the researchers to reach willing participants efficiently within a limited timeframe, as supported by similar survey-based studies (Alam et al., 2024; Etikan et al., 2016; Saha & Roknuzzaman, 2024; Zulfiqar & Khalid, 2024). Although convenience sampling improved accessibility and response rate, it did not guarantee proportional representation of all subgroups within the population. At the end of the data collection process, a total of 374 valid responses were obtained and used for analysis. The sample size was considered adequate for both descriptive and inferential statistical analysis.

Instrument for Data Collection

Data were collected using a structured questionnaire developed in line with the objectives of the study and existing literature on GenAI use in academic writing. The questionnaire consisted of six sections:

- **Section 1:** Demographic information of respondents (such as gender, age, academic level, awareness of generative AI, and engagement with academic writing).
- **Section 2:** Types of academic writing tasks undertaken by students.

- **Section 3:** Students' attitudes toward declaring the use of GenAI in academic writing.
- **Section 4:** Extent to which students declare their use of GenAI in academic work.
- **Section 5:** Students' level of awareness of institutional policies on GenAI use.
- **Section 6:** Factors influencing students' decisions to declare or not declare GenAI use.

Sections 2 to 6 were structured on a four-point Likert scale, and response options ranged from Strongly Agree (4) to Strongly Disagree (1). A four-point scale was adopted to eliminate a neutral midpoint and encourage respondents to take a definite position, thereby improving clarity and interpretability of responses (Asún et al., 2016; Ayanbode & Adetoro, 2021). A decision benchmark of 2.50 was used for interpretation. Mean scores above 2.50 indicated agreement, while mean scores below 2.50 indicated low levels. The absence of a neutral option enhanced decisiveness and strengthened data interpretation (Asún et al., 2016; Pornel & Saldaña, 2013; Ayanbode & Adetoro, 2021; Idhalama et al., 2021; Labrague et al., 2020; Oladokun et al., 2025).

Validity and Reliability of the Instrument

Content validity of the instrument was ensured through expert review. The questionnaire was assessed by five experts in Library and Information Science who examined the items for clarity, relevance, and alignment with the study objectives. Their suggestions informed the refinement of the instrument. A pilot study was conducted using 30 LIS students from a university not included in the main study. Data obtained from the pilot test were analysed using Cronbach's alpha to determine the internal consistency of the instrument. The reliability coefficients for the major constructs ranged from 0.72 to 0.81, exceeding the recommended threshold of 0.70 for acceptable reliability (Hussey et al., 2025; Taber, 2018). This confirmed that the instrument was reliable for the main study.

Procedure for Data Collection

Data collection was conducted between December 2025 and February, 2026 using Google Forms. The survey link was distributed through academic colleagues in the participating universities via WhatsApp and email, who further shared it with LIS students. Follow up messages and reminders were periodically sent to enhance participation, a strategy known to improve response rates in online surveys (Dillman et al., 2014). Participation in the study was voluntary. An introductory section of the questionnaire informed respondents about the purpose of the study, assured them of confidentiality, and emphasized their right to withdraw at any stage without penalty. No personally identifiable information was collected from participants.

Method of Data Analysis

Data were analysed using both descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, mean scores, and standard deviations, were used to summarise respondents' demographic characteristics and address the research objectives. Mean scores were interpreted using a four-point Likert scale with a decision benchmark of 2.50. For hypothesis testing, non-parametric statistical techniques were employed due to the nature of the Likert-scale data. The Mann–Whitney U test was used to examine differences between two independent groups (gender), while the Kruskal–Wallis H test was applied to assess differences across multiple groups (academic levels). In addition, the Spearman rank-order correlation was used to determine the relationship between key variables, particularly students' attitudes toward GenAI declaration and their awareness of institutional policies. All analyses were conducted using SPSS, with the level of significance set at 0.05 (Pallant, 2020).

Results

Table 1: Demographic information of respondents (N=374)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	132	35.3
	Female	232	62.0
	Prefer not to say	10	2.7
Age Range	18-20	168	44.9
	21-23	124	33.2
	24-26	52	13.9
	27 and above	30	8.0
Academic Level	100 Level	48	12.8
	200 Level	86	23.0
	300 Level	156	41.7
	400 Level	84	22.5
Awareness of Generative AI	Yes	374	100
	No	0	0

Engagement in academic writing	Yes	374	100
	No	0	0

Table 1 shows the demographic distribution of the respondents. The data indicate that the majority of participants were female (62.0%), followed by males (35.3%), while a small proportion (2.7%) preferred not to disclose their gender. In terms of age, most respondents were between 18–20 years (44.9%), followed by 21–23 years (33.2%), suggesting that the sample is largely composed of younger undergraduates. Regarding academic level, the highest proportion of respondents were in 300 level (41.7%), followed by 400 level (22.5%), 200 level (23.0%), and 100 level (12.8%), indicating stronger representation from mid- to final-year students. Notably, all respondents (100%) reported awareness of generative AI and engagement in academic writing, confirming that the sample is fully relevant to the study context.

Table 2: Types of Generative Artificial Intelligence tools used by students in Nigerian library schools for academic writing

S/N	Tool	SA	A	D	SD	Mean	SD
1	ChatGPT	210	120	30	14	3.40	0.78
2	Gemini	180	130	44	20	3.26	0.84
3	DeepSeek	172	138	44	20	3.24	0.83
4	Claude	168	140	46	20	3.22	0.82
5	DALL-E	160	138	50	26	3.16	0.87
6	Meta AI	120	150	70	34	2.95	0.92
7	Copilot	130	140	70	34	2.98	0.91
8	Grammarly	140	160	50	24	3.11	0.85
9	Turnitin	150	140	54	30	3.09	0.88
10	Semantic Scholar	120	150	70	34	2.95	0.92
11	SciSpace	118	152	70	34	2.94	0.92
12	Connected Papers	110	150	80	34	2.89	0.93
13	Consensus AI	108	152	80	34	2.88	0.93
14	QuillBot	140	150	60	24	3.08	0.86

Table 2 presents the types of generative AI tools used by students for academic writing. The results reveal a generally high level of usage across all listed tools, as all mean scores exceed the benchmark of 2.50. ChatGPT recorded the highest mean score (3.40), indicating it is the most widely used tool among students. This is followed closely by Gemini (3.26), DeepSeek (3.24), and Claude (3.22), reflecting strong engagement with large language models. Tools such as DALL-E (3.16), Grammarly (3.11), Turnitin (3.09), and QuillBot (3.08) also show substantial usage, suggesting that students employ both content generation and writing support tools. Meanwhile, platforms like Semantic Scholar (2.95), SciSpace (2.94), Connected Papers (2.89), and Consensus AI (2.88) recorded comparatively lower but still significant usage. Overall, the findings indicate that students utilize a wide range of AI tools, with a stronger preference for conversational and generative systems.

Table 3: Types of Academic Writing Tasks Undertaken by Students

S/N	Item Statement	SA	A	D	SD	Mean	SD
1.	I frequently write course assignments as part of my academic work.	220	120	24	10	3.47	0.70
2.	I engage in term paper writing in my programme.	200	130	30	14	3.38	0.76
3.	I write seminar papers as part of my coursework.	190	130	40	14	3.33	0.79
4.	I participate in report writing (fieldwork, SIWES, or practicum reports).	180	140	40	14	3.30	0.80
5.	I engage in research proposal writing.	150	140	60	24	3.11	0.86
6.	I engage in article or manuscript writing for publication.	120	140	80	34	2.92	0.91

Table 3 highlights the types of academic writing tasks undertaken by students. The findings show that students are actively engaged in various academic writing activities, with all items recording mean scores above 2.50. Course assignments have the highest mean (3.47), indicating they are the most common writing task. This is followed by term papers (3.38), seminar papers (3.33), and report writing (3.30), suggesting consistent engagement in structured academic

tasks. Research proposal writing (3.11) and manuscript writing for publication (2.92) also show moderate participation, though comparatively lower. These results suggest that while students are highly involved in routine academic writing, engagement in advanced scholarly writing such as publication is less frequent.

Table 4: Attitudes Toward Declaring GenAI Use in Academic Writing

S/N	Item Statement	SA	A	D	SD	Mean	SD
1.	Declaring the use of GenAI in academic writing is necessary.	60	90	140	84	2.33	0.95
2.	I believe that using GenAI without declaration is academically inappropriate.	70	90	130	84	2.39	0.97
3.	I feel comfortable disclosing my use of GenAI tools in assignments.	50	80	150	94	2.23	0.96
4.	Declaring GenAI use promotes academic integrity.	70	100	120	84	2.42	0.97
5.	I consider GenAI use similar to other academic aids that should be acknowledged.	80	90	120	84	2.45	0.99
6.	I think declaring GenAI use may negatively affect how my work is evaluated.	160	120	60	34	3.08	0.91
7.	I believe students should always disclose any assistance received from GenAI tools.	70	100	120	84	2.42	0.97
8.	I feel that declaring GenAI use is unnecessary for minor assistance (e.g., grammar correction).	150	130	60	34	3.05	0.92
9.	I am willing to declare my use of GenAI if required by my institution.	120	130	80	44	2.87	0.94
10.	I believe that failure to declare GenAI use constitutes academic dishonesty.	70	100	120	84	2.42	0.97

Table 4 examines students' attitudes toward declaring GenAI use in academic writing. The findings indicate generally negative or weak attitudes toward declaration, as most mean scores fall below the 2.50 benchmark. Students do not strongly agree that declaring GenAI use is necessary (2.33) or that non-declaration is academically inappropriate (2.39). Similarly, they show low comfort in disclosing usage (2.23) and only moderate agreement that declaration promotes academic integrity (2.42). However, students strongly agree that declaring GenAI use may negatively affect evaluation (3.08) and that declaration is unnecessary for minor assistance (3.05). Despite this, there is moderate willingness to declare usage if required by the institution (2.87). Overall, the results suggest that students are hesitant about disclosure, largely influenced by fear of negative academic consequences and perceptions that minor AI use does not require acknowledgment.

Table 5: Extent of Declaration of GenAI Use

S/N	Item Statement	SA	A	D	SD	Mean	SD
1.	I declare my use of GenAI tools in my academic assignments.	40	80	160	94	2.18	0.93
2.	I acknowledge GenAI use when it contributes significantly to my work.	50	80	150	94	2.23	0.95
3.	I include statements indicating GenAI use in my submitted assignments.	40	70	170	94	2.15	0.93
4.	I cite or reference GenAI tools when I use them.	50	80	150	94	2.23	0.95
5.	I declare GenAI use only when explicitly required by my lecturer.	150	120	70	34	3.03	0.92
6.	I avoid declaring my use of GenAI tools in academic work.	160	130	60	24	3.14	0.88
7.	I disclose GenAI use in research-related writing (e.g., proposals, projects).	50	80	150	94	2.23	0.95
8.	I provide detailed explanations of how GenAI was used in my work.	30	70	170	104	2.07	0.92

9.	I declare GenAI use in both minor and major academic tasks.	40	80	160	94	2.18	0.93
10.	I consistently follow any available guidelines when declaring GenAI use.	50	80	150	94	2.23	0.95

Table 5 presents the extent to which students declare their use of GenAI tools. The findings indicate a generally low level of declaration, as most mean scores are below 2.50. Students report low levels of declaring AI use in assignments (2.18), acknowledging significant contributions (2.23), including statements (2.15), citing tools (2.23), and providing detailed explanations (2.07). However, students tend to declare AI use when explicitly required by lecturers (3.03), and many admit to avoiding disclosure (3.14). These results reveal a pattern of conditional and inconsistent disclosure, where students are more likely to comply only when compelled by external requirements rather than internal ethical motivation.

Table 6: Awareness of Institutional Policies on GenAI Use

S/N	Item Statement	SA	A	D	SD	Mean	SD
1.	I am aware that my institution has policies on the use of GenAI in academic work.	60	80	150	84	2.31	0.96
2.	I understand the guidelines for declaring GenAI use in my institution.	50	80	160	84	2.25	0.95
3.	My lecturers have informed me about GenAI use policies.	200	120	34	20	3.33	0.80
4.	I have received formal instruction on ethical use of GenAI tools.	60	80	150	84	2.31	0.96
5.	I know the consequences of not declaring GenAI use.	70	80	140	84	2.36	0.97
6.	Institutional policies on GenAI use are clearly communicated to students.	60	80	150	84	2.31	0.96
7.	I have accessed official documents outlining GenAI use policies.	50	80	160	84	2.25	0.95
8.	I understand what constitutes acceptable and unacceptable GenAI use.	60	80	150	84	2.31	0.96
9.	My institution provides training on responsible GenAI use.	50	80	160	84	2.25	0.95
10.	I am confident in my knowledge of GenAI-related academic regulations.	60	80	150	84	2.31	0.96

Table 6 shows students' awareness of institutional policies on GenAI use. The results indicate generally low awareness, with most items scoring below 2.50. Students report limited awareness of institutional policies (2.31), poor understanding of guidelines (2.25), lack of formal instruction (2.31), and minimal access to official documents (2.25). However, one notable exception is that lecturers have informed students about GenAI policies (3.33), suggesting that awareness is often transmitted informally rather than through structured institutional frameworks. Overall, the findings indicate that while students are somewhat exposed to policy information, their depth of understanding and confidence in policy knowledge remain limited.

Table 7: Factors Influencing Declaration of GenAI Use

S/N	Item Statement	SA	A	D	SD	Mean	SD
1.	Fear of academic penalties influences my decision to declare GenAI use.	120	100	100	54	2.76	0.96
2.	Lecturer expectations affect whether I disclose GenAI use.	110	110	100	54	2.74	0.96
3.	Institutional policies influence my decision to declare GenAI use.	80	90	130	74	2.47	0.97
4.	My personal sense of academic integrity influences my disclosure behavior.	90	90	120	74	2.52	0.98
5.	Peer practices influence whether I declare GenAI use.	80	100	120	74	2.49	0.97
6.	The perceived importance of the assignment affects my decision to declare GenAI use.	90	100	120	64	2.57	0.96
7.	My level of understanding of GenAI tools affects my disclosure decisions.	90	100	120	64	2.57	0.96

8.	The absence of clear guidelines discourages me from declaring GenAI use.	110	110	100	54	2.74	0.96
9.	Concerns about being judged discourage me from disclosing GenAI use.	100	110	110	54	2.68	0.97
10.	Ease of using GenAI tools influences whether I declare their use.	90	110	120	54	2.63	0.96

Table 7 identifies factors influencing students' decisions to declare or not declare GenAI use. The results show that several factors moderately influence disclosure decisions, as most mean scores are slightly above 2.50. Fear of academic penalties (2.76), lecturer expectations (2.74), absence of clear guidelines (2.74), and concerns about being judged (2.68) are key influencing factors. Additionally, perceived importance of assignments (2.57), understanding of GenAI tools (2.57), and ease of use (2.63) also play roles. However, institutional policies (2.47) and peer practices (2.49) fall slightly below the benchmark, indicating weaker influence. Overall, the findings suggest that psychological and contextual factors, particularly fear and ambiguity, are stronger determinants of disclosure behavior than formal institutional structures.

Hypotheses Testing

Hypothesis 1: There is no significant difference in students' attitudes toward declaring GenAI use based on gender.

Table 8: Results of Mann–Whitney U Test Examining Gender Differences in Students' Attitudes Toward Declaring Generative AI Use

Variable	Gender	N	Mean Rank	Sum of Ranks	U	Z	p-value
Attitude toward GenAI Declaration	Male	132	184.62	24,359.84	8,365.50	-0.91	0.363
	Female	232	189.77	44,020.64			

Table 8 presents the results of the Mann–Whitney U test examining gender differences in students' attitudes toward declaring GenAI use. The findings show no statistically significant difference between male and female students ($U = 8365.50$, $Z = -0.91$, $p = 0.363$). Since the p-value is greater than 0.05, the null hypothesis is retained. This indicates that gender does not significantly influence students' attitudes toward GenAI declaration, and both male and female students exhibit similar perceptions and behaviors regarding disclosure.

Hypothesis 2: There is no significant difference in attitudes toward GenAI declaration across academic levels.

Table 9: Results of Kruskal–Wallis H Test Examining Differences in Students' Attitudes Toward Declaring Generative AI Use Across Academic Levels

Variable	Academic Level	N	Mean Rank	H (Chi-square)	df	p-value
Attitude toward GenAI Declaration	100 Level	48	176.20	2.87	3	0.412
	200 Level	86	182.45			
	300 Level	156	191.88			
	400 Level	84	186.73			

Table 9 shows the results of the Kruskal–Wallis H test assessing differences in attitudes across academic levels. The findings reveal no statistically significant difference among students in different academic levels ($H = 2.87$, $df = 3$, $p = 0.412$). As the p-value exceeds 0.05, the null hypothesis is accepted. This suggests that students' academic level does not significantly affect their attitudes toward declaring GenAI use, indicating a consistent pattern of attitudes across all levels of study.

Hypothesis 3: There is no significant relationship between students' attitudes toward GenAI declaration and their awareness of institutional policies.

Table 10: Results of Spearman Rank-Order Correlation Between Students' Attitudes Toward Declaring Generative AI Use and Awareness of Institutional Policies

Variables	N	Spearman's ρ	p-value
Attitudes toward GenAI Declaration vs Awareness of Institutional Policies	374	0.118	0.071

Table 10 presents the results of the Spearman rank-order correlation examining the relationship between students' attitudes toward GenAI declaration and their awareness of institutional policies. The results indicate a weak positive correlation ($\rho = 0.118$) that is not statistically significant ($p = 0.071$). Since the p-value is greater than 0.05, the null hypothesis is retained. This implies that there is no significant relationship between students' attitudes and their awareness of institutional policies, suggesting that awareness alone may not be sufficient to influence attitudes toward GenAI declaration.

Discussion

The findings of this study reveal that students in Nigerian library schools make extensive use of a wide range of generative artificial intelligence tools for academic writing, with conversational and content-generation systems emerging as the most dominant. This pattern reflects a strong preference for tools that support idea generation, drafting, and refinement of academic work. This finding aligns with previous studies which report that students strategically adopt generative AI tools based on perceived usefulness and task relevance (Adnan, 2025; Alsaeed et al., 2025; Farinosi & Melchior, 2025a). The prominence of multifunctional tools further supports the argument that students increasingly engage with AI not merely as support systems but as co-creative partners in academic tasks. This agreement with the literature reinforces the view that perceived performance benefits strongly drive adoption. Within the framework of the Unified Theory of Acceptance and Use of Technology, this finding can be explained by performance expectancy and effort expectancy, as students are more inclined to use technologies that enhance productivity and are easy to use (Venkatesh et al., 2003).

The study also shows that students are actively engaged in a variety of academic writing tasks, particularly routine forms such as assignments, term papers, and seminar work, while participation in advanced scholarly writing such as manuscript preparation is comparatively lower. This pattern suggests that students' engagement with academic writing is largely shaped by curriculum requirements rather than voluntary scholarly output. This finding is consistent with the literature, which indicates that students tend to use generative AI tools to support structured academic tasks that are integral to their coursework (Heil et al., 2025; Beckman et al., 2025). The relatively lower engagement in publication-oriented writing also reflects existing evidence that advanced academic writing requires higher levels of expertise and motivation. From a theoretical perspective, this aligns with facilitating conditions in UTAUT, as institutional structures and academic requirements determine the contexts in which students engage in writing activities.

In contrast, the findings on students' attitudes toward declaring the use of generative AI reveal a generally negative or hesitant disposition. Students do not strongly perceive declaration as necessary, and many express discomfort with disclosing their use of AI tools. At the same time, there is a notable concern that disclosure could negatively influence how their academic work is evaluated. This finding is consistent with prior studies that highlight students' ambivalent attitudes toward AI use, where perceived benefits coexist with ethical uncertainty and fear of consequences (Adnan, 2025; Adžić et al., 2024). It also aligns with evidence that students often operate within unclear ethical boundaries, leading to inconsistent attitudes toward disclosure (Farinosi & Melchior, 2025a). However, the finding partially contradicts studies that suggest a stronger ethical orientation among students, as the present results indicate that ethical considerations are often overshadowed by concerns about academic judgment. Within the UTAUT framework, this can be interpreted through social influence and perceived risk, where students' attitudes are shaped by expectations of lecturers and the perceived consequences of disclosure.

Closely related to attitudes, the study finds that the actual extent of declaring generative AI use is generally low and inconsistent. Students rarely acknowledge their use of AI tools in academic work and tend to disclose only when explicitly required. This behaviour indicates a gap between usage and transparency, reflecting a pattern of conditional compliance rather than intrinsic ethical commitment. This finding strongly supports existing literature, which identifies widespread non-disclosure and selective reporting of AI use among students (Nelson et al., 2025; Qu et al., 2025). It also reinforces the notion of "strategic non-disclosure," where students deliberately decide when and whether to acknowledge AI assistance. The findings further align with research showing that ethical awareness alone does not guarantee compliance with disclosure norms (Fang & Cai, 2025). From a UTAUT perspective, this behaviour can be linked to facilitating conditions, as unclear institutional expectations reduce the likelihood of consistent compliance.

The study further reveals that students' awareness of institutional policies on generative AI use is generally low, with many lacking a clear understanding of guidelines, expectations, and consequences. Although some students report receiving information from lecturers, this awareness appears fragmented and insufficient for guiding behaviour. This finding is consistent with previous studies that highlight a disconnect between general awareness of AI technologies and specific knowledge of institutional policies (Akça et al., 2025; Adnan, 2025). It also supports the argument that

inadequate communication and lack of structured training contribute to confusion and inconsistent practices among students. Within the UTAUT framework, this finding directly relates to facilitating conditions, as the absence of clear institutional support systems and policy communication limits students' ability to engage in responsible and compliant behaviour.

In terms of factors influencing disclosure decisions, the study finds that fear of academic penalties, lecturer expectations, absence of clear guidelines, and concerns about being judged are among the most influential factors. These findings are in strong agreement with the literature, which emphasizes the role of perceived risk, social influence, and psychological factors in shaping disclosure behaviour (Gonsalves, 2025; Hsiao & Tang, 2025). The influence of fear and uncertainty highlights the importance of contextual and emotional dimensions in students' decision-making processes. Additionally, the relatively weaker influence of institutional policies suggests that formal regulations alone may not be sufficient to drive compliance without effective communication and enforcement. These findings align closely with the UTAUT constructs of social influence and facilitating conditions, as both interpersonal expectations and institutional clarity significantly affect behavioural outcomes.

The findings on demographic differences indicate that students' attitudes toward declaring generative AI use do not significantly vary based on gender or academic level. This suggests that perceptions of AI disclosure are relatively uniform across different student groups. This finding is consistent with aspects of the literature that suggest demographic variables may have limited influence compared to cognitive and contextual factors (Tsaryk & Frick, 2025). However, it contrasts with the original propositions of UTAUT, which identify demographic factors such as gender and experience as potential moderators of technology-related behaviour (Venkatesh et al., 2003). The absence of significant differences in this study suggests that attitudes toward AI declaration may be more strongly shaped by shared academic environments and institutional contexts than by individual demographic characteristics.

Finally, the study finds no significant relationship between students' attitudes toward declaring AI use and their awareness of institutional policies. This indicates that awareness alone does not necessarily translate into positive attitudes or ethical behaviour. This finding is consistent with previous research showing that knowledge of policies does not automatically lead to compliance, particularly when ethical considerations are influenced by perceived risks and social norms (Akça et al., 2025; Tsaryk & Frick, 2025). It also reinforces the argument that behavioural outcomes are shaped by a complex interaction of factors rather than a single determinant. Within the UTAUT framework, this highlights the limitation of facilitating conditions when they are not supported by strong social influence and perceived benefits of compliance. In sum, the findings of this study largely align with existing literature in demonstrating widespread use of generative AI tools, inconsistent disclosure practices, and the influence of contextual and psychological factors on student behaviour. At the same time, the study contributes new insights by highlighting the weak link between policy awareness and disclosure behaviour, as well as the limited role of demographic factors. The application of UTAUT provides a useful explanatory framework, showing that students' engagement with generative AI and their disclosure decisions are shaped by performance expectations, social pressures, and institutional support systems.

Implications of the Study

The findings of this study carry important implications for both policy development and academic practice within Nigerian higher education, particularly in library and information science programmes. From a policy perspective, the widespread use of generative artificial intelligence tools alongside low levels of declaration highlights a clear need for the development of explicit, coherent, and accessible institutional policies on AI use. The current situation, where students demonstrate limited awareness and understanding of guidelines, suggests that existing policies are either insufficient or poorly communicated. Institutions must therefore move toward establishing comprehensive frameworks that clearly define acceptable and unacceptable uses of generative AI, as well as the expectations for disclosure across different types of academic tasks. Such policies should go beyond general statements and provide practical guidance, including examples of when and how to acknowledge AI use. In addition, the finding that students are more likely to disclose AI use only when explicitly required implies that policy enforcement mechanisms must be strengthened. This may involve embedding disclosure requirements within assignment instructions, assessment rubrics, and academic integrity regulations to ensure consistency and compliance.

The findings also suggest that policy initiatives should address students' fears and misconceptions about the consequences of disclosure. Since many students perceive that declaring AI use may negatively affect their academic evaluation, institutions must ensure that policies are framed in a way that encourages transparency rather than discourages it. This includes promoting a culture where responsible AI use is recognized as part of legitimate academic practice, rather than automatically associated with misconduct. Clear communication from institutions and lecturers regarding the purpose of disclosure such as promoting transparency and ethical scholarship can help to reduce anxiety and build trust among students.

In terms of practice, the findings indicate the critical role of lecturers and academic staff in shaping students' understanding and behaviour. The evidence that students rely significantly on lecturer guidance for information about AI policies suggests that instructors serve as key intermediaries between institutional frameworks and student practice. As such, there is a need for lecturers to be adequately trained and supported to provide consistent and accurate guidance

on AI use and disclosure. This includes integrating discussions of generative AI into teaching, offering clear instructions on assignment expectations, and modelling appropriate disclosure practices. Lecturers should also consider redesigning assessment strategies to account for the presence of AI tools, focusing more on critical thinking, originality, and process-based evaluation. Furthermore, the findings indicate the need for structured educational interventions to improve students' ethical awareness and practical understanding of AI use. While students are highly engaged with AI tools, their limited understanding of institutional expectations and ethical implications suggests a gap in digital and AI literacy. Institutions should therefore incorporate formal training programmes, workshops, or curriculum components that address responsible AI use, academic integrity, and disclosure practices. Such initiatives would help students move from mere tool usage to informed and ethical engagement. Finally, the finding that demographic factors such as gender and academic level do not significantly influence attitudes toward AI declaration suggests that interventions should be broadly targeted rather than limited to specific student groups. Institution-wide strategies are therefore more appropriate, ensuring that all students receive consistent information, training, and support regardless of their background or level of study.

Conclusion

The study concludes that generative artificial intelligence has become an integral part of academic writing practices among students in Nigerian library schools, with widespread adoption driven primarily by the perceived usefulness and ease of use of these tools. Students actively engage with a variety of AI applications, particularly for routine academic tasks such as assignments, term papers, and seminar writing, indicating that these technologies are now embedded in their everyday learning processes. However, this high level of usage is not matched by a corresponding level of transparency, as students demonstrate generally weak and hesitant attitudes toward declaring their use of generative AI in academic work.

The findings further reveal that the actual practice of declaring AI use is low and inconsistent, with most students only disclosing their use when explicitly required. This indicates a significant gap between engagement with AI tools and adherence to principles of academic transparency. Students' reluctance to declare usage is largely influenced by fear of negative academic consequences, concerns about being judged, and the perception that minor forms of AI assistance do not warrant acknowledgment. These concerns are compounded by limited awareness and poor understanding of institutional policies, suggesting that many students operate within an environment of ambiguity and uncertainty regarding acceptable practices.

Additionally, the study establishes that students' attitudes toward declaring AI use are not significantly influenced by gender or academic level, indicating that these perceptions are broadly shared across different demographic groups. It also finds that awareness of institutional policies does not significantly translate into positive attitudes toward disclosure, highlighting that knowledge alone is insufficient to drive ethical behaviour. Instead, disclosure practices are shaped by a complex interaction of psychological, social, and institutional factors. Generally, the study concludes that while generative AI offers substantial benefits for enhancing academic productivity, its integration into academic writing has introduced important challenges related to transparency and academic integrity. The absence of clear, well-communicated institutional guidelines, combined with students' concerns about potential consequences, has resulted in inconsistent and often limited disclosure practices. The study therefore indicates the need for universities to move beyond mere awareness creation and develop comprehensive, supportive frameworks that promote clarity, build trust, and encourage responsible and transparent use of generative AI in academic work.

Based on the findings and conclusion of this study, the following recommendations have been proposed:

1. University management should develop and implement clear, comprehensive, and accessible policies on generative AI use and disclosure, including explicit guidelines on when and how students are required to declare AI assistance.
2. Lecturers should embed mandatory AI disclosure requirements into assignment instructions and grading rubrics, while also clearly communicating that responsible AI use will not automatically lead to penalization.
3. LIS educators should integrate structured training on ethical AI use, academic integrity, and disclosure practices into the curriculum to strengthen students' professional responsibility toward transparent information use.
4. Library schools should organize regular workshops and orientation programmes to improve students' understanding of AI policies, reduce fear of negative evaluation, and promote a culture of ethical and transparent AI usage.
5. Students should adopt responsible academic practices by consistently declaring their use of generative AI tools, recognizing that transparency is a core component of academic integrity and their future professional roles.

Limitations and Suggestions for Further Studies

This study is not without limitations. First, the use of a cross-sectional survey design means that data were collected at a single point in time, which limits the ability to capture changes in students' attitudes and behaviours toward generative AI declaration over time. As the use of AI tools in education is rapidly evolving, students' perceptions and practices may shift with increased exposure, policy development, and institutional interventions. Second, the study relied on self-reported data, which may be subject to social desirability bias or underreporting, particularly given the sensitivity surrounding academic integrity and non-disclosure of AI use. Students may have provided responses they perceived as acceptable rather than fully reflecting their actual practices. Third, the adoption of a convenience sampling technique

restricts the generalizability of the findings. Although efforts were made to include institutions across the six geopolitical zones of Nigeria, the sample may not fully represent all library and information science students in the country. Additionally, the study focused specifically on students within library and information science programmes, which may limit the applicability of the findings to other academic disciplines where the nature and expectations of AI use may differ. Another limitation lies in the exclusive use of quantitative methods, which, while useful for identifying patterns and relationships, do not provide deeper insights into the underlying reasons, motivations, and contextual nuances influencing students' disclosure behaviours. Finally, the study examined awareness of institutional policies but did not assess the actual content, quality, or enforcement of these policies, which could play a significant role in shaping student behaviour.

In light of these limitations, several directions for further research are suggested. Future studies could adopt longitudinal designs to examine how students' attitudes and disclosure practices evolve over time, particularly as institutional policies and AI literacy initiatives become more established. There is also a need for qualitative or mixed-methods research to explore in greater depth the motivations, perceptions, and contextual factors that influence students' decisions to declare or not declare AI use. Expanding the scope of research to include students from other academic disciplines would provide comparative insights and enhance the generalizability of findings across higher education contexts. In addition, future studies could investigate the perspectives of lecturers and academic administrators to better understand how institutional expectations, assessment practices, and policy enforcement shape student behaviour. Further research may also examine the effectiveness of specific interventions, such as policy reforms, training programmes, and assessment redesign, in promoting transparent and ethical AI use. Finally, studies that critically analyse the content, clarity, and implementation of institutional AI policies would provide valuable evidence for improving policy frameworks and ensuring that they effectively support responsible academic practices.

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An Overview of Artificial Intelligence in Transforming Reference Services in Nigerian University Libraries

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Abstract

This paper emphasizes the growing necessity for libraries to adjust to technological developments and improve the ways in which users access knowledge. The study examined the role of AI in transforming reference services in Nigerian university libraries, with particular focus on the current status of reference services, the various applications of AI, and the potential benefits of integrating AI into service delivery. The study adopted an empirical approach, drawing on observation, review of existing literature and documented practices, and structured questionnaires administered to library staff and library users. Data were analyzed descriptively to identify patterns in awareness, utilization, and challenges of AI adoption. The findings revealed that there is a high level of awareness and interest in the implementation of AI among librarians, library staff, and students. However, the actual utilization of AI remains relatively low. The study also underscores challenges affecting the harnessing of AI into reference services, including inadequate funding, a lack of technical skills, poor infrastructure, unreliable power supply, and limited internet connectivity.

Keywords: Artificial Intelligence (AI), Nigerian University Libraries, Reference Services.

Introduction:

Among other industries, education has undergone major transformations due to artificial intelligence (AI). The potential of AI to revolutionize library services is now being recognized by Nigerian universities. Libraries have long served as essential repositories of knowledge, adapting to evolving societal needs and technological advancements (Abdullahi, 2023). Traditionally, academic libraries have been seen as knowledge repositories that offer access through carefully chosen print collections and reference services (Ramadevi & Bhatt, 2026). There are many advantages to utilizing AI in university libraries, including better information processing, higher efficiency, and better services. Additionally, AI can simplify activities like cataloging, archiving, and indexing, enabling librarians to concentrate on more demanding duties. They emphasize the important role that libraries play in higher education by providing information to all users, regardless of age, background, gender, or religion.

Libraries are constantly changing in response to shifting demands for knowledge and technology. In order to remain current and accessible, they must adjust to the quick rate of technological development. AI is transforming libraries into technologically advanced and user-centric institutions. It is causing significant changes in the field of library and information professions (Akinola, 2023). Innovation is becoming a crucial requirement for academic libraries (Ramadevi & Bhatt, 2026).

Reference services have long been a part of libraries. They connect users with a large amount of information. The reference desk is a counter where individuals may sit in the library. The library reference desk has always been a resource for individuals seeking information. They can also get help from them over the phone or by mail, which might take a while to get an answer. Because things are changing with technology, it makes sense to have a reference service. This is like an upgrade to the usual way of rendering library services. The main function of online reference services is to help librarians and people who use the library converse with each other through digital means.

University libraries are not just buildings that hold books and information. It could be physical, digital, or in cloud space. Their primary responsibility is to guarantee that individuals have access to the knowledge they require. University libraries use technology like mobile phones, cloud computing, and artificial intelligence to assist people. This includes different forms of AI such as expert systems, natural language processing, and machine learning. AI is modelled after human intelligence to adapt, recognize, and process information and is increasingly changing the ways and manner people handle certain tasks (Omeluzor, 2024). However, studies show that Nigerian university libraries have not fully adopted the use of Artificial Intelligence.

Several problems hinder Nigerian university libraries from incorporating Artificial Intelligence. These hinderances include: the lack of computer skills and technical knowledge to use AI tools effectively amongst library staff. Insufficient funding to afford necessary AI tools for libraries, lack of open-mindedness among librarians (Akinola, 2023), poor power supply, poor internet connectivity, privacy and ethical issues, and lastly, concern that AI will cause library staff to lose their jobs. To abate these obstacles, necessitated or prompt the study of harnessing artificial intelligence to transform reference services in Nigeria universities.

1.1 Objectives of the study

The study aims to achieve the following objectives:

1. To examine the status quo of reference services in Nigerian university libraries.
2. To explore the various applications of Artificial Intelligence in library reference services.
3. To analyze the potential benefits of integrating Artificial Intelligence into reference services in Nigerian university libraries.

Research Questions

1. What is the current status of reference service in Nigerian university libraries?
2. What are the various applications of artificial intelligence in library reference services?
3. What are the potential benefits of integrating AI into reference services in Nigerian university libraries?

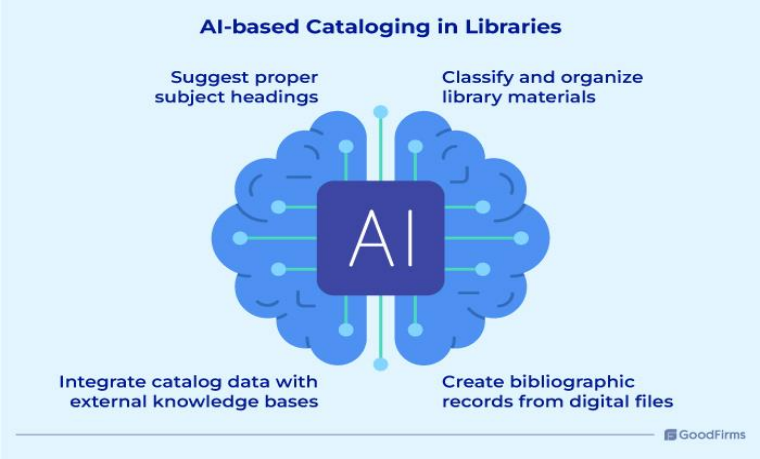
Literature Review:

The field of artificial intelligence has seen a considerable surge in popularity in recent years, especially in 2023. Several scholars see artificial intelligence as a critical field that all businesses must deal with. Artificial Intelligence, which is the latest in the development, has been viewed as one of the evolutionary technological tools that has brought about tremendous change in the operations and services of the library (Harriet, 2024). One of the most significant aspects of artificial intelligence is that it may be used in a variety of applications. The Oxford English Dictionary defines AI as the capacity of computers, or other devices, to exhibit intelligent behavior. This suggests that AI systems can occasionally outperform humans and appear to reason, learn, and act like them. The Association for the Advancement of Artificial Intelligence (AAAI) defines artificial intelligence as the scientific understanding of the mechanisms behind thought and intelligent behaviour.

Current Status of Reference Service Using AI:

The father of artificial intelligence, John McCarthy, defines it as the science and engineering of making intelligent robots, with an emphasis on intelligent computer software. Innovations in library and information science, in particular, are constantly expanding the horizons of what is possible for humans. In the last seven decades, storage technologies have progressed from solid-state drives, floppy disk drives, and hard disk drives. Based on user preferences and browsing history, these smart artificial intelligence (AI) systems may offer customized recommendations, help with reference services, and even respond to frequently asked questions. By utilizing sentiment analysis (Odigie, 2024) and natural language processing (NLP), these chatbots are able to have meaningful conversations with users and provide help when needed.

Figure 1: AI-based Cataloging in Libraries



Source: Mupaikwa (2024)

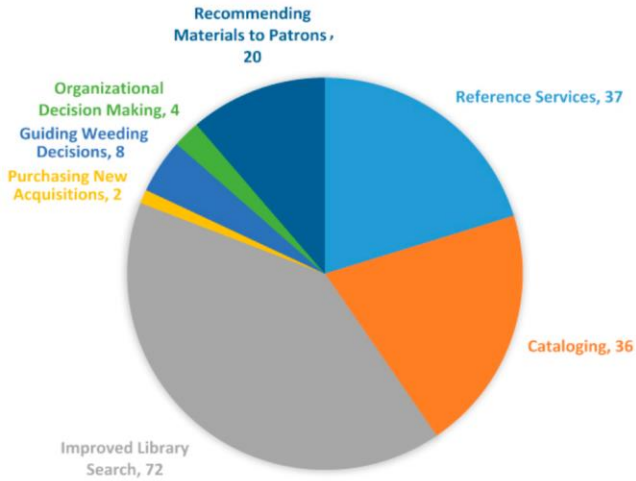
AI in Reference Services

As virtual reference services replace desk-reference library services, some conventional library functions have been taken over by technology, indicating that they may soon become obsolete. One of the major library sections is the reference service industry, which has been greatly impacted by these technological developments (Mupaikwa, 2024). It is not possible to depend on chatbots to mimic human intelligence and emotional expression. However, chatbots may be a cheap way to respond to the majority of common reference queries and point users in the right direction for help.

Digital reference assistants are intended to enhance the regular operations of reference desks and increase service productivity (Nawaz, 2020), not to take the place of individuals or reduce human interaction.

In their essay, Nawaz & Saldeen (2020) discussed the benefits of AI chatbots in reference services. They are as follows: Chatbots allow multiple users to benefit from chat services simultaneously. As a result, users have 24/7 access to chatbots that can maintain ongoing conversations and provide timely, reliable answers. Users can easily access them from anywhere at any time, even when the library is closed. Globally, university libraries have begun deploying chatbots to support reference services, including responding to frequently asked questions, assisting with database navigation, and providing basic research support (Folorunso & Kaltumi, 2025). ChatGPT can aid with technical and reader services such as answering basic reference inquiries, navigating the library website, and assisting with research, cataloguing, classification, and collection development (Adetayo, 2023).

Figure 2: Pie Chart Illustrating areas in academic libraries where employees would like to see AI introduced.



Source: Lund et al (2020)

The pie chart above, by Lund, Omame, Tijani, and Agbaji (2020), illustrates the areas in academic libraries where employees would like to see AI introduced. The highest proportion, 72%, favoured improvements in library search systems, while reference services were the second-highest category at 37%, with the remaining categories distributed across other library functions. This reveals that while introducing and strengthening search systems is the most paramount need, there is clear awareness among library employees that reference services could also benefit significantly from harnessing AI into library services.

The current state of reference services in Nigerian university libraries:

Okeke, Oghenetega, and Nwabu (2013) did research on the reference and information services offered by academic libraries in Federal Polytechnic, Oko, Anambra State University, Nnamdi Azikiwe University, and Madonna University, all of which are located in Anambra State, Nigeria. According to the study's findings, the reference and information services provided by these libraries were inadequate, and the only area where students expressed satisfaction was with photocopying materials. Furthermore, Madukoma (2015) discovered that the reference services at the Babcock University Library in Ogun State, Nigeria, were insufficient and underutilized. Oyewole and Belau (2021) in their research on the availability and usage of electronic reference services at Bells University in Ogun State, Nigeria, found that the main ones were emailing questions to the librarian, phone conversations with the librarian, and internet chats with the librarian. In addition, the research by Uzoigwe and Eze (2018) on the perceived benefits of reference services in Nigerian University Libraries found that the majority of Nigerian university libraries offer reference services and that the majority of students expressed a high level of satisfaction. Among the reference services they highlighted were access, e-journals, ICT supply in reference services, and user education.

Reference librarians' public image has also been examined. In contrast to the majority of Florida students who thought reference librarians were helpful, Kampen-Breit and Cooke's (2015) study revealed that these students were reluctant to approach them for help since their past experiences with reference librarians were perceived as unpleasant and obnoxious. Successful AI implementation in Nigerian libraries requires more than technological solutions alone. Equally important are organizational factors (leadership commitment, staff development), contextual adaptations (localization, infrastructure planning), and sustainable implementation models that balance innovation with practical constraints (Umoru, 2025).

Application of Artificial Intelligence in Library Reference Services:

Application of AI tools for reference service delivery in libraries Reference service is defined as a part of library administration that deals with the assistance given to patrons in their use or quest for resources of the library. According to Honghai (2020), reference service helps to establish contact between a user and the right document at the right time, thereby saving the time of the user. Credited with the founding of library reference service, Green (1876) as cited in

Honghai (2020) said in a paper read at a meeting of the American Library Association, that a librarian should be as unwilling to allow an inquirer to leave the library with his question unanswered as a shop-keeper is to have a customer go out of his store without making a purchase. Apart from requesting for on-desk services, reference is increasingly conducted via phone calls, chat and e-mail. If online book stores are now very smart with almost accurate recommendations, then a digital library cannot afford to offer less. Traditionally, reference services were provided in person at a specific desk within the library building, over the phone, and by letter (Cordell, 2013).

Potential Benefits of Integrating AI into Reference Services:

The benefits of the use of AI tools for reference service delivery in libraries, according to Ashikuzzaman, (2024), posited that AI chatbots have emerged as a transformative force in libraries, promising to revolutionize user experience with their ability to provide instantaneous assistance and access to information. These digital assistants offer patrons the convenience of round-the-clock support and personalized interactions. The integration of these tools in libraries, academic libraries especially has significantly enhanced the patron experience, improved accessibility, and optimizing library operations, ensuring, libraries remain vital in the digital age. Additionally, AI tools such as chatbots and virtual assistants enable libraries to extend their services beyond traditional operating hours, ensuring patrons can access support and resources whenever needed. Integrating artificial intelligence (AI) tools into library services has revolutionized how patrons interact with and access information (Ajinyemi, 2023). These intelligent virtual assistants have become invaluable assets in enhancing user satisfaction by providing round-the-clock assistance, personalized support, and efficient information retrieval. With their ability to analyze queries, offer tailored recommendations, and continuously improve through machine learning algorithms, AI chatbots have reshaped the library experience, offering patrons unparalleled convenience and accessibility**.**

Theoretical Framework:

This research paper took into account the Theory of Technology Acceptance Model (TAM), which explains how to encourage users to accept and utilize technology. This theory provides a theoretical basis for understanding the adoption and impact of AI in reference services within Nigerian universities. In the context of this study, TAM is relevant in explaining how libraries, staff, and students perceive AI tools in reference services. When users believe that AI technologies such as chatbots are useful and easy to use, they are more likely to incorporate them in their service delivery. Chatbots offer promise in supporting librarians' roles across different library tasks (Okpala et al., 2024).

Methodology

This study adopted an empirical research design. An empirical approach is one that draws conclusions from observation, review of existing practices, and direct evidence gathered from those involved in the phenomenon under investigation. In this study, the researcher examined the role of artificial intelligence in transforming reference services in Nigerian university libraries by combining observation of current library practices, review of documented experiences reported in existing literature, and structured questionnaires administered to library staff and library users. This design allowed the researcher to ground findings in real observations and the reported experiences of those who provide and use reference services in Nigerian university libraries.

Discussion of Findings:

Current Status of Reference Service in Nigerian University Libraries

The findings from the literature review reveal that the current status of reference services in Nigerian university libraries is still predominantly traditional and underdeveloped in terms of technological integration. Existing practices continue to rely on face-to-face interactions, telephone communication, and basic electronic services such as email and simple online chats. This statement is strongly supported in the literature written by Okeke, Oghentega, and Nwabu (2013), who found that reference and information services in Nigerian academic libraries were generally inadequate and underdeveloped. Similarly, Madukoma (2015) reported that reference services in Babcock University library were insufficient and underutilized. Oyewole and Belau (2021) further observed that available electronic reference services are largely limited to basic communication tools rather than advanced digital systems. This situation reflects broader challenges within Nigerian academic libraries, including inadequate funding, poor infrastructure, unstable power supply, and weak internet connectivity (Akinola, 2023; Harriet, 2024). Hence, the current state of reference services can be described as transitional, positioned between traditional service models and emerging digital possibilities, but yet to fully embrace AI.

Various Applications of Artificial Intelligence in Library Reference Services:

Empirical analysis reveals that Artificial Intelligence has various applications in library reference services, even though its practical implementation in Nigerian university libraries remains limited. The literature points out several functional areas where AI can significantly enhance service delivery.

One of the most outstanding applications is the use of AI-powered chatbots to handle routine enquiries and frequently asked questions. Nawaz (2020) emphasized that AI systems can provide immediate and accurate responses to users,

thereby improving access to information. Nawaz & Saldeen (2020) further noted that chatbots enable synchronous interaction with multiple users and provide continuous reference support. In addition, AI technologies such as natural language processing (NLP) and machine learning promote more interactive and user-friendly communication between libraries and users. These technologies enable systems to interpret user questions and provide appropriate responses (Odigie, 2024).

AI is also applied in intelligent information retrieval systems, which enhance search accuracy and provide personalized recommendations based on user behaviour. Adetayo (2023) highlighted that AI tools such as ChatGPT can assist in supporting research processes.

Despite these identified applications, the gap between theoretical potential and actual implementation remains significant. This disparity aligns with the Technology Acceptance Model (TAM), which suggests that incorporation of AI is influenced not only by perceived usefulness but also by infrastructural readiness and ease of use (Okpala et al., 2024).

Potential Benefits of Integrating AI into Reference Services in Nigerian University Libraries

The empirical evidence explains that the incorporation of AI into reference services provides several benefits in terms of efficiency, accessibility, and overall service quality. A major benefit is the improvement in response time, as AI systems can process and respond to queries instantly. Nawaz (2020) observed that AI significantly enhances the speed and reliability of reference service delivery. Similarly, Satheesh (2024) noted that AI improves operational efficiency and user experience in library services.

Another key benefit is, unlike traditional reference desks, AI systems provide uninterrupted access to information, which leads to an increase in accessibility of library services (Nawaz & Saldeen, 2020). AI also contributes to the reduction of workload by handling repetitive enquiries, allowing librarians to concentrate on more complex tasks. This shift promotes professional productivity (Ramadevi & Bhatt, 2026).

However, the recognition of these benefits is subject to addressing major issues such as poor infrastructure and inadequate funding. Umoru (2025) emphasized that successful AI incorporation requires strategic planning, organizational readiness, and sustainable implementation models.

Overall, the empirical evidence suggests that while the benefits of AI in reference services are diverse, their full recognition in Nigerian university libraries relies on intentional and sustained efforts to overcome existing limitations.

Conclusion

This research has demonstrated that artificial intelligence holds significant potential to enhance reference services in Nigerian university libraries. Empirical evidence indicates that current reference services remain highly traditional, with limited technological integration, despite increasing recognition of AI (Okeke et al., 2013; Oyewole & Belau, 2021). The analysis further reveals that AI technologies such as chatbots can enhance service delivery by improving response time and accessibility (Satheesh, 2024). However, persistent challenges continue to prevent proper and effective implementation.

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Application of Digital Skills for Innovative Library Services Delivery in Distance Learning Programme by Librarians in National Open University of Nigeria

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Abstract

This study investigated digital skills acquisition among librarians and its influence on innovative library service delivery in the National Open University of Nigeria (NOUN). The study adopted a descriptive survey research design. The population comprised professional librarians working in selected NOUN study centres across the six geopolitical zones of Nigeria and the university headquarters. Data were collected using a structured questionnaire designed to obtain information on the types of digital skills acquired, methods of skills acquisition, application of digital skills in distance learning library services, and challenges affecting effective digital skills development. Data were analysed using descriptive statistics, including frequency counts, percentages, mean scores, and standard deviations. The findings revealed that librarians possessed basic digital competencies such as online information searching, use of electronic databases, and management of digital resources. However, competencies in advanced digital areas essential for distance learning environments, including virtual reference services, learning management system integration, digital content creation, and online user engagement, were relatively low. The study further identified major challenges affecting digital skills acquisition and application, including limited training opportunities, inadequate ICT infrastructure, insufficient institutional support, and workload pressures. The findings also indicated that the acquisition and application of digital skills contributed positively to innovative library service delivery for distance learners. The study concluded that the extent of application of digital skills among librarians for innovative library service delivery in NOUN was moderate, as librarians demonstrated competence in basic digital operations but showed limited proficiency in advanced digital skills required for delivering innovative services in distance learning environments. The study recommended regular capacity-building programmes, improved ICT infrastructure, and stronger institutional support to enhance librarians' digital competencies and promote more innovative library service delivery.

Keywords: Digital Skills Acquisition, Librarians, Innovative Library Services, Distance Learning, ICT Competencies, National Open University of Nigeria.

Introduction

The rapid transformation of the global information environment, driven by advances in Information and Cmmunication Tchnologies (ICTs), has significantly reshaped the roles and responsibilities of librarians. In contemporary academic settings, particularly within distance learning institutions, traditional library practices are increasingly being complemented by digitally mediated services that support remote access, virtual learning, and real-time information delivery. This paradigm shift has made digital skills acquisition an indispensable requirement for librarians who are expected to provide innovative, user-centered, and technology-driven services (Adeleke&Olorunsola, 2020; Ezeani&Igwesi, 2012). Digital skills refer to the competencies required to effectively use digital technologies for accessing, evaluating, creating, and disseminating information. These competencies encompass a wide range of abilities, including information retrieval, database management, digital content creation, online communication, data curation, and the use of library management systems. Librarians equipped with such skills are better positioned to function efficiently in modern digital library environments and to support teaching, learning, and research activities in higher institutions (Ilomäki et al., 2016; Ng, 2012). In the context of the evolving knowledge economy, digital literacy is no longer optional but a core professional requirement for librarians seeking relevance in the 21st century (Aina, 2014). In Nigeria, the emergence of digital librarianship has been influenced by the increasing adoption of electronic resources, institutional repositories, and online learning platforms. However, studies have shown that while many librarians possess basic digital competencies, there are still gaps in advanced skills necessary for innovative service delivery. Challenges such as inadequate ICT infrastructure, inconsistent power supply, limited access to training opportunities, and insufficient funding continue to hinder effective digital skills acquisition among librarians (Okiy, 2010; Salaam & Okezie, 2018). These limitations are particularly significant in distance learning environments where digital proficiency is essential for supporting geographically dispersed learners.

The National Open University of Nigeria (NOUN), as the foremost open and distance learning institution in the country, operates within a technology-driven educational framework that relies heavily on digital information systems. Unlike conventional universities, NOUN delivers instruction through online platforms, electronic course materials, and virtual

learning environments. Consequently, librarians in NOUN are required to go beyond traditional roles of information custodians to become digital facilitators, information literacy instructors, e-resource managers, and virtual support providers. Their ability to acquire and apply digital skills directly influences the effectiveness of library service delivery and the overall learning experience of distance learners (Ojedokun&Owolabi, 2003; Yusuf & Balogun, 2011). Furthermore, the integration of emerging technologies such as artificial intelligence, big data, and cloud computing has expanded the scope of librarianship. Librarians are now expected to participate in knowledge creation, digital scholarship, and collaborative learning ecosystems, thereby enhancing student engagement and academic productivity in open and distance learning contexts (Lippincott, 2015; Cox, 2016). This evolution underscores the need for continuous professional development and strategic capacity building in digital competencies. Innovative library service delivery in distance learning environments involves the use of digital tools and platforms to provide seamless access to information resources, including e-books, online journals, databases, and institutional repositories. It also includes virtual reference services, online user education, digital archiving, and personalized information services. The effectiveness of these services depends largely on the extent to which librarians have acquired and can apply relevant digital skills. Without such competencies, the potential of digital library services to support flexible and inclusive education cannot be fully realized (Ezeani&Igwesi, 2012; Aina, 2014).

Statement of the Problem

The increasing adoption of digital technologies in open and distance learning institutions has transformed the nature of library services, requiring librarians to acquire and apply a wide range of digital skills to support remote learners effectively. In the National Open University of Nigeria (NOUN), library services are expected to be delivered through digital platforms that facilitate access to information resources, virtual assistance, online information literacy instruction, and other technology-driven services. However, concerns have been raised regarding the level of digital skills possessed by librarians and the extent to which such skills are applied in the delivery of innovative library services. Notwithstanding the investments in information and communication technologies, several factors such as inadequate ICT infrastructure, limited professional development opportunities, insufficient institutional support, and technological changes may affect librarians' acquisition and application of digital skills. These challenges have the potential to influence the quality and effectiveness of library services provided to distance learners. More so, although previous studies have examined ICT competencies and digital literacy among librarians, there is limited empirical evidence on how digital skills acquisition influences innovative library service delivery within the context of open and distance learning institutions, particularly the National Open University of Nigeria. This gap in knowledge creates the need for a study that investigates the digital skills acquired by librarians, the methods through which such skills are obtained, the extent to which the skills are applied in service delivery, and the challenges affecting their effective utilization.

The objectives of the Study

The study is guided by the following specific objectives:

1. To find out the level of digital skills possessed by librarians in the National Open University of Nigeria.
2. To identify the types of digital skills required for innovative library service delivery in a distance learning environment.
3. To investigate the extent to which librarians apply digital skills in delivering library services in the National Open University of Nigeria.
4. To find out the challenges affecting digital skills acquisition among librarians in the National Open University of Nigeria.

Research Questions

The following research questions will guide the study:

1. What is the level of digital skills possessed by librarians in the National Open University of Nigeria?
2. What types of digital skills are required for innovative library service delivery in a distance learning environment?
3. To what extent do librarians apply digital skills in delivering library services in the National Open University of Nigeria?
4. What are the challenges affecting digital skills acquisition among librarians in the National Open University of Nigeria?

Literature Review

The literature review examines existing scholarly works related to digital skills acquisition and its influence on innovative library service delivery. The review is organized in line with the objectives of the study, focusing on the level of digital skills possessed by librarians, the types of digital skills required for innovative service delivery in distance learning environments, the application of digital skills in library services, challenges affecting digital skills acquisition, and strategies for enhancing digital competencies among librarians. The review also identifies gaps in existing studies and provides a foundation for understanding the role of digital skills in improving library service delivery within open and distance learning institutions such as the National Open University of Nigeria (NOUN).

Level of Digital Skills Possessed by Librarians

Digital skills have become an essential requirement for librarians in contemporary information environments. These skills extend beyond basic computer literacy to include competencies in digital literacy, information management, online communication, and the use of emerging technologies. According to Ng (2012), digital skills encompass the ability to locate, evaluate, create, and communicate information using digital technologies. Similarly, van Laar et al. (2017) emphasized that librarians require a combination of technical, cognitive, and social competencies to function effectively in digital environments. In academic and distance learning institutions, librarians are expected to possess skills that enable them to support users in accessing and utilizing electronic information resources efficiently. Studies have shown that many librarians possess basic digital competencies such as internet searching, word processing, email communication, and database usage. However, proficiency levels vary across institutions and regions, particularly in developing countries where access to training and technological resources may be limited (Aina, 2014). Assessing the level of digital skills possessed by librarians is therefore necessary for determining their preparedness to deliver modern library services.

Types of Digital Skills Required for Innovative Library Service Delivery in Distance Learning Environments

The digital transformation of library services has created a demand for diverse digital competencies among librarians. Innovative service delivery requires skills in digital content creation, electronic resource management, virtual reference services, online information literacy instruction, database administration, learning management system integration, and social media engagement. The American Library Association (2019) noted that librarians must continuously update their technological competencies to remain relevant in changing information environments. In distance learning environments, librarians require additional skills that enable them to support users remotely. These include competencies in virtual communication, online collaboration tools, cloud-based technologies, and digital repository management. Hussain (2020) observed that the effectiveness of innovative library services depends largely on librarians' ability to utilize digital technologies creatively and efficiently. Consequently, identifying the specific digital skills required in distance learning environments is important for improving library service delivery.

Application of Digital Skills in Library Service Delivery

The acquisition of digital skills is meaningful only when such skills are effectively applied in library operations and services. Digital skills enable librarians to provide innovative services such as virtual reference assistance, online user education, institutional repository management, electronic resource provision, and remote access support. These services enhance accessibility, efficiency, and user satisfaction, particularly in institutions that serve geographically dispersed learners. Distance learning has significantly expanded the responsibilities of librarians beyond traditional service models. According to Moore and Kearsley (2012), librarians in distance education institutions play critical roles in facilitating access to information resources and supporting independent learning. UNESCO (2020) further emphasized that digital technologies have transformed library services into predominantly online and user-centred systems. In institutions such as the National Open University of Nigeria, effective application of digital skills is essential for meeting the information needs of distance learners.

Challenges Affecting Digital Skills Acquisition among Librarians

Despite the growing importance of digital competencies, several challenges hinder effective digital skills acquisition among librarians. Inadequate ICT infrastructure remains a major obstacle, particularly in developing countries where internet connectivity and technological facilities are often insufficient. Okiy (2010) identified poor funding, inadequate equipment, and limited access to training opportunities as significant barriers to digital skills development among librarians. Other challenges include resistance to technological change, heavy workloads, and limited institutional support for professional development. The World Bank (2021) also highlighted the digital divide and unequal access to technological resources as factors affecting digital competence development in many developing nations. These challenges can limit librarians' ability to acquire and apply the digital skills required for innovative service delivery.

Strategies for Enhancing Digital Skills Acquisition among Librarians

Enhancing digital skills acquisition requires deliberate institutional and professional interventions. Continuous professional development programmes, workshops, seminars, and online training opportunities are among the most effective approaches for improving librarians' competencies. The International Federation of Library Associations and Institutions (IFLA, 2021) emphasized the need for lifelong learning and continuous skills upgrading to address rapidly changing technological demands. Other important strategies include increased funding for ICT infrastructure, integration of digital competencies into Library and Information Science curricula, mentorship programmes, and collaboration among libraries and educational institutions. The Association of College and Research Libraries (2016) noted that institutional support is critical for sustaining digital competence development among librarians. These strategies can contribute significantly to improved library service delivery in digital and distance learning environments.

Empirical Review

Available studies indicate that digital skills play a significant role in enhancing library service delivery. However, most existing studies have focused on digital literacy, ICT competencies, or technology adoption among librarians in conventional academic libraries. There is limited empirical evidence specifically examining digital skills acquisition

and its influence on innovative library service delivery in open and distance learning institutions such as the National Open University of Nigeria. This gap in the literature justifies the need for the present study.

Summary of Literature Review

The literature reviewed indicates that digital skills are essential for effective and innovative library service delivery, particularly in distance learning environments. Librarians require a wide range of digital competencies to support electronic information services and remote learners. However, challenges such as inadequate infrastructure, insufficient training opportunities, and limited institutional support continue to affect digital skills acquisition. The reviewed studies also reveal limited empirical evidence on the influence of digital skills acquisition on innovative library service delivery within the context of open and distance learning institutions in Nigeria, thereby necessitating the present study.

Methodology

The design enabled systematic collection and quantitative analysis of data without manipulation of variables.The study was conducted at the National Open University of Nigeria (NOUN), an Open and Distance Learning (ODL) institution with study centres across Nigeria, where digital technologies are central to library service delivery. The population comprised 65 professional and para-professional librarians, and due to the manageable size, a census sampling technique was employed, allowing all members of the population to participate. Data were collected using a structured questionnaire titled Digital Skills Acquisition and Innovative Library Service Delivery Questionnaire (DSAILSDQ), organized into sections covering demographic information, digital skills, service delivery, challenges, and improvement strategies. The instrument was based on a four-point Likert scale. The collected data were analyzed using descriptive statistics of mean and standard deviation, with a criterion mean of 2.50 used for decision-making.and inferential statistics (Pearson Product Moment Correlation).

Data Presentation and Discussion of the Findings

This study examined digital skills acquisition among librarians and its implications for innovative library service delivery in a distance learning context. The findings are discussed in relation to existing literature.

Table 1: Level of Digital Skills Acquisition (N = 65)

S/N	Digital Skills Acquisition	SA	A	D	SD	Mean	Decision
1	I possess basic computer operation skills (e.g., MS Word, Excel, PowerPoint).	40	20	5	0	3.54	Accepted
2	I am proficient in the use of library management software (e.g., KOHA).	30	25	10	2	3.31	Accepted
3	I have the ability to manage electronic databases effectively.	25	28	12	2	3.20	Accepted
4	I am skilled in online information retrieval and advanced search techniques.	35	22	8	2	3.42	Accepted
5	I can effectively use institutional repositories for information storage and retrieval.	20	30	15	3	3.08	Accepted
6	I possess skills in digital cataloguing and metadata creation (e.g., MARC).	18	27	20	5	2.97	Accepted
7	I am competent in using online communication tools (e.g., Zoom, Google Meet).	33	24	8	2	3.38	Accepted
8	I have skills in managing digital library platforms and services.	22	26	17	5	3.08	Accepted
9	I am capable of troubleshooting basic ICT-related problems.	15	20	30	10	2.46	Rejected
10	I engage in continuous learning to improve my digital competencies.	28	25	12	3	3.25	Accepted

Table 1indicated that librarians in the National Open University of Nigeria possess a moderate to high level of digital skills, as reflected in the generally high mean scores across most items. Core competencies such as basic computer operations (Mean = 3.54), online information retrieval (Mean = 3.42), and use of online communication tools (Mean = 3.38) were strongly affirmed, suggesting that librarians are well-equipped with foundational digital capabilities required for contemporary library services. Similarly, competencies in database management (Mean = 3.20), use of library management software (Mean = 3.31), and engagement in continuous digital learning (Mean = 3.25) were also rated positively, indicating a reasonable level of professional adaptability in a technology-driven environment. However, a notable exception is ICT troubleshooting skills (Mean = 2.46), which fell below the acceptance threshold. This suggests

a critical gap in technical problem-solving abilities, which may hinder efficient service delivery, especially in a digital and remote learning context.

Overall, the findings imply that while librarians demonstrate competence in general digital operations, there is a need to strengthen advanced and technical digital skills to enhance service effectiveness.

Table 2: Innovative Library Service Delivery (N= 65)

S/N	Library Service Delivery	SA	A	D	SD	Mean	Decision
1	I provide virtual reference services to users.	30	28	5	2	3.32	Accepted
2	I participate in online user education and information literacy programmes.	28	27	8	2	3.25	Accepted
3	I support remote access to electronic information resources.	32	26	5	2	3.35	Accepted
4	I contribute to the development and management of digital repositories.	25	27	9	4	3.12	Accepted
5	I use social media platforms to deliver library services.	20	25	12	8	2.88	Accepted
6	I assist users through email and online chat services.	33	25	5	2	3.37	Accepted
7	I develop digital content for library users (e.g., tutorials, guides).	18	25	14	8	2.82	Accepted
8	I support e-learning platforms with relevant library services.	30	26	7	2	3.29	Accepted
9	I provide current awareness services (CAS) using digital tools.	28	27	8	2	3.25	Accepted
10	I participate in collaborative digital library initiatives.	25	28	8	4	3.14	Accepted

Grand Mean = 3.18

Table 2 revealed that a broad range of digital service-related competencies are widely recognized and required, as evidenced by the high grand mean of 3.18. Librarians strongly affirmed the importance of skills such as email and online user support (Mean = 3.37), remote access facilitation (Mean = 3.35), and virtual reference services (Mean = 3.32), highlighting the centrality of digital interaction in service delivery. Additionally, competencies related to e-learning support (Mean = 3.29), current awareness services (Mean = 3.25), and participation in collaborative digital initiatives (Mean = 3.14) further emphasize the evolving role of librarians in digitally mediated learning environments. Although slightly lower, skills such as digital content development (Mean = 2.82) and social media service delivery (Mean = 2.88) were still accepted, indicating emerging but less fully developed areas of practice. Overall, the results underscore that innovative library service delivery in distance learning environments requires a diverse set of digital, communication, and content development skills, with particular emphasis on user-centered and remote service capabilities.

Table 3: Relationship between Digital Skills and Service Delivery (N = 65)

S/N	Relationship Between DS and SD	SA	A	D	SD	Mean	Decision
1	Digital skills enhance my ability to deliver innovative library services.	40	22	2	1	3.55	Accepted
2	My level of ICT proficiency influences the quality of services I provide.	38	24	2	1	3.52	Accepted
3	Digital competencies improve user satisfaction in library services.	42	20	2	1	3.57	Accepted
4	Lack of digital skills limits effective service delivery.	35	25	4	1	3.45	Accepted
5	Continuous digital training improves library service innovation.	39	23	2	1	3.54	Accepted
6	Digital literacy is essential for supporting distance learners.	41	21	2	1	3.55	Accepted
7	My digital skills enable me to adapt to emerging technologies.	37	24	3	1	3.49	Accepted
8	There is a strong link between digital skills and library service efficiency.	38	23	3	1	3.51	Accepted

Grand Mean = 3.52

Table 3 findings showed that digital skills are applied to a high extent in library service delivery, as reflected in the grand mean of 3.52. Respondents strongly agreed that digital skills enhance service delivery (Mean = 3.55), improve

user satisfaction (Mean = 3.57), and support distance learners (Mean = 3.55).Furthermore, the results indicate that ICT proficiency significantly influences service quality (Mean = 3.52) and enables librarians to adapt to emerging technologies (Mean = 3.49). The strong agreement that digital skills improve service efficiency (Mean = 3.51) and innovation (Mean = 3.54) highlights the strategic importance of digital competence in modern librarianship. The consistent high ratings across all items suggest that librarians are not only aware of digital tools but are actively leveraging them to enhance service delivery.

Overall, the findings demonstrate that digital skills are integral to effective and innovative library services, particularly in a distance learning environment.

Table 4: Challenges Affecting Digital Skills Acquisition (N = 65)

S/N	Challenges	SA	A	D	SD	Mean	Decision
1	Inadequate ICT infrastructure affects my digital skills acquisition.	42	20	2	1	3.58	Accepted
2	Poor internet connectivity hinders effective use of digital tools.	45	18	1	1	3.66	Accepted
3	Lack of regular training programmes limits skill development.	38	22	4	1	3.49	Accepted
4	Insufficient funding affects access to digital tools and training.	40	20	4	1	3.52	Accepted
5	Resistance to change affects adoption of digital technologies.	20	28	12	5	2.97	Accepted
6	Limited access to modern library technologies hinders performance.	35	25	4	1	3.45	Accepted
7	Heavy workload limits time for acquiring digital skills.	30	25	8	2	3.28	Accepted
8	Lack of institutional support affects digital skills acquisition.	35	25	4	1	3.45	Accepted

Grand Mean = 3.42

Table 4 results indicated that indicated that librarians face significant challenges in acquiring and utilizing digital skills, with a high grand mean of 3.42. The most prominent challenges include poor internet connectivity (Mean = 3.66), inadequate ICT infrastructure (Mean = 3.58), and insufficient funding (Mean = 3.52). These findings highlight systemic and infrastructural limitations that constrain digital capacity development. Additionally, lack of training opportunities (Mean = 3.49) and limited access to modern technologies (Mean = 3.45) further compound the problem, suggesting that both resource availability and capacity-building initiatives are insufficient. Although comparatively lower, resistance to change (Mean = 2.97) still emerged as a notable factor, indicating some level of behavioral or organizational inertia.

Overall, the findings suggest that institutional, technological, and financial barriers significantly impede digital skills acquisition, thereby limiting the effectiveness of library service delivery.

Implications of the Study

The study underscores the importance of digital skills in promoting effective and innovative library service delivery in Open and Distance Learning environments. It implies that librarians require continuous professional development to enhance their digital competencies and adapt to emerging technologies. The study further highlights the need for adequate institutional support through improved ICT infrastructure, funding, and enabling policies to facilitate digital transformation in libraries. Enhanced digital competence among librarians can improve access to electronic resources, increase user satisfaction, and strengthen support for teaching, learning, and research. Overall, digital competence, continuous training, institutional support, and technology adoption remain essential for sustaining innovative library services and improving the effectiveness of academic libraries.

- **Level of Digital Skills Possessed by Librarians**

  The findings revealed that librarians in the National Open University of Nigeria possess a moderate to high level of digital skills, particularly in basic computer operations, online information retrieval, and the use of communication tools. This suggests that librarians have adapted to the digital transformation of library services, especially in Open and Distance Learning (ODL) environments. This result aligns with the work of Ezeani and Igwesi, who reported that librarians in Nigerian academic institutions demonstrate competence in basic ICT applications but require further training in advanced digital tools. Similarly, Aina emphasized that while librarians possess foundational digital literacy, the rapid evolution of information technologies demands continuous upgrading of skills. However, the study identified a significant gap in ICT troubleshooting skills, indicating limited technical depth. This supports findings by Ogunsola, who noted that inadequate technical expertise remains a major constraint in the effective deployment of digital library systems in developing countries.

- **Types of Digital Skills Required for Innovative Service Delivery**

  The study further revealed that a wide range of digital competencies including virtual reference services, remote access support, e-learning facilitation, and digital communication are essential for innovative library service delivery. This finding corroborates the position of Davis, whose Technology Acceptance Model (TAM) emphasizes that the usefulness and ease of use of technology significantly influence its adoption in professional settings. In the context of librarianship, digital skills enhance the perceived usefulness of library services among

users. Additionally, the importance of digital content creation and social media usage, though less strongly developed, reflects emerging trends in librarianship. This is consistent with studies that highlight the evolving role of librarians as digital content curators and online service facilitators, rather than mere custodians of print resources.

- **Extent of Application of Digital Skills in Service Delivery**

  The findings indicate that librarians apply digital skills to a high extent, particularly in enhancing service delivery, improving user satisfaction, and supporting distance learners. This suggests that digital competencies are not only present but are being effectively utilized in practice. This aligns with findings by Ezeani, who observed that ICT integration in library services significantly improves access to information resources and service efficiency. The ability of librarians to adapt to emerging technologies also reflects a growing culture of innovation within the profession. Furthermore, the strong agreement that digital skills enhance service efficiency and innovation supports the argument that digital competence is a key driver of modern library performance, particularly in ODL institutions where physical interaction is limited.

- **Challenges Affecting Digital Skills Acquisition**

  Despite the positive findings, the study identified several significant challenges, including poor internet connectivity, inadequate ICT infrastructure, insufficient funding, and limited training opportunities. These challenges highlight systemic barriers that hinder effective digital skills acquisition. These findings are consistent with earlier studies by Ogunsola, who identified infrastructural deficiencies as a major obstacle to digital library development in Nigeria. Similarly, Aina noted that funding constraints and lack of institutional support limit the capacity of libraries to fully embrace digital transformation.

  The issue of workload and resistance to change also suggests organizational and behavioral challenges, which may affect the pace of digital adoption among librarians.

- **Strategies for Enhancing Digital Skills Acquisition**

  The study identified several effective strategies for enhancing digital competencies, including regular ICT training, improved infrastructure, better internet connectivity, institutional support, and professional development opportunities. These findings are in line with global best practices in librarianship, which emphasize continuous professional development as essential for adapting to technological change. The importance of training and infrastructure support reinforces the argument that digital transformation requires both human capacity development and technological investment.

  Moreover, the encouragement of self-directed learning and collaboration reflects a shift towards lifelong learning and knowledge sharing, which are critical in a rapidly evolving digital environment.

Summary of Findings

This study demonstrates that while librarians possess and apply digital skills effectively, their full potential is constrained by infrastructural and institutional challenges. The findings reinforce the view that digital skills are central to innovative library service delivery and that improving these skills requires a holistic approach involving training, policy support, and technological investment. In line with the Technology Acceptance Model, the study suggests that enhancing librarians' digital competencies will improve both the perceived usefulness and effectiveness of library services, thereby leading to better user outcomes in distance learning environments.

Conclusion

Digital skills are fundamental to innovative library service delivery in the National Open University of Nigeria (NOUN), where teaching, learning, and information services are largely technology-driven. The application of digital competencies enables librarians to provide innovative services such as virtual reference services, digital content management, remote user support, online information retrieval, and access to electronic resources for distance learners. As the demand for technology-based library services continues to increase, librarians require adequate digital competencies to effectively support teaching, learning, and research activities within the Open and Distance Learning environment.The effectiveness of innovative library service delivery depends largely on librarians' ability to acquire, update, and apply relevant digital skills in their daily operations. Therefore, strengthening digital competencies through continuous professional development, access to modern technologies, and institutional support is essential for sustaining innovation, improving service quality, and enhancing the overall effectiveness of library services in NOUN.

Recommendations

1. **Provision of Adequate ICT Infrastructure**

   The management of the National Open University of Nigeria should invest in modern ICT infrastructure and digital facilities to enhance librarians' opportunities for acquiring and applying digital skills in library operations and service delivery.

2. **Improvement of Internet Connectivity**

   Efforts should be made to provide reliable, stable, and high-speed internet connectivity in libraries to facilitate access to digital resources, online training platforms, and technology-based library services.

3. **Organization of Regular Training Programmes**

   Continuous professional development programmes, including workshops, seminars, and ICT training sessions, should be organized regularly to improve librarians' digital competencies and keep them abreast of emerging technologies.

4. **Increased Funding for Digital Skills Development**

   Adequate financial resources should be allocated to libraries for the acquisition of digital technologies, software applications, and staff training programmes aimed at enhancing digital skills acquisition.

5. **Promotion of Positive Attitudes toward Technological Change**

   Library management should implement awareness programmes and change management initiatives to encourage librarians to embrace technological innovations and reduce resistance to the adoption of digital technologies.

6. **Provision of Access to Modern Library Technologies**

   Libraries should be equipped with up-to-date digital tools, automated systems, and emerging technologies to facilitate practical exposure and improve librarians' technological proficiency.

7. **Reduction of Workload Constraints**

   Library management should review work schedules and provide adequate staffing to enable librarians to devote sufficient time to training, self-development, and digital skills acquisition activities.

8. **Strengthening Institutional Support**

   University authorities and library management should formulate supportive policies and provide incentives that encourage continuous learning, innovation, and the effective utilization of digital technologies among librarians.

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APPLICATION OF INFORMATION AND COMMUNIATION TECHNOLOGY ON THE UTILIZATION OF ELECTRONIC INFORMATION RESOURCES BY STUDENTS OF KATSINA STATE INSTITUTE OF TECHNOLOGY AND MANAGEMENT

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Abstract

This study investigated the impact of information and communication technology (ICT) on the utilization of electronic information resources among students of katsina state institute of technology and management (KSTIM), and the specific objectives include: Identify the types of ICTs applied in the use of electronic resources in KSTIM, Katsina State, Ascertain the level of use of electronic information resources with the application of ICTs in the study area. The study adopted Quantitative Research Method and a descriptive survey design. The population of the study comprised all students of Katsina State Institute of Management Studies, numbering one thousand three hundred and five (1,305). 378 sample size and a proportionate stratified random sampling technique was employed, and the sample size was determined using Slovin's formula. A questionnaire was used as the instrument for data collection. The finding indicated that respondents generally disagreed that most ICT tools such as computers and laptops and the level of use of electronic information resources among respondents is generally low, as reflected in their disagreement. The study recommended the institution should improve ICT infrastructure by providing adequate facilities and stable internet connectivity to enhance access to electronic resources and Regular ICT training and capacity-building programmes should be organized to improve users' skills and increase the utilization of e-resources.

Keywords: Information and Communication Technology (ICT), Utilization, Electronic Information Resources, Students, Katsina State Institute of Technology and Management (KSITM).

Introduction

The rapid advancement of ICTs has fundamentally transformed the way information is generated, accessed, and utilized in contemporary academic environments. In an era where knowledge is increasingly digitized, students rely heavily on electronic information resources (EIRs) such as e-books, online journals, institutional repositories, and academic databases to support learning and research. Despite the availability of these resources, their effective utilization largely depends on the presence and functionality of Information and Communication Technologies (ICTs), which serve as the primary tools for accessing and managing electronic information (Graaf, 2023). This reality raises important concerns about the extent to which ICTs influence students' engagement with electronic resources, particularly in developing educational contexts.

This study is anchored on the critical role that ICT played in enhancing the accessibility and utilization of electronic information resources among students of KSITM, but their effectiveness is shaped by factors such as accessibility, user competence, and infrastructural support. Everinmene and Eze (2021) opine that ICTs encompass a wide range of technologies including computers, mobile devices, internet connectivity, software applications, and digital communication platforms that facilitate the storage, retrieval, and dissemination of information (Ghadulwo 2022). In educational settings, these tools act as enablers, allowing students to interact with electronic resources efficiently and effectively. Therefore, the level at which ICTs are available and properly utilized directly determines how well students can benefit from electronic information resources.

The application of ICTs in the use of electronic information resources is evident in various academic activities. For instance, students utilize internet-enabled devices to access scholarly databases such as Google Scholar, JSTOR, and ScienceDirect for research purposes. Library systems integrated with Online Public Access Catalogues (OPACs) allow users to locate materials quickly and conveniently. Learning Management Systems (LMS) such as Moodle and Google Classroom support teaching and learning by providing platforms for accessing lecture materials, submitting assignments, and participating in discussions (Ghadulwo 2022). Additionally, mobile technologies and cloud-based tools enable students to download e-books, stream educational content, and collaborate on academic tasks regardless of geographical limitations. These applications demonstrate how ICTs improve accessibility to quality information, enhance research skills, and support overall academic achievement.

However, the utilization of ICTs in accessing electronic information resources is not without challenges. Abubakar et. al. (2017) highlight that the major issues are limited ICT infrastructure, including inadequate computer systems, slow or unreliable internet connectivity, and insufficient access to digital libraries. Furthermore, many students face challenges related to inadequate digital literacy, which affects their ability to effectively search for, evaluate, and utilize

electronic information resources. Inconsistent power supply also poses a significant barrier, frequently disrupting access to ICT facilities and online resources. Other challenges such as high cost of internet services, lack of institutional support, and limited training opportunities further constrain the optimal use of ICTs. These factors collectively reduce the potential benefits that electronic information resources can offer to students.

Access to and proficiency in ICT tools determine the frequency and effectiveness of students' engagement with digital academic materials. Additionally, intervening factors such as infrastructure availability, training, and electricity supply play a moderating role in shaping students' use of electronic information resources. The study lies in the growing importance of ICT-driven education and the need to maximize the benefits of electronic information resources in higher institutions. As institutions like Katsina State Institute of Technology and Management (KSTIM) continue to adopt digital learning approaches, it is essential to assess how ICTs contribute to or hinder students' use of electronic resources. Understanding these dynamics will provide valuable insights for policymakers, educators, and administrators to improve ICT infrastructure, enhance digital literacy programs, and develop supportive policies. Ultimately, this study seeks to contribute to the improvement of academic performance, research efficiency, and overall educational development by promoting effective integration and utilization of ICTs in accessing electronic information resources.

Statement of the Problem

In academic environment, students are expected to have adequate access to functional Information and Communication Technologies (ICTs) and possess the necessary digital skills to effectively utilize electronic information resources (EIRs) for learning and research (Ghadulwo 2022; Graaf, 2023). Such an environment supports seamless access to online journals, e-books, and academic databases, thereby enhancing students' research capabilities, critical thinking, and overall academic performance. Higher institutions, including Katsina State Institute of Technology and Management (KSTIM), are increasingly adopting digital systems with the expectation that ICT integration will promote efficient information access and improve educational outcomes.

However, despite the availability of ICTs Infrastructure provided by high institution of learning but, the utilization of electronic information resources among students remains suboptimal due to several persistent challenges. These include limited ICT infrastructure, inadequate digital literacy, poor internet connectivity, and inconsistent power supply, all of which restrict students' ability to fully engage with available electronic resources. As a result, the expected benefits of ICT integration in high institution are not fully realized. Therefore, this study seeks to Identify the types of ICTs applied in the use of electronic resources in KSTIM, Katsina State, and ascertain the level of use of electronic information resources with the application of ICTs in the study area.

Objectives of the study

The study aims to:

1. Identify the types of ICTs applied in the use of electronic resources in KSTIM, Katsina State.
2. Ascertain the level of use of electronic information resources with the application of ICTs in the study area.

Literature Review

The application of Information and Communication Technologies (ICTs) plays a central role in facilitating access to and use of electronic resources in academic environments. Common ICT tools include computers, laptops, smartphones, internet connectivity, library management systems, institutional repositories, and digital databases. These technologies enable users to access e-books, e-journals, online databases, and other scholarly materials efficiently. For instance, internet-enabled devices allow students to retrieve academic content from platforms such as online journals and digital libraries, while institutional repositories support the storage and dissemination of theses and dissertations. For instance, Ghadulwo (2022) and Kuper, Sakibu, and Arthur (2018) emphasize that although students are generally aware of ICT tools like computers and online databases, actual usage is often limited to basic functions such as downloading lecture materials rather than engaging in advanced academic research. This suggests a gap between availability and effective utilization. Similarly, Abubakar and Adetimirin (2015) argue that computer literacy significantly influences the depth of e-resource usage, implying that without adequate ICT skills, users may underutilize available technologies. In addition, Abubakar, Gupiyem, and Banwar (2017) highlight that accessibility to ICT infrastructure, including reliable internet and functional devices, is a critical determinant of usage, yet many institutions in developing contexts still face infrastructural deficiencies that restrict optimal engagement with electronic resources.

Moreover, the integration of advanced ICT applications such as digitization tools, institutional repositories, and open science platforms has transformed access to scholarly information, but not without challenges. Everinmene and Eze (2021) note that digitization technologies enhance preservation and accessibility of academic works, yet their implementation is often hindered by inadequate funding, technical expertise, and maintenance issues. Likewise, Gautam and Sinha (2017) observe that while academic staff and researchers increasingly depend on e-journals and digital databases, disparities in ICT skills and uneven access to subscription-based resources limit their full benefits. Graaf (2023) further points out that the adoption of open science services by research libraries offers significant opportunities for collaboration and knowledge sharing; however, organizational and policy constraints can impede their effective deployment. The review showed that the diverse ICTs are available for supporting e-resource use, their impact is

constrained by systemic issues such as insufficient infrastructure, limited user training, and weak institutional support, thereby calling for a more integrated and sustainable approach to ICT development in academic libraries.

The level of use of electronic information resources with the application of ICTs has been widely examined, with evidence suggesting a moderate but uneven pattern of utilization across different academic contexts. Studies show that while awareness of e-resources is relatively high, the actual level of use often varies depending on access to ICT tools and user competence. For example, Ghadulwo (2022) found that undergraduate students demonstrate considerable awareness of e-resources, yet their usage is largely limited to basic academic needs such as assignments and lecture notes. Similarly, Kuper, Sakibu, and Arthur (2018) reported that although students are familiar with electronic databases and online resources, the frequency of use remains inconsistent due to challenges such as limited access to computers and unreliable internet connectivity. In the Nigerian context, Akinola et al. (2020) observed that postgraduate students make significant use of e-journals for research purposes; however, their usage is often constrained by access barriers and limited ICT proficiency. This suggests that the presence of ICTs alone does not automatically translate into high-level or sustained use of electronic information resources.

Abubakar and Adetimirin (2015) emphasize that higher levels of computer literacy are associated with increased and more effective use of electronic resources among postgraduate students. Supporting this, Abubakar, Gupiyem, and Banwar (2017) identify ICT accessibility as a significant correlate of e-resource usage, noting that students with better access to digital tools and stable internet are more likely to engage frequently with electronic materials. On a broader scale, Gautam and Sinha (2017) found that faculty members and research scholars exhibit relatively higher levels of usage compared to students, largely due to their research demands and familiarity with ICT applications. Meanwhile, emerging ICT-driven initiatives such as digitization projects and open science platforms have the potential to enhance usage levels by improving accessibility and visibility of scholarly content (Everinmene & Eze, 2021; Graaf, 2023). However, Akuffo and Budu (2019) caution that without adequate training and user support, the level of utilization may remain suboptimal. The level of use of electronic information resources is not only a function of availability but also of users' skills, infrastructural capacity, and the effectiveness of institutional policies supporting ICT integration.

The impact of ICT application on the use of electronic resources is widely acknowledged as transformative, particularly in enhancing access, efficiency, and quality of academic research. ICT tools such as computers, internet connectivity, digital libraries, and online databases have significantly improved users' ability to locate, retrieve, and utilize scholarly information. Studies indicate that the integration of ICTs into academic environments has led to increased usage of e-resources, as users can conveniently access materials remotely and in real time. For instance, Ghadulwo (2022) and Kuper, Sakibu, and Arthur (2018) observe that ICT adoption has improved students' engagement with electronic resources by making information more accessible and easier to navigate. Similarly, Akinola et al. (2020) highlight that postgraduate student relies heavily on ICT-driven platforms such as e-journals and online databases for research, thereby enhancing the quality and timeliness of their academic work. This demonstrates that ICT application not only increases the frequency of e-resource use but also improves the overall learning and research experience. However, Abubakar and Adetimirin (2015) argue that computer literacy significantly determines how effectively users can exploit electronic resources, suggesting that low skill levels may limit the benefits of ICT integration. In addition, Abubakar et. al. (2017) emphasizes that inadequate ICT infrastructure, such as poor internet connectivity and limited access to devices, can reduce the positive impact of ICT on e-resource usage. Furthermore, Everinmene and Eze (2021) note that although digitization technologies improve the preservation and accessibility of academic content, challenges such as insufficient funding and technical expertise can hinder their sustainability. Graaf (2023) also points out that while open science and digital library services have expanded opportunities for collaboration and knowledge sharing, institutional and policy limitations may restrict their full implementation.

The use of electronic information resources in academic environments is often constrained by several interrelated challenges, particularly in developing contexts. One major issue is inadequate ICT infrastructure, including limited access to computers, insufficient bandwidth, and unstable internet connectivity. Studies indicate that even where e-resources are available, poor infrastructure significantly reduces their effective utilization. For instance, Kuper, Sakibu, and Arthur (2018) found that students experience difficulty accessing online databases due to unreliable internet services, while Ghadulwo (2022) reported that limited availability of ICT facilities restricts frequent use of electronic resources. In addition, inconsistent power supply remains a persistent barrier, especially in Nigerian institutions, disrupting access to digital platforms and discouraging continuous usage. These infrastructural challenges highlight the gap between the provision of electronic resources and their actual utilization in academic settings. Another critical challenge relates to users' digital literacy and institutional support systems. Abubakar and Adetimirin (2015) emphasize that low levels of computer literacy hinder users' ability to effectively search, evaluate, and utilize electronic information resources. Similarly, Abubakar, Gupiyem, and Banwar (2017) identify limited ICT skills and poor accessibility as key factors affecting e-resource usage among postgraduate students. Furthermore, issues such as lack of awareness, inadequate training programs, and insufficient user support services contribute to underutilization. Everinmene and Eze (2021) also note that challenges in digitization processes such as lack of technical expertise and funding affect the availability and sustainability of electronic resources. On a broader scale, Graaf (2023) points out that organizational and policy-related constraints, including weak implementation of open access initiatives, can limit the accessibility and

sharing of scholarly information. Therefore, while electronic resources offer significant academic benefits, their effective use is hindered by a combination of infrastructural, technical, and institutional challenges that require strategic intervention.

Methodology

The study adopted Quantitative research method and a descriptive survey design. The population of the study comprised all students of Katsina State Institute of Management Studies, numbering one thousand three hundred and five (1,305). A sample size of 378 respondents and proportionate stratified random sampling technique was employed. A questionnaire was used as the instrument for data collection and was validated by experts in the field of Library of Information Science. The reliability result of the instrument was 0.872. The data collected were analyzed using descriptive statistics, where mean and standard deviation were used, while SPSS version 23 was employed for the analysis.

Response Rate

A total of three hundred and seventy-eight (378) copies of the questionnaire were distributed to respondents in the KSTIM, and three hundred and five (305) copies were duly completed and returned. This represents a response rate (80.7%).

Table 1. Types of ICTs Applied in the Use of Electronic Resources

S/N	Statements	Mean	Standard deviation	Decision
1	Computers and laptops are widely used to access electronic resources.	2.20	.98	D
2	Smartphones are commonly used for accessing e-resources.	2.90	.88	D
3	Internet connectivity facilitates access to electronic information resources.	3.00	1.44	A
4	Library databases and OPAC are frequently used for information retrieval.	2.10	1.12	D
5	Institutional repositories are utilized for accessing academic materials	1.32	.47	D

(Strongly Agree – Agree – Neutral – Disagree – Strongly Disagree)

The finding indicated that respondents generally disagreed that most ICT tools such as computers and laptops (Mean = 2.20), smartphones (Mean = 2.90), library databases/OPAC (Mean = 2.10), and institutional repositories (Mean = 1.32) are widely used for accessing electronic resources. However, they agreed that internet connectivity facilitates access to electronic information resources (Mean = 3.00), suggesting it is the most recognized and utilized ICT support among the listed tools.

Table 2. Level of Use of Electronic Information Resources with ICTs

		NU		**RU**		**SWU**		**MU**		**EU**		**Mean**	**STD**
S/N	**Statement**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**		
1	I frequently use e-resources for academic assignments.	150	49.18	125	40.9	30	9.83	0	0	0	0	2.56	1.23
2	I use electronic journals for research purposes.	180	59.01	100	32.78	25	8.19	0	0	0	0	1.79	0.76
3	I use e-books regularly for my studies.	177	58.03	128	41.96	28	9.18	0	0	0	0	1.78	.81
4	I use online databases for academic information retrieval.	140	45.90	100	32.78	65	21.31	0	0	0	0	1.42	.61
5	I utilize e-resources on a daily basis	157	51.47	128	41.96	20	6.55	0	0	0	0	1.32	.47

(Not Use – Rarely use – Somewhat Use – Moderately Use – Extremely use)

The finding indicated that the level of use of electronic information resources among respondents is generally low, as reflected in their disagreement with all the statements. This includes infrequent use of e-resources for academic assignments (Mean = 2.56), electronic journals (Mean = 1.79), e-books (Mean = 1.78), online databases (Mean = 1.42), and daily utilization of e-resources (Mean = 1.32), showing limited engagement with ICT-based academic resources.

Discussion of the Findings

1. Identify the types of ICTs applied in the use of electronic resources in KSTIM, Katsina State. The results show a generally low level of utilization of ICT tools for accessing electronic resources, with internet connectivity being the only widely acknowledged facilitator. In line with the present finding that ICT utilization is generally low with internet connectivity being the main facilitator, Ghadulwo (2022) and Kuper et al. (2018) similarly reported limited use of ICT tools for accessing e-resources among students, while Abubakar et al. (2017) emphasized that ICT accessibility strongly influences usage, supporting the importance of internet as observed in this study. However, Graaf (2023) differs by highlighting advanced institutional ICT services in research libraries that enhance access to digital resources.

2. Ascertain the level of use of electronic information resources with the application of ICTs in the study area. The results reveal a generally poor level of utilization of electronic information resources for academic purposes among respondents. The present finding of poor utilization of electronic information resources aligns with Akuffo and Budu (2019) and Ghadulwo (2022), who also reported low usage levels among students in Ghana and Nigeria. Similarly, Kuper et al. (2018) found limited engagement with e-resources due to lack of awareness and skills. In contrast, Akinola et al. (2020) reported higher usage of electronic journals among postgraduate students, suggesting better utilization at advanced academic level

Summary of the Findings.

1. The study shows that the use of ICT tools for accessing electronic resources at KSTIM, Katsina State is generally low. Among the available ICT facilities, only internet connectivity is widely used and recognized as the main support for accessing e-resources.

This finding agrees with studies by Ghadulwo (2022) and Kuper et al. (2018), which also reported limited use of ICT tools among students. It also aligns with Abubakar et al. (2017), who found that access to ICT, especially the internet, strongly affects how often electronic resources are used.

However, it contrasts with Graaf (2023), who reported that some research libraries have advanced ICT systems that significantly improve access to digital resources.

2. The findings indicate that the level of use of electronic information resources through ICTs in the study area is generally poor. This shows that respondents make limited use of e-resources for academic activities.This result is consistent with Akuffo and Budu (2019) and Ghadulwo (2022), who also observed low usage levels among students in Ghana and Nigeria. It also agrees with Kuper et al. (2018), who linked low utilization to inadequate awareness and insufficient ICT skills.

However, the finding differs from Akinola et al. (2020), who reported higher use of electronic journals among postgraduate students, suggesting that utilization tends to improve at more advanced academic levels.

Conclusion

In conclusion, the study reveals that the application of ICTs for accessing electronic information resources in KSTIM, Katsina State is generally low, with internet connectivity being the only widely utilized and recognized tool. The level of use of electronic information resources is also poor, indicating limited engagement with ICT-based academic materials among respondents. Although ICT application has a positive influence on learning, particularly in information retrieval and independent study, its effectiveness in improving quality access and research efficiency remains limited. Furthermore, several challenges such as poor internet connectivity, inadequate ICT facilities, lack of ICT skills, irregular power supply, and insufficient training significantly hinder effective utilization of electronic information resources in the study area.

Recommendations

1.The institution should improve ICT infrastructure by providing adequate facilities and stable internet connectivity to enhance access to electronic resources. This can be achieved through increased budgetary allocation for ICT development, regular maintenance of existing facilities, installation of additional access points, and collaboration with internet service providers to ensure reliable and high-speed internet access for users. This will enhance access to and utilization of electronic resources for teaching, learning, and research.

2. Regular ICT training and capacity-building programmes should be organized to improve users' skills and increase the utilization of e-resources, Conducting periodic ICT literacy and e-resource utilization training programmes for students, academic staff, and researchers, Through workshops, seminars, hands-on training sessions, orientation programmes, online tutorials, and continuous user support services. Training schedules should be developed and implemented regularly, with practical demonstrations on accessing, searching, retrieving, and utilizing electronic resources for teaching, learning, and research purposes.

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APPLICATION OF ROBOTICS IN SHELVING MAINTENANCE FOR IMPROVED LIBRARY SERVICE AND OPERATIONS

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Abstract

This paper focuses on the utilization of robots in shelving maintenance in library operations. Libraries are an essential part of our communities, providing access to information, education and entertainment. However, keeping track of all the books and resources in a library can be a daunting task. Robotics technology can be used to automate routine tasks, such as inventory management and book retrieval, which can save time and reduce the workload of librarians. The paper provides categories of robotic designs such as; Mechanical construction, electrical components that powers and control the machinery and software. It also highlights historical background of robotics in library applications and the benefits of using shelf-reading robots in libraries. It also discusses the global reviews of Robots, functions and relevance of the applications of robots to shelf reading and maintenance. The paper gave challenges, conclusions and ways forward for using shelf-reading robots in libraries which includes; a need for training and retooling of library staff for improved library services and experiences for all patrons.

Key words: Robotics, Robotics operating system, Robotics designs, Robotic shelving and RFID

Introduction

Libraries are an essential part of our communities, providing access to information, education, and entertainment. However, keeping track of all the books and resources in a library can be a daunting task. This is where shelf-reading robots come in. These robots are designed to navigate the library shelves and scan for misplaced or misfiled books, making it easier for librarians to keep the collection organized and up-to-date. The integration of robotics in libraries is an emerging trend that has gained attention from scholars and practitioners alike.

According to a study by Malpica et al (2019), robotics technology can be used to automate routine tasks, such as inventory management and book retrieval, which can save time and reduce the workload of librarians. For example, robotic assistants can help patrons locate books and provide

recommendations based on their reading history, as suggested by Doherty & Edmonds (2020). But the question remains: does the functionality of shelf-reading robots justify their cost and implementation in library operations. Libraries in universities are essential agents that develop, organize, provide easy access to and preserve materials to meet the needs of students and scholars.

The inspiration behind inventing a library shelf-reading robot was to automate and expedite the time-consuming manual checking of the accuracy and organization of the library bookshelves. The ground-breaking idea was to create a robot that could efficiently scan library shelves, and detect misplaced or misfiled books, whilst allow librarians to focus on customer-facing initiatives that will continue to improve the overall efficiency of the library operation, much to the convenience and benefit of its significant student community. *(Savastano e al., 2022).*

Robotics is the interdisciplinary study and practice of the design, construction, operation, and use of robots. The goal of most robotics is to design machines that can help and assist humans. Many robots are built to do jobs that are hazardous to people, such as finding survivors in unstable ruins, and exploring space, mines and shipwrecks. Others replace people in jobs that are boring, repetitive, or unpleasant, such as cleaning, monitoring, transporting, and assembling. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes. It is a branch of technology that deals with the design, construction, operation, and application of robots. In the context of libraries, robotics refers to automated machines used to perform tasks like sorting, shelving, and assisting users. (Kilian et al., 2022).

Some of the larger libraries around the world already have automated storage and retrieval systems (ASRS). This, for instance, applies to the Joe and Rika Mansueto Library at the University of Chicago that introduced an ASRS capable

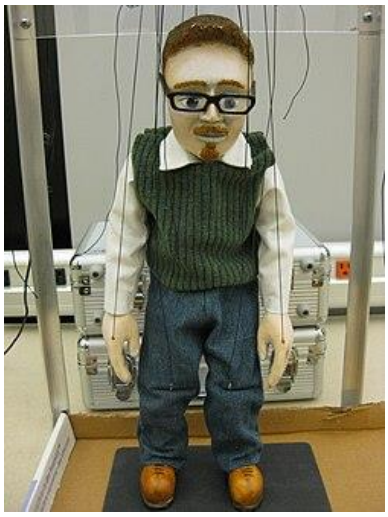
of shelving 3.5 million volumes underground by size rather than classification, and the Bodleian Libraries' book storage facility at the University of Oxford using an ASRS holding 8 million items (University of Chicago, 2022). In a world that produces 2.5 quintillion bytes of data every day according to IBM consumer Products1, vast amounts of information and consequently huge quantities of printed material are produced every single day. Automated library systems come in handy as part of manageable logistics solutions at larger libraries, whether the materials to be handled are books, or collections.

The evolving role of libraries in the digital age demands constant innovation to meet the increasing needs of students, researchers, and faculty. Robotics, an area that has seen exponential growth in other sectors, is now finding its way into academic libraries. These robotic systems are designed to streamline library functions by automating tasks that were previously performed manually, such as sorting, shelving, cataloging, and even user assistance. *(Raji 2024).*

Categories of Robotics Designs

Robotics usually combines three aspects of design work to create robot systems. The followings are the categories of robotics designs.

1. Mechanical construction: a frame, form or shape designed to achieve a particular task. For example, a robot designed to travel across heavy dirt or mud might use caterpillar tracks. Origami inspired robots can sense and analyze in extreme environments. The mechanical aspect of the robot is mostly the creator's solution to completing the assigned task and dealing with the physics of the environment around it. Form follows function.
2. Electrical components that power and control the machinery. For example, the robot with caterpillar tracks would need some kind of power to move the tracker treads. That power comes in the form of electricity, which will have to travel through a wire and originate from a battery, a basic electrical circuit. Even petrol powered machines that get their power mainly from petrol still require an electric current to start the combustion process which is why most petrol-powered machines like cars, have batteries. The electrical aspect of robots is used for movement (through motors), sensing (where electrical signals are used to measure things like heat, sound, position, and energy status), and operation (robots need some level of electrical energy supplied to their motors and sensors in order to activate and perform basic operations)
3. Software: A program is how a robot decides when or how to do something. In the caterpillar track example, a robot that needs to move across a muddy road may have the correct mechanical construction and receive the correct amount of power from its battery, but would not be able to go anywhere without a program telling it to move. Programs are the core essence of a robot, it could have excellent mechanical and electrical construction, but if its program is poorly structured, its performance will be very poor (or it may not perform at all). There are three different types of robotic programs: remote control, artificial intelligence, and hybrid.
4. A robot with remote control_programming has a preexisting set of commands that it will only perform if and when it receives a signal from a control source, typically a human being with remote control. It is perhaps more appropriate to view devices controlled primarily by human commands as falling in the discipline of automation rather than robotics. Robots that use artificial intelligence interact with their environment on their own without a control source, and can determine reactions to objects and problems they encounter using their preexisting programming. A hybrid is a form of programming that incorporates both AI and RC functions in them.



Pupet Magnus

A robot- Manipulated Marionette with complex control systems

To find out whether a robot could provide valuable assistance at any given library, one would have to initially look at the different routines and tasks at the library in question and break every library task down into simple movements, or operations that a robot with the current technology would be expected to be able to execute. The handling and circulation of materials is one thing. But there are many other traditional librarian tasks to consider like the acquisition of materials that are to be cataloged, classification of materials, replacement of materials to more modern ones as part of the overall maintenance, and bibliographical support of researchers and students to name a few. Some academic libraries also provide bibliometric analyses at multiple levels and guidance on how to achieve scientific impact (Joe, 2020)

Robot Operating System

A robot operating system (ROS) facilitates robotics development by providing tools, libraries, and communication structures for modular applications. The robot operating system simplifies and accelerates robotics software development by providing a framework for building modular, distributed, and reusable code. Its open-source nature, extensive community support, and diverse set of tools make it an indispensable tool for both beginners and experts in robotics. While its technicalities might seem intricate at first glance, ROS essentially acts as a facilitator, allowing developers to focus on innovating and creating advanced robotic systems without getting bogged down by low-level intricacies (Johnson, 2020)

Additionally, ROS features a package management system that organizes and shares code among users. Users can create and distribute packages containing libraries, algorithms, drivers, or complete applications. This fosters collaboration within the robotics community as developers can leverage existing packages and contribute their own, accelerating the development process. Moreover, the robot operating system is highly adaptable and can be employed in various robotic applications, ranging from industrial robots and autonomous vehicles to drones and household robots. Its flexibility and scalability make it a preferred choice for both research and commercial projects in robotics.

Robot Operating System Applications

The followings are the various robot operating systems applications.

1. **Autonomous vehicles and drones:**

Self-driving cars: ROS is extensively used in autonomous vehicle research and development. It enables sensor data integration (LiDAR, cameras, and GPS) for perception, decision-making algorithms, and control systems. For instance, teams participating in the Defense Advanced Research Projects Agency (DARPA) Urban Challenge used ROS to develop self-driving cars capable of navigating urban environments autonomously.

2. **Industrial robotics**

Robotic arms in manufacturing: ROS facilitates the development of industrial robots for tasks such as pick-and-place, assembly, and welding. It helps coordinate robotic arm movements, integrate sensors for object detection, and interface with machinery. Universal Robots, a leading industrial robot manufacturer, utilizes ROS to program and control its robotic arms.

3. **Humanoid robots**

Humanoid robot navigation: ROS enables the creation of humanoid robots capable of performing various tasks. It assists in implementing algorithms for navigation, object recognition, grasping, and interacting with the environment. The HRP-4C robot developed by AIST in Japan used ROS for its control system and high-level functionalities (Allen, 2024)

4. **Research and education**

Robotics research platforms: ROS serves as a fundamental tool in robotics research and education. It provides a standardized framework for experimenting with algorithms, testing new concepts, and teaching robotics concepts. Many universities and research institutions worldwide utilize ROS in their robotics courses and experiments due to its accessibility and versatility.

In each of these applications, ROS serves as a unifying platform that simplifies the development and deployment of complex robotic systems. It offers a standardized framework for integrating sensors, implementing algorithms, controlling actuators, and managing the overall functionality of robots, regardless of the application domain.

Benefits of Robot Operating System

ROS offers several key benefits contributing to its popularity and widespread adoption in robotics. Here are some of the key advantages, along with examples illustrating these benefits:

1**. Modularity and reusability**: This modularity allows developers to re-use code, reducing development time and effort.

2. **Open-source nature:** A robotics startup working on autonomous delivery robots can leverage ROS's open-source libraries and tools without incurring substantial software development costs. By utilizing ROS, they can access a vast community-contributed codebase, accelerating their development process and enabling rapid prototyping.

3. **Distributed computing architecture**

In the context of a robotic swarm, each robot can run ROS nodes communicating with one another. These nodes might exchange information about the environment, facilitating collaborative decision-making. For instance, a swarm of drones coordinating their flight paths to cover an area efficiently demonstrates the advantages of ROS's distributed architecture.

4. **Hardware abstraction**

A robotics company developing a robotic arm can use ROS to interface with various sensors and actuators without being concerned about specific hardware details. This abstraction simplifies the development process, allowing the company to focus on higher-level functionalities rather than low-level hardware integration.

5. **Educational value:** Universities offering robotics courses leverage ROS to teach students fundamental concepts in robotics. Students can experiment with different robotic systems, learn about ROS's architecture, and gain practical experience through simulations and hands-on projects, preparing them for real-world applications.

6. **Integration with various robotics hardware:** Using ROS, a robotics enthusiast building a DIY robot can easily integrate various off-the-shelf sensors, actuators, and motor controllers into the project. The availability of ROS drivers and libraries for a wide range of hardware components streamlines the integration process (German National Library, 2020)

Historical Background of Robotics in Library Applications

The use of robotics in libraries began in the late 20th century when automated systems for cataloging and sorting materials were first introduced. Over the years, advancements in robotics technology have expanded the role of robots in libraries, particularly in developed countries. Early examples include robotic arms used for sorting materials and automatic check-in/check-out systems. In the 2000s, more sophisticated robots, such as those used for inventory management and user interaction, began to be deployed in academic libraries. The integration of robotics into academic libraries represents a significant shift in how information is accessed, organized, and delivered. Over time, technological advancements have transformed libraries from traditional book repositories into dynamic information hubs. Robotics has played a crucial role in enhancing operational efficiency, improving user experiences, and redefining library services (Allen, 2022)

Benefits of Robotics in Library Services

Robotics can enhance the learning experience by providing interactive exhibits and activities

that promote STEM (Science, Technology, Engineering, and Math) education. Chen & Pan, (2019) noted that such interactive exhibits can be effective in engaging children and youth, who may be more motivated to learn through interactive and hands-on experiences. Stock takes, that identify books that need to be replaced or re-ordered can now be carried out more frequently, thereby maintaining the library's full book collection. The shelf-reading robot can also be used to improve quality control issues as it will automatically identify missing or misplaced items (Davis, 2020)

Benefits of using Robots in Shelf-reading in Libraries

Below are the highlighted benefits of Shelf-reading robots in libraries;

1. **Increased Efficiency**: Traditionally, shelf-reading has been a time-consuming and labor-intensive task for librarians. By automating this process with robots, libraries can save significant amounts of time and resources. Shelf-reading robots can scan and analyze library shelves for misplaced books and other errors in shelving, identifying the areas that require attention and making it easier for librarians to fix these issues.

2. **Improved Accuracy**: Shelf-reading robots can help to improve the accuracy of the library catalogue by identifying misplaced books and other errors in shelving. By ensuring that books are properly shelved and easy to locate, shelf-reading robots can help to improve the accessibility and usability of library collections.

3. **Enhanced User Experience**: By ensuring that books are properly shelved and easy to locate, shelf-reading robots can help to improve the overall user experience for patrons. This can be especially important for patrons with limited mobility or other disabilities who may find it challenging to physically search through shelves.

4. **Cost Savings**: Automating shelf-reading with robots can save libraries significant amounts of time and resources, which can translate into cost savings. While the initial investment in shelf-reading robots may be significant, the long-term cost savings can be substantial.

Global Overview of Shelf-Reading Robots in Libraries

With the use of technology like RFID, computer vision, and artificial intelligence, shelf-reading

robots have become a necessary component of contemporary libraries all over the world. They automate shelf audits, find lost objects, and maintain precise organization. These robots have been adopted by libraries all around the world, from Singapore and China to the United States and Sweden, to increase productivity, decrease manual labour, and improve collection management. Regular maintenance, staff training, integration with library management systems, data analysis for informed decision-making, expert collaboration in development, incorporating user feedback, accessibility concerns, and ongoing innovation are all examples of best practices. These robots are essential to the way library services are developing because they promote environmentally friendly behaviours and enhance the user experience in general.

Library holdings are only useful if they're findable. For print collections at least, even recommending the most relevant titles ultimately falls short if they're not on the right shelf. However, the process of finding out if things have been properly shelved is time-consuming and never ending, as materials are continuously moved even if they don't circulate outside the building. The task is often handled by support staff, interns, or volunteers, but Singapore's National Library Board has a new alternative: a library robot, developed by researchers at the Infocom research branch of Singapore's Agency for Science, Technology and Research (Indraji & Satishkumar, 2024). Library holdings are only useful if they are findable. While many libraries focus on the digital aspects of improving search, for print collections at least, even recommending the most relevant titles ultimately falls short if they are not on the right shelf. Misfiled materials can lead to major controversies, such as the one that recently led to the resignation of former Boston Public Library President Amy Ryan, as well as that staple of library human interest stories, the rare book or manuscript "discovered" in a library or archive (Frazier & Park, 2021)

Global Trends and Future Prospects

The adoption of robotics in academic libraries is expected to continue growing, driven by advancements in AI, machine learning, and IoT (Internet of Things). Future trends include; Collaborative Robots (Cobots): This is designed to work alongside humans, enhancing productivity without replacing staff. Autonomous Navigation: Robots capable of navigating complex environments without human intervention. AI-Driven Personalization: Tailored recommendations and adaptive learning environments based on user preferences. Emerging examples include: Beijing Institute of Technology Library (China): Developing robots with advanced facial recognition and NLP capabilities to provide personalized services. European Union's Robotics in Libraries Initiative: Exploring collaborative projects to standardize robotics integration across academic institutions. **(**Prodhani, 2016)

How Robotics Operating System Works

Understanding how the robot operating system works involves delving into its core concepts and the step-by-step processes it employs. Here's a breakdown of the workings of ROS into key technical steps:

Node creation: The foundation of ROS lies in its nodes, which are individual processes responsible for specific tasks. Developers create these nodes using ROS libraries in languages such as C++ or Python. Each node typically performs a particular function, such as controlling a sensor, processing data, or executing algorithms.

Communication via topics: Nodes communicate with each other using a pub-sub model through topics. Topics are named buses, where nodes can publish messages (publishers) or subscribe to receive messages (subscribers). For instance, a camera node might publish images to a 'camera' topic, while an image processing node subscribes to this topic to receive and process the images (Wright & Patel, 2020)

Functions of Robots in Shelf Maintenance

The Shelf-reading robot autonomously scans the book shelves after the library closes and detects the RFID tags embedded in the books. The system uses a self-localization algorithm to analyse the digital data collected against the library's collection database to identify miss - sequenced books, missing books, and books that belong to other libraries. This removes the need for full-library shelf reading as library staff need only attend to the mis-shelved books, which is about 5% of the library collection. Most importantly, it addresses the perennial customer complaint of not able to locate a book in the library. The item locations collected from the daily scan are integrated with the library catalogue. This enables customers to self-help and locate the library books faster without the need to understand the library shelving

standards, e.g. the Dewey Decimal Classification system. The Autor sorter processes books returned at the book drop and facilitates the automatic sorting of the returned items into bins based on pre-defined categories (Vijayi, 2024)

Manual intervention is required only for exception items, which is about 1% of the returned items. This has improved productivity, and achieved a high level of accuracy in terms of the returned items being sorted. Using analysis results of past loan records, the autosorter also identifies popular items for library staff to place at "Just Returned" shelves at the entrance of the library so that library users can easily locate them. The autonomous robot is able to carry a large volume of items (about 2000 books per day) and transports them back to the sorting room. The system improves productivity and eliminates the need for staff to spend time walking across the library to collect the items. It also enhances workplace safety by reducing the need for staff to carry heavy items across long distances (Wright & Patel, (2020)

Challenges with Robot's Implementation

1. One of the major concerns is the cost of implementing and maintaining robotics technology, which may be a barrier for smaller libraries with limited budgets.
2. Robot may need to be enhanced with more proximity sensors and re-programmed to handle new situations or environments. In addition, robots need to be serviced regularly to ensure optimal performance.
3. There is a need to modify the environment to be robot-friendly. Site survey and preparation is crucial to ensure a successful deployment. This includes removal of obstacles in the robot navigation path, reconfiguration of shelves and appropriate positioning of books. Robots can throw tantrums too Robots are best doing what they are programmed to do.

Conclusion

The application of robot technology in shelving maintenance in a library for improved services may be furthered by inherent library needs, local/national and international trends, patron demands, and staff/management demands. Currently, libraries with positive attitudes to new technologies and even prior experience with robotics seem to be inclined to invest in robots that could autonomously navigate, locate and place books on information desks which assist in the education of students and the patrons. Obstacles towards the application of robotic proved to be fearful among the library staff of being gradually replaced by robots, an unsatisfying level of robotic functionality and/or a simple reluctance to apply and implement new and advanced library task solutions that in turn would demand retraining and retooling the library staff and perhaps even an organizational restructuring. The general lack of resources (staff time, money, space) would present an obstacle, as well as the cost of maintaining the patron's enthusiasm with robots in the long term.

Way forward

1. Cost-Efficiency Solutions: Libraries should explore funding opportunities or partnerships to reduce the initial investment required for robotics.

2. Staff Training: Providing comprehensive training programs for library staff can ease the transition to robotics and help overcome resistance.

3. Gradual Implementation: Libraries should consider a phased implementation of robotics, starting with small-scale automation projects before expanding. 4. User Education: Libraries should offer workshops and resources to educate users on how robotics can improve their experience.

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Artificial Intelligence and Information Service Delivery in University Libraries in Abia State, Nigeria

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Abstract

The growing integration of artificial intelligence (AI) into library operations has created opportunities for improving information service delivery through enhanced information retrieval, personalized user support, and service efficiency. Despite increasing global adoption, evidence suggests that AI implementation in many Nigerian university libraries remains limited. This study investigated the application of AI in information service delivery in selected university libraries in Abia State, Nigeria. Specifically, the study examined the pattern of AI tool use, the extent of AI application in major service areas, librarians' perceptions of AI adoption, barriers affecting implementation, and strategies for strengthening AI-supported information service delivery. A descriptive cross-sectional survey design was adopted. The population comprised 86 professional and para-professional library personnel drawn from Abia State University Library, Michael Okpara University of Agriculture Library, and Clifford University Library. A census approach was employed, and 75 valid responses were obtained, representing an 87.2% response rate. Data were collected using a structured questionnaire and analyzed using frequency counts, percentages, mean scores, and standard deviations. The findings revealed that AI adoption in the selected university libraries remains low, with most respondents reporting little or no use of AI tools. AI application was found to be concentrated primarily in information retrieval and search services, while adoption in cataloguing, reference, and user service delivery remained limited. Respondents, however, expressed highly positive perceptions of AI and acknowledged its potential to improve efficiency, service quality, and user satisfaction. Major barriers identified were inadequate funding, poor ICT infrastructure, and limited institutional support. The study concludes that AI adoption in the selected university libraries is constrained more by organizational and infrastructural factors than by librarians' attitudes toward the technology. The study recommends strategic investment in ICT infrastructure, continuous staff capacity development, dedicated funding mechanisms, institutional AI policies, and phased implementation of AI-enabled library services.

Keywords: *Artificial intelligence, information service delivery, university libraries, AI adoption, academic libraries, Nigeria.*

Introduction

University libraries are increasingly adopting digital technologies to improve information service delivery and respond to changing patterns of teaching, learning, and research. Among these technologies, artificial intelligence (AI) has emerged as a significant innovation with the potential to enhance information discovery, automate routine processes, personalize user support, and improve access to information resources (Das & Islam, 2021). In library and information science, AI encompasses technologies such as chatbots, recommendation systems, intelligent search tools, automated cataloguing, and metadata generation systems that support the delivery of information services.

Information service delivery remains a core function of university libraries and involves providing users with timely, relevant, and accessible information to support academic and research activities. As user expectations become increasingly shaped by digital environments, libraries are under pressure to deliver services that are more efficient, responsive, and user-centred. Consequently, AI is increasingly viewed as a strategic tool for improving service quality and operational efficiency (Cox, 2023).

Globally, academic libraries have begun integrating AI into reference services, information retrieval, collection management, and user support. However, debates persist regarding the extent of AI adoption, its impact on service delivery, ethical concerns, staff preparedness, and infrastructural requirements (Cox, 2023). Evidence from low- and middle-income countries suggests that while awareness of AI is growing, implementation remains constrained by funding limitations, inadequate infrastructure, policy gaps, and shortages of relevant technical skills (Nakaziba et al., 2026).

In Nigeria, discussions on AI in libraries have increased, yet evidence of widespread operational adoption remains limited. Existing studies have focused largely on awareness, opportunities, and challenges, with less attention given to how AI is actually applied in library services and the factors influencing its effectiveness. In Abia State, where university libraries are expected to support teaching, learning, and research in an increasingly digital environment, there is limited empirical evidence regarding the AI tools currently in use, the extent of their application in information service delivery, librarians' perceptions of their usefulness, and the barriers affecting implementation. Understanding these issues is important because the effectiveness of AI-supported information service delivery depends not only on the availability of AI technologies but also on how extensively they are used, how they are perceived by librarians, and the institutional conditions that support or constrain their adoption.

Against this background, this study examines the application of artificial intelligence in selected university libraries in Abia State and its implications for information service delivery.

Statement of the Problem

Artificial intelligence has the potential to improve information service delivery in university libraries through enhanced information discovery, personalized user support, and greater operational efficiency. Consequently, university libraries are increasingly expected to integrate AI technologies into their services to meet the evolving needs of users in digital learning environments.

Despite growing awareness of AI in Nigerian academic libraries, evidence suggests that operational adoption remains limited and uneven due to infrastructural deficiencies, inadequate funding, insufficient technical expertise, weak institutional support, and the absence of clear implementation policies (Afolayan, 2022; Igbo et al., 2024). While librarians may recognize the potential value of AI, positive perception does not necessarily translate into effective adoption and application.

In university libraries in Abia State, little empirical evidence exists regarding the AI tools currently in use, the extent of their application in information service delivery, librarians' perceptions of AI adoption, and the institutional barriers affecting implementation. Consequently, it remains unclear how these factors influence the application of AI for information service delivery. This knowledge gap limits evidence-based decisions on strategies required to enhance AI adoption and strengthen information service delivery in university libraries within the state.

Recent scholarship suggests that the successful application of AI in university libraries depends not only on the availability of AI tools but also on librarians' acceptance of such technologies and the institutional conditions supporting their adoption. Studies consistently identify perceived usefulness, staff capability, infrastructure, funding, organizational support, and policy frameworks as important factors influencing AI implementation (Cox, 2023; Nakaziba et al., 2026). These factors reflect the assumptions of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) theory, which explain how technological innovations are perceived, adopted, and sustained within organizations. Understanding AI application in university libraries therefore requires attention not only to the technologies themselves but also to librarians' perceptions and the institutional environment within which adoption occurs.

Objectives of the Study

The main objective of this study is to examine the application of artificial intelligence and its implications for information service delivery in selected university libraries in Abia State.

The specific objectives are to:

1. Identify the artificial intelligence tools currently used in information service delivery in the selected university libraries.
2. Determine the extent of artificial intelligence application in information service delivery in the selected university libraries.
3. Examine librarians' perceptions of the contribution of artificial intelligence to information service delivery.
4. Identify the barriers affecting the effective application of artificial intelligence in information service delivery in the selected university libraries.
5. Determine strategies for enhancing the application of artificial intelligence for improved information service delivery in the selected university libraries.

Literature Review

The integration of artificial intelligence (AI) into university library services has become a significant area of scholarly inquiry as libraries respond to rapid digital transformation, changing user expectations, and the growing complexity of information environments. Recent literature increasingly positions AI not merely as a technological innovation but as a strategic enabler of information service delivery capable of transforming information discovery, access, organization, and user engagement (Cox, 2023; Cox & Wang, 2025). However, emerging evidence also suggests that successful AI implementation depends on a combination of technological, organizational, and human factors. This review synthesizes contemporary literature around five interconnected themes aligned with the objectives of the study: AI tools used in university libraries, the extent of AI application in information service delivery, librarians' perceptions of AI adoption, barriers to implementation, and strategies for enhancing AI-supported information service delivery.

Artificial Intelligence and Information Service Delivery in University Libraries

Artificial intelligence refers to computational systems capable of performing tasks that traditionally require human intelligence, including learning, reasoning, decision-making, pattern recognition, and natural language processing. Within library and information science, AI encompasses a range of technologies such as machine learning algorithms, expert systems, recommender systems, chatbots, intelligent search engines, robotics, automated classification tools, and generative AI applications (Das & Islam, 2021).

The growing relevance of AI in libraries is closely linked to information service delivery, which remains one of the fundamental functions of university libraries. Information service delivery involves the processes through which

libraries connect users with information resources and provide support for teaching, learning, and research activities. These services include reference assistance, information literacy instruction, current awareness services, circulation, resource discovery, research consultations, and digital access services. As academic libraries increasingly operate within digital and hybrid information environments, the effectiveness of service delivery depends on the ability to provide timely, accurate, personalized, and user-centred access to information resources (Parsons-Diamond, 2026).

Recent scholarship argues that AI has the capacity to reshape virtually every stage of information service delivery. AI-driven systems can improve search precision, automate routine inquiries, support multilingual interactions, personalize recommendations, and provide continuous virtual assistance. Cox (2023) contends that AI should be viewed not only as a service-enhancement technology but also as a transformative force capable of redefining library work, professional competencies, and organizational structures. Consequently, contemporary discussions increasingly focus on how AI can be integrated responsibly and effectively into information service ecosystems rather than whether it should be adopted.

AI Tools Used in University Libraries

The range of AI technologies currently deployed in academic libraries continues to expand. Ayinde et al. (2026) identify six major domains of AI application in higher education libraries: technical services, reference and information services, collection development, administration, user education, and professional development. Across these domains, AI tools are being used to automate metadata generation, support cataloguing and classification, improve resource discovery, facilitate virtual reference services, and enhance decision-making processes.

Similarly, Nakaziba et al. (2026) identified chatbots, RFID-enabled systems, robotics, facial recognition technologies, intelligent search systems, and generative AI applications as the most frequently reported AI tools in academic libraries across low- and middle-income countries. Chatbots, in particular, have gained prominence because of their ability to provide real-time responses to routine user inquiries and extend service availability beyond conventional library hours. The emergence of generative AI has further accelerated interest in AI-supported library services. Hamad and Shehata (2025) found that GPT-based technologies can significantly enhance information retrieval, research support, and user engagement by facilitating conversational interactions with information systems. However, while AI tools are increasingly available, evidence suggests substantial disparities in adoption across institutions and regions. The presence of AI technologies does not necessarily indicate meaningful integration into information service delivery, particularly in developing-country contexts where implementation often remains experimental or fragmented.

Extent of AI Application in Information Service Delivery

Although awareness of AI has increased considerably, the extent of operational application remains uneven. Existing literature suggests that AI adoption tends to occur first in service areas where benefits are immediately visible to users, particularly information retrieval, virtual reference, and user support services.

Ayinde et al. (2026) observed that reference and information services constitute the most frequently reported area of AI application in academic libraries. AI-powered discovery systems and recommendation engines have become attractive because they directly improve users' ability to locate relevant information resources. Similarly, Hamad and Shehata (2025) reported that generative AI tools are increasingly being used to enhance information access and support research-related inquiries.

However, studies consistently show that implementation remains partial rather than comprehensive. Gmiterek and Kotuła (2025), studying public university libraries in Poland, found widespread institutional interest in generative AI but relatively moderate levels of operational utilization. Nakaziba et al. (2026) similarly concluded that AI implementation in many developing countries remains concentrated in isolated service functions rather than integrated across the full spectrum of library operations.

This pattern suggests that awareness and experimentation are advancing more rapidly than institutionalized adoption. Consequently, assessing the extent of AI application within specific university library contexts remains essential for understanding its actual contribution to information service delivery.

Librarians' Perceptions of AI Adoption

The success of technological innovations is strongly influenced by the perceptions of intended users. The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use significantly influence technology adoption decisions. This perspective has become increasingly relevant in studies examining AI adoption among library professionals.

Several studies report generally positive attitudes toward AI within academic libraries. Ajani et al. (2022) found that Nigerian librarians demonstrated substantial awareness of AI technologies and acknowledged their potential to improve library services. Likewise, Çakmak and Eroğlu (2025) reported that university library administrators viewed AI as an important mechanism for enhancing service efficiency, operational effectiveness, and institutional competitiveness.

Nevertheless, positive perception alone does not guarantee successful implementation. Fagbola and Egbebi (2025) found that although librarians expressed favourable attitudes toward AI, actual adoption remained limited due to infrastructural deficiencies and inadequate organizational support. Similar findings have been reported across other developing

contexts, where enthusiasm for AI often exceeds institutional capacity to implement it effectively. These findings support the argument that perceptions are necessary but insufficient conditions for sustained adoption.

Barriers Affecting AI Application in Information Service Delivery

A recurring theme in contemporary literature is the existence of substantial barriers to AI adoption in academic libraries. These barriers are technological, organizational, financial, ethical, and human in nature. Infrastructure deficiencies remain among the most frequently cited constraints. Nakaziba et al. (2026) identified inadequate ICT infrastructure, unreliable internet connectivity, and insufficient technological resources as major obstacles to implementation in low- and middle-income countries. Financial limitations similarly affect the acquisition, maintenance, and upgrading of AI systems.

Human capacity issues also feature prominently. Cox and Wang (2025) argue that the increasing complexity of AI systems requires new competencies among library professionals, including data literacy, algorithmic awareness, AI evaluation skills, and ethical decision-making capabilities. However, many institutions lack sufficient opportunities for staff training and professional development. Ethical and governance concerns have emerged as additional barriers. The International Federation of Library Associations and Institutions (IFLA, 2024) highlights concerns relating to privacy, transparency, algorithmic bias, accountability, intellectual freedom, and inclusivity. These concerns are particularly important because libraries have longstanding commitments to equitable access to information and user confidentiality.

The literature therefore indicates that AI adoption is not merely a technological challenge but a multidimensional organizational issue requiring institutional readiness, governance structures, and sustainable resource commitments.

Strategies for Enhancing AI-Supported Information Service Delivery

Given the challenges associated with AI adoption, recent studies increasingly focus on implementation strategies rather than technological possibilities alone. Danquah et al. (2024) argue that successful AI integration requires strategic planning, institutional commitment, sustainable funding mechanisms, and continuous assessment of implementation outcomes. Professional development is consistently identified as a critical requirement. The Association of College and Research Libraries (ACRL, 2025) proposes a competency framework emphasizing ethical awareness, technical literacy, analytical skills, and practical application capabilities. Similarly, Cox and Wang (2025) advocate systematic AI literacy programmes to prepare library professionals for emerging technological responsibilities.

Institutional policies and governance frameworks have also become increasingly important. IFLA (2024) recommends the development of clear policies addressing ethical use, accountability, privacy protection, transparency, and responsible deployment of AI systems. Furthermore, studies suggest that collaborative partnerships among universities, technology providers, and professional associations can facilitate knowledge sharing and resource mobilization. Collectively, the literature indicates that sustainable AI implementation requires a combination of technological investment, human capacity development, policy support, ethical governance, and organizational commitment.

Theoretical Foundation

This study is anchored on the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory. TAM provides a useful framework for understanding librarians' perceptions of AI by explaining how perceived usefulness and perceived ease of use influence technology acceptance and utilization. The theory is particularly relevant to the study objective examining librarians' perceptions of AI-supported information service delivery.

DOI Theory complements TAM by explaining how innovations are adopted and diffused within organizational settings. The theory emphasizes factors such as compatibility, trialability, observability, organizational readiness, and resource availability. DOI therefore provides a useful lens for understanding variations in the extent of AI application, barriers to adoption, and strategies for implementation in university libraries. Together, the two theories provide a comprehensive explanation of how individual perceptions and organizational conditions interact to shape AI adoption and application in information service delivery.

The reviewed literature demonstrates that AI is increasingly transforming information service delivery in university libraries through applications in information retrieval, virtual reference services, resource discovery, and user support. However, the evidence also reveals that successful implementation depends on multiple interrelated factors, including the types of AI tools available, the extent of their application, librarians' perceptions, institutional readiness, funding, infrastructure, policy frameworks, and staff capability.

A consistent finding across the literature is that positive attitudes toward AI do not automatically translate into effective implementation. Rather, organizational preparedness and enabling institutional conditions largely determine whether AI technologies become embedded in library service delivery. Although these issues have received growing attention globally, there remains limited empirical evidence from Nigerian university libraries, particularly within Abia State. Specifically, little is known about the AI tools currently in use, the extent of their application in information service delivery, librarians' perceptions, barriers affecting implementation, and strategies required to strengthen adoption. This study addresses that gap by providing context-specific evidence from selected university libraries in Abia State.

Methodology

This study adopted a descriptive cross-sectional survey design to examine the application of artificial intelligence (AI) in information service delivery in selected university libraries in Abia State, Nigeria. The study was conducted in three university libraries representing the major ownership categories of universities in Nigeria: Abia State University Library (state-owned), Michael Okpara University of Agriculture Library (federal-owned), and Clifford University Library (private-owned).

The population comprised 86 professional and para-professional library personnel in the selected university libraries. Given the manageable size of the population, a census approach was adopted. Data were collected using a structured questionnaire developed from the study objectives, relevant literature, and the underlying assumptions of the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI) Theory. The instrument contained items on AI tools used in information service delivery, extent of AI application, librarians' perceptions of AI adoption, barriers to implementation, and strategies for enhancing AI-supported information service delivery.

The questionnaire was subjected to face and content validation by experts in Library and Information Science and research methodology. A pilot study was conducted to ascertain the clarity and suitability of the instrument before the main survey. Of the 86 questionnaires administered, 75 were properly completed and returned, yielding a response rate of 87.2%.

Data were analyzed using descriptive statistics, including frequency counts, percentages, mean scores, and standard deviations. These statistics were used to describe the pattern of AI use, assess the extent of AI application, examine librarians' perceptions, identify implementation barriers, and determine strategies for improving AI-supported information service delivery in the selected university libraries.

Results and Discussion

The findings are presented according to the research questions and objectives of the study.

Research Question 1: What is the pattern of AI tool use in the selected university libraries?

Table 1 Present Pattern of AI Use Among Respondents.

Category	Frequency	Percentage
No use of AI tools	50	66.67
Use of AI tools	19	25.33
Use of multiple or advanced AI tools	6	8.00
Total	**75**	**100.00**

Source: Field survey data, 2026.

Table 1 shows that AI use in the selected university libraries remains limited. Of the 75 respondents, 50 (66.7%) indicated that AI tools were not being used in their libraries, while only 19 (25.3%) reported the use of AI tools. A further 6 respondents (8.0%) indicated the use of multiple or relatively advanced AI applications.

The finding indicates that AI adoption in the selected university libraries is still at an early stage. Although AI technologies are increasingly discussed within the library profession, their practical deployment remains limited across the studied institutions. The dominance of the "no use" category suggests that AI has not yet become an integral component of routine library operations and service delivery.

This finding supports Ajani et al. (2022), who reported growing awareness of AI among Nigerian librarians but limited institutional readiness for implementation. Similarly, Nakaziba et al. (2026) observed that AI adoption in many low- and middle-income countries remains uneven and often confined to isolated applications. The finding suggests that the selected university libraries are still within the introductory phase of AI adoption, characterized by awareness and experimentation rather than widespread operational integration. AI adoption in the selected university libraries remains low, indicating that AI has not yet been institutionalized as a core component of information service delivery.

Research Question 2: To what extent is AI applied in major information service areas in the selected university libraries?

Table 2 Presents the Extent of AI Application Across Major Library Service Areas.

Service area	High extent n (%)	Low extent n (%)	Mean	SD
Cataloguing and classification	6 (8.00)	69 (92.00)	0.73	0.60
Reference services	6 (8.00)	69 (92.00)	0.57	0.64
User service delivery	6 (8.00)	69 (92.00)	0.65	0.63
Information retrieval/search	49 (65.33)	26 (34.67)	1.31	0.96

Source: Field survey data, 2026.

The results reveal that AI application is generally low across most service functions. Cataloguing and classification (M = 0.73), reference services (M = 0.57), and user service delivery (M = 0.65) recorded low levels of application. Information retrieval and search recorded the highest mean score (M = 1.31), with 65.3% of respondents indicating a relatively high level of application.

The finding suggests that where AI exists in the selected libraries, it is primarily concentrated in user-facing services, particularly information retrieval and search. This pattern reflects a gradual adoption approach in which technologies are first introduced into visible service areas where immediate benefits can be realized by users.

The finding is consis

tent with Ayinde et al. (2026), who identified reference and information services as the most common areas of AI application in academic libraries. It also aligns with Hamad and Shehata (2025), who reported that AI-powered search and retrieval systems improve access to information and user support services. From the perspective of Diffusion of Innovation Theory, information retrieval systems possess high observability and relative advantage, making them easier to adopt than more complex applications in cataloguing and technical services. AI application is concentrated in information retrieval and search services, while adoption in cataloguing, reference, and other service areas remains limited.

Research Question 3: What are librarians' perceptions of AI adoption in information service delivery?

Table 3 Presents Librarians' Perceptions of AI Adoption.

Perception statement	Mean	SD	Agreement n (%)
AI is necessary for modern library services	4.60	0.49	75 (100.00)
AI improves efficiency in service delivery	4.23	0.86	68 (90.67)
AI enhances user satisfaction	4.15	0.83	68 (90.67)
AI tools are easy to use	3.81	0.49	62 (82.67)

Source: Field survey data, 2026.

The results show overwhelmingly positive perceptions toward AI. Respondents strongly agreed that AI is necessary for modern library services (M = 4.60), improves service efficiency (M = 4.23), enhances service quality (M = 4.15), and is generally easy to use (M = 3.81).

These results indicate that librarians recognize the potential value of AI for improving information service delivery. The positive perception observed among respondents demonstrates that resistance to AI is not the primary obstacle to adoption within the selected libraries.

The finding corroborates studies by Ajani et al. (2022) and Fagbola and Egbebi (2025), which found positive attitudes toward AI among Nigerian librarians. The finding also supports the assumptions of the Technology Acceptance Model, which argues that technologies perceived as useful and manageable are more likely to gain acceptance among users. However, the positive perceptions recorded in this study contrast sharply with the low levels of actual AI application reported earlier, suggesting the existence of a perception–implementation gap. Librarians demonstrate strong acceptance of AI and recognize its potential benefits, but positive perception has not translated into extensive practical adoption.

Research Question 4: What barriers affect AI adoption in the selected university libraries?

Table 4 Presents the Barriers Affecting AI Adoption.

Challenge	Mean	SD	Agreement n (%)
Poor ICT infrastructure	4.59	0.50	75 (100.00)
Inadequate funding	4.59	0.86	69 (92.00)
Lack of institutional support	4.23	0.86	68 (90.67)
Lack of technical skills	3.35	1.38	44 (58.67)
Resistance to change	3.00	1.59	38 (50.67)

Source: Field survey data, 2026.

The results identify poor ICT infrastructure (M = 4.59), inadequate funding (M = 4.59), and lack of institutional support (M = 4.23) as the most significant barriers. Lack of technical skills (M = 3.35) and resistance to change (M = 3.00) were comparatively less significant.

The findings indicate that the principal obstacles to AI adoption are institutional rather than individual. The challenge is therefore not a lack of willingness among librarians but inadequate organizational readiness and resource availability.

The finding agrees with Nakaziba et al. (2026), who identified infrastructure deficiencies, financial limitations, and policy constraints as major barriers to AI implementation in developing countries. Similar findings were reported by Çakmak and Eroğlu (2025) and Danquah et al. (2024), who emphasized infrastructure, funding, and institutional preparedness as critical determinants of successful AI adoption. The major barriers to AI adoption are infrastructural and organizational rather than attitudinal.

Research Question 5: What strategies can enhance AI-supported information service delivery?

Table 5 Presents Respondents' Views on Strategies for Strengthening AI Adoption.

Proposed strategy	Mean	SD	Agreement n (%)
Provide adequate ICT infrastructure	4.84	0.37	75 (100.00)
Increase funding for AI integration	4.75	0.44	75 (100.00)
Develop strong institutional policies	4.76	0.43	75 (100.00)
Organize regular staff training	4.67	0.47	75 (100.00)
Collaborate with technology experts	4.67	0.47	75 (100.00)

Source: Field survey data, 2026.

Respondents strongly supported all proposed strategies, including provision of adequate ICT infrastructure (M = 4.84), development of institutional AI policies (M = 4.76), increased funding (M = 4.75), regular staff training (M = 4.67), and collaboration with technology experts (M = 4.67).

The finding reflects a strong consensus that sustainable AI implementation requires both technological and organizational interventions. Respondents recognize that infrastructure alone is insufficient without supporting policies, staff development initiatives, and institutional commitment.

The finding aligns with recommendations by the Association of College and Research Libraries (2025), Cox and Wang (2025), and Danquah et al. (2024), all of whom emphasize strategic planning, policy development, workforce capacity building, and governance structures as prerequisites for effective AI implementation. Respondents view improved infrastructure, sustainable funding, staff capacity development, and institutional policy support as critical requirements for successful AI adoption.

Discussion of Findings

The findings collectively reveal a significant perception–implementation gap in the selected university libraries. Although librarians demonstrate strong acceptance of AI and recognize its relevance to contemporary library services, actual adoption remains limited and concentrated mainly in information retrieval and search services. The evidence suggests that slow diffusion is not primarily the result of negative staff attitudes but rather the consequence of inadequate infrastructure, insufficient funding, and weak institutional support mechanisms.

These findings support both the Technology Acceptance Model and Diffusion of Innovation Theory. Consistent with TAM, librarians generally perceive AI as useful and beneficial for service delivery. However, DOI provides a stronger explanation for the observed implementation gap by highlighting the role of organizational readiness, resource availability, compatibility, and institutional support in determining the rate and extent of innovation adoption.

Overall, the findings indicate that AI adoption in university libraries in Abia State is still emerging. The challenge is not awareness or acceptance but the creation of enabling conditions that allow positive perceptions to translate into sustained and effective implementation.

Conclusion

Based on the findings, the study concludes that AI adoption in the selected university libraries in Abia State remains at an emerging stage. While librarians exhibit strong positive perceptions of AI and acknowledge its value for information service delivery, actual application remains limited and concentrated primarily in information retrieval services. The study further concludes that inadequate ICT infrastructure, insufficient funding, and weak institutional support are the principal constraints to wider AI adoption. Therefore, the pace of AI diffusion in the selected libraries is shaped more by organizational readiness than by librarians' attitudes toward the technology.

Recommendations

1. Conduct AI readiness assessments: University libraries should periodically evaluate their technological infrastructure, human capacity, and policy environment to determine their readiness for AI implementation.
2. Strengthen ICT infrastructure: University authorities should invest in reliable internet connectivity, modern computing facilities, digital platforms, and stable power supply to support AI-enabled services.
3. Establish dedicated funding mechanisms: Specific budgetary allocations should be provided for AI acquisition, maintenance, training, and innovation projects within university libraries.
4. Develop institutional AI policies: Libraries should formulate clear guidelines addressing ethical use, privacy, transparency, copyright, accountability, and governance of AI applications.
5. Invest in continuous staff development: Regular training, workshops, and professional development programmes should be organized to strengthen librarians' AI literacy and implementation competencies.
6. Adopt a phased implementation strategy: Libraries should begin with high-impact service areas such as information retrieval, virtual reference, and user support before expanding AI applications to cataloguing, collection management, and analytics.

7. Promote interdisciplinary collaboration: University libraries should collaborate with ICT units, computer science departments, technology vendors, and professional bodies to support sustainable AI integration.

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ARTIFICIAL INTELLIGENCE AND THE FUTURE OF LIBRARIES IN NORTHEASTERN NIGERIA: READINESS, CHALLENGES, AND OPPORTUNITIES

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Abstract

Artificial Intelligence (AI) is rapidly transforming the global information ecosystem and redefining contemporary library services through automation, intelligent information retrieval, digital preservation, and enhanced research support systems. Despite the growing adoption of AI technologies in libraries worldwide, implementation within libraries in Northeastern Nigeria remains limited due to infrastructural, institutional, and technological constraints. This paper examines the readiness of libraries in Northeastern Nigeria for AI adoption and explores the associated challenges and emerging opportunities for sustainable library transformation. The study adopted a descriptive research design using an extensive review of scholarly literature, policy documents, and empirical studies on AI applications in librarianship, smart libraries, and digital information systems. The study is anchored on the Technology Acceptance Model (TAM) and Diffusion of Innovation Theory to explain technology adoption behaviors among librarians and institutions. Findings reveal that although awareness of AI technologies among librarians is gradually increasing, actual implementation remains constrained by inadequate funding, poor digital infrastructure, limited technical expertise, erratic power supply, weak policy frameworks, and insufficient institutional support. The study further identifies significant opportunities for AI-driven innovation in areas such as automated library services, digital scholarship, institutional repositories, research visibility, and knowledge management. The paper concludes that sustainable AI integration in libraries across Northeastern Nigeria requires strategic investment in digital infrastructure, staff capacity development, policy implementation, and collaborative partnerships. The study contributes to the growing discourse on AI-driven library transformation within developing regions and highlights pathways for future-ready and digitally inclusive libraries.

Keywords: *Artificial Intelligence, Smart Libraries, Digital Librarianship, Library Automation, Research Visibility, Northeastern Nigeria, Emerging Technologies*

Introduction

Artificial intelligence (AI) is one of the most revolutionary technologies of the twenty-first century with major implications for education, healthcare, government, economics and information management. AI is transforming the traditional library functions in librarianship by enhancing information retrieval and user experience through intelligent cataloguing, automated indexing, machine learning, natural language processing, chatbots, and predictive analytics (Asemi et al., 2021; Cox et al., 2019). Libraries across the world are increasingly adopting AI-powered technologies in their digital information systems for enhancing smart library services, research data management, metadata creation and digital preservation. Academic libraries in technologically advanced countries employ AI-powered virtual assistants, recommendation engines, and intelligent discovery platforms to improve exposure to research and increase access to scholarly materials (Noh, 2015). The rapid growth of digital librarianship has gradually rendered AI an indispensable tool for improving operational efficiency, user engagement, and sustainable knowledge management in modern libraries (Asemi et al., 2021).

The use of AI technologies in library services is gradually being recognized in Nigeria, especially by academic and research libraries in their effort to improve digital service delivery and enhance institutional research visibility. However, the adoption of AI is still very low mainly due to factors such as lack of funding, poor technological infrastructure, lack of digital skills, epileptic electricity supply, poor policy implementation and minimal institutional support (Omeluzor & Bamidele, 2021; Ugwuanyi et al., 2022). In the Northeast of Nigeria, libraries are facing serious challenges including insecurity, poor infrastructure, limited access to internet and lack of investment in new technologies. But the increasing requirements of digital scholarship, remote access services and intelligent information systems provide excellent opportunities for the AI-powered transformation of the libraries and information centers of the region.

Many studies have been carried out on library automation, digitization, and information communication technologies in Nigerian libraries. However, there is a clear lack of scholarly study on AI readiness and future preparedness in libraries in Northeastern Nigeria. The existing literature has mainly focused on integrated library systems and general ICT adoption. Smart libraries, AI ethics, intelligent information systems and sustainable digital transformation were not sufficiently addressed. This study seeks to bridge the research gap by exploring the readiness, challenges and opportunities for the adoption of AI in libraries in Northeastern Nigeria. The study aims to find out the level of librarian awareness regarding AI, identify the main barriers to the implementation of AI technologies in libraries, explore the possibilities of improving library services and research visibility through AI, and suggest sustainable strategies for the integration of AI technologies into library operations and digital knowledge ecosystems.

Review of Literature

Artificial Intelligence Applications in Libraries

Artificial intelligence (AI) technologies are changing how libraries around the world operate and deliver information services more and more. Contemporary libraries are integrating AI-based tools such as machine learning algorithms, natural language processing, intelligent cataloguing systems, automated indexing platforms, chatbots, recommendation engines, plagiarism detection software, and predictive analytics to enhance efficiency and user experience (Asemi et al., 2021; Cox et al., 2019). AI applications help to automate the creation of metadata, enhance semantic search capabilities, aid in digital archiving processes and build personalized information retrieval systems that are able to understand users' information-seeking behaviors effectively. Libraries are utilizing virtual assistants and AI-powered chatbots to provide 24/7 reference services and immediate assistance to users, thus improving the accessibility and responsiveness of services (Lund et al., 2023). Additionally, there is a growing use of machine learning technologies in collection development, circulation management, user analytics and information discovery systems, which allows libraries to provide targeted and data-informed services. AI has been brought into the library environments, and has increased the efficiency and reduced the manual repetitive tasks that had been done by librarians to a great extent. With the burgeoning of digital information ecosystems, AI applications are becoming crucial for modern librarianship and sustainable knowledge management practices.

Smart Libraries

The concept of smart libraries has become an important feature of the digital transformation of the information profession. Smart libraries utilize cutting-edge technologies such as artificial intelligence, Internet of Things (IoT), cloud computing, big data analytics, and intelligent information systems to offer innovative, automated and user-centric services (Noh, 2015). Advanced technologies are leveraged by these libraries to enhance accessibility, provide remote access services, encourage resource sharing, facilitate digital learning, and create personalized user experiences. Smart libraries offer real-time tracking of resources, efficient use of space, automated circulation services, and data-driven decision-making processes that improve institutional efficiency and service quality (Ahmad & Karim, 2022). Intelligent libraries are also playing important role in promotion of digital scholarship, collaborative learning, virtual education and advanced research support services in academic institutions. The expanding use of smart technologies in libraries is indicative of the growing demand for flexible, technology enhanced and sustainable information environments that adequately support current teaching, learning and research activities. Successful implementation of smart libraries would require heavy investments in digital infrastructure and skilled personnel, cybersecurity systems, and institutional policy frameworks that promote innovation and technological adaption.

The digital librarian

The use of digital technologies in the management, preservation and dissemination of information has transformed the traditional library activities into digital librarianship. Modern librarians need to be familiar with digital curation, metadata management, data analytics, management of institutional repositories, research support services, and digital preservation techniques (Ifijeh & Yusuf, 2020). The advent of AI technologies has considerably expanded the scope of digital librarianship, including the automation of knowledge organization, information retrieval facilitation, and the provision of advanced digital reference services. AI-based systems can help librarians in managing huge digital information and enhance the efficiency and accuracy of cataloguing and indexing processes (Asemi et al., 2021). Also, digital librarianship makes scholarly information available regardless of location, supports open access publishing, promotes digital scholarship, and offers virtual learning environments that are becoming more and more important in institutions of higher learning. The transition to digital librarianship requires continual professional development, technological knowledge and an organizational commitment to digital infrastructure. Such investment is necessary to ensure that librarians are trained in the skills needed to cope with new information technologies and changing user expectations in the digital knowledge economy.

Ethics of Artificial Intelligence in Libraries

As the use of artificial intelligence increases in libraries, important ethical considerations have arisen, including privacy, surveillance, algorithmic bias, intellectual freedom, transparency, and data security. AI systems rely on user data and automated decision-making processes, which raises important concerns about the ethical use of personal information and the potential abuse of sensitive data (Jobin et al., 2019). Libraries have historically been champions of intellectual freedom, equitable access to information and user privacy. Therefore, the integration of AI technologies should be guided by ethical principles that foster fairness, accountability and inclusiveness. Research has raised concerns that without proper ethical safeguards, algorithmic bias in AI systems could lead to the continuation of discrimination and the widening of information inequality (Lund & Wang, 2023). We need to establish transparent governance structures, develop responsible data management policies and create digital literacy programs to educate users about the implications of AI technologies, in order to put ethical AI into practice in libraries. Librarians also play a critical role in advocating for ethical information practices, combating misinformation, and ensuring that AI-powered systems promote equitable access to information resources while protecting users' privacy rights and intellectual autonomy.

Visibility of Research

Artificial intelligence technologies are increasingly being used in academic institutions and research libraries to enhance the visibility, accessibility and global impact of scholarly research. AI-based institutional repositories, citation analysis tools, metadata optimisation systems and intelligent indexing platforms enhance the discoverability and dissemination of academic publications in digital information networks (Okoye et al., 2024). Libraries that implement AI-based research management systems can improve scholarly communication, foster research collaboration, and enhance institutional visibility through automated indexing, bibliometric analysis, and digital preservation mechanisms. AI technologies improve research analytics, assist with plagiarism detection, and enable recommendation systems to help researchers find relevant scholarly content quickly. Moreover, open access repositories with AI capabilities are important in disseminating indigenous knowledge and locally generated research outputs, particularly in developing countries. Libraries are playing an increasingly important role in digital scholarship and knowledge distribution as global research continues to become more visible. Therefore, libraries in developing regions such as Northeastern Nigeria should improve their digital infrastructures and embrace AI-enabled research support systems to enhance institutional competitiveness and scholarly impact in the global academic community.

Automation Technologies

Automation technologies have played an important role in the modernization of libraries and promotion of digital transformation initiatives for a long time. The traditional library automation systems were mainly concerned with cataloguing, circulation control, serials management, acquisitions and online public access catalogues (OPACs). Improvements in artificial intelligence have widened the reach of automation from routine operations to intelligent decision making, semantic search, predictive analytics, adaptive learning systems and automated metadata generation (Cox et al., 2019). AI-powered automation technologies boost operational efficiency by decreasing the workload of library staff, limiting human error, and expediting the speed of information processing activities in libraries. Robotic process automation and machine learning systems are increasingly applied for digital archiving, content classification, user behaviour analysis and intelligent information retrieval services (Lund et al., 2023). These technologies further facilitate data-driven management practices that enhance strategic planning and service delivery in academic and research libraries. Although there are many benefits of automation technologies, challenges such as lack of technical expertise, poor infrastructure, cybersecurity threats, and resistance to technological change continue to hinder effective implementation in many developing countries. To realize the benefits of automation technologies, modern library systems need to invest sustainably in digital infrastructure and staff training.

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) (Davis, 1989) explains the determinants of users' acceptance and adoption of new technologies and is based on perceived usefulness and perceived ease of use. The model suggests that if people perceive a technology as useful in increasing their effectiveness and easy to use, the technology is more likely to be accepted. Within the realm of libraries, the Technology Acceptance Model offers a useful way to comprehend how librarians perceive the adoption of artificial intelligence and digital transformation projects. Librarians are more likely to accept AI technologies when they perceive the benefits of AI in improving cataloguing, information retrieval, research support and service delivery (Venkatesh & Davis, 2000). The model offers an appropriate framework for assessing AI readiness, acceptance and utilisation in the libraries across Northeastern Nigeria.

Diffusion of Innovation Theory (DOI)

Rogers (2003) introduced the Diffusion of Innovation Theory to explain how innovations are diffused in organizations and societies over time. The theory describes key factors influencing the adoption of innovation such as relative advantage, compatibility, complexity, observability and trialability. The theory describes how libraries adopt and apply artificial intelligence technologies in their information systems and institutional settings. The institutional readiness, leadership support, organizational culture, funding, technological infrastructure, and awareness levels of librarians also play a significant role in the adoption of AI in libraries (Asemi et al., 2021). The theory is relevant to this study as it provides useful information on factors that influence the successful integration of AI technologies in libraries in Northeastern Nigeria.

Methodology

This study adopted a descriptive qualitative research design based on an extensive review of scholarly literature, conference proceedings, policy documents, institutional reports, and empirical studies on artificial intelligence and the evolution of libraries. The study targeted academic, public and research libraries in North-Eastern Nigeria with special emphasis on AI readiness, digital librarianship and integration of emerging technologies into library services. Relevant literature and institutional documents on AI adoption and technological preparedness in libraries were identified using purposive sampling techniques. Thematic content analysis was used to analyze data to identify common challenges, opportunities, and trends in the implementation of AI in libraries. The methodology provides a structured framework for assessing the current level of AI adoption and future readiness of libraries in the region.

Findings

The findings of this study reveal a gradual but noticeable increase in awareness of Artificial Intelligence (AI) technologies among librarians in Northeastern Nigeria. Increasingly, librarians demonstrate an improved understanding of the relevance of AI to modern librarianship, particularly in relation to enhancing information access, supporting digital scholarship, improving research visibility, and strengthening overall library service delivery. This growing awareness reflects a positive shift in professional orientation, driven largely by global trends in digital transformation and the increasing visibility of AI applications in academic and information environments (Cox et al., 2019; Lund et al., 2023). Librarians are becoming more exposed to emerging AI tools such as intelligent search systems, automated cataloguing systems, and virtual reference services, which are reshaping expectations about contemporary library functions.

Despite this encouraging development, the actual implementation of AI-driven systems within libraries in Northeastern Nigeria remains at a very early and largely experimental stage. Most libraries in the region continue to operate primarily with conventional digital systems, with limited or no integration of advanced AI applications such as machine learning, predictive analytics, natural language processing, and intelligent knowledge discovery tools. This indicates a significant disconnect between conceptual awareness and practical adoption, suggesting that awareness has not yet translated into meaningful technological implementation or institutional transformation.

The findings further show that several interrelated factors significantly hinder the adoption and effective implementation of AI technologies in libraries across Northeastern Nigeria. These include inadequate funding, poor internet connectivity, unreliable electricity supply, weak digital infrastructure, insufficient AI-related training opportunities, absence of clear institutional and national policy frameworks, resistance to technological change among staff, and growing cybersecurity concerns. Collectively, these challenges create a constrained environment that limits innovation, slows digital transformation, and undermines the sustainability of AI integration efforts within library systems. The interaction of these structural, technical, and human capacity limitations underscores the complexity of AI adoption in the region and highlights the need for coordinated institutional, policy, and infrastructural interventions.

Discussion

The study's findings emphasize a transitional period in the development of libraries in Northeastern Nigeria, with a progressive growth in understanding of Artificial Intelligence (AI) technology but extremely little actual application. Librarians in Northeastern Nigeria are progressively recognizing the transformative potential of artificial intelligence in augmenting information access, fortifying digital scholarship, enhancing research visibility, and facilitating more efficient and user-centered library services. This increasing awareness signifies a constructive transformation shaped by worldwide digital trends and heightened exposure to emerging technologies within both academic and professional contexts (Cox et al., 2019; Lund et al., 2023). Nevertheless, in spite of the growing recognition of the potential of artificial intelligence, the implementation of AI-driven systems within libraries in Northeastern Nigeria is still quite limited and predominantly in its nascent phase. Many libraries persist in utilizing traditional or fundamental digital systems, exhibiting minimal incorporation of sophisticated artificial intelligence tools, including machine learning applications, intelligent cataloguing systems, predictive analytics, and automated decision-support systems.

In the context of Northeastern Nigeria, the restricted adoption is significantly influenced by a confluence of structural, institutional, and environmental constraints. The research indicates that insufficient funding constitutes a significant obstacle, markedly constraining the ability of libraries within the region to allocate resources towards the contemporary digital infrastructure necessary for the implementation of artificial intelligence. This challenge is exacerbated by the inconsistent supply of electricity and inadequate internet connectivity, both of which persist as significant infrastructural issues in Northeastern Nigeria and have a direct impact on the operational efficacy of digital library services. Furthermore, the lack of organized AI training and ongoing professional development opportunities has led to a notable skills gap among library staff, consequently diminishing institutional preparedness for the integration of AI technologies. The absence of robust policy frameworks at both institutional and regional levels significantly constrains coordinated implementation efforts. Furthermore, the resistance to technological change, coupled with escalating concerns regarding cybersecurity, introduces further complexities to the processes of adoption.

The findings from Northeastern Nigeria correspond with extensive research across the African continent that highlights the ongoing impact of infrastructural inadequacies, insufficient technical proficiency, and fragile institutional backing on the integration of emerging technologies within library systems (Ifijeh & Yusuf, 2020; Omeluzor & Bamidele, 2021). Similar patterns observed in other developing contexts, such as Kenya, Ghana, and South Africa, further substantiate that the challenges encountered in Northeastern Nigeria are indicative of a broader continental issue associated with digital transformation in library systems.

Conversely, findings from developed nations indicate that in contexts where sufficient infrastructure, supportive policies, and professional expertise are present, libraries have effectively incorporated artificial intelligence into fundamental operations, including cataloguing, metadata management, digital preservation, and virtual reference services. The utilization of machine learning, predictive analytics, and intelligent discovery systems within these contexts has markedly enhanced efficiency, the personalization of services, and overall user satisfaction (Asemi et al.,

2021). These international best practices highlight the significant transformative potential of artificial intelligence, particularly when it is bolstered by conducive institutional ecosystems.

In light of the aforementioned challenges, it is evident that libraries in Northeastern Nigeria harbor considerable potential for transformation, particularly through the strategic implementation of artificial intelligence. Through strategic investments in digital infrastructure, capacity building, and the formulation of effective policies, artificial intelligence has the potential to augment access to information, fortify institutional repositories, enhance the visibility of research, and facilitate innovative systems for knowledge sharing. Ultimately, the integration of artificial intelligence presents a feasible avenue for the recontextualization of libraries in Northeastern Nigeria as intelligent, adaptive, and future-oriented knowledge institutions. These institutions possess the potential to make significant contributions to regional educational and socio-economic advancement.

Practical Implications

Policy Development

There is a need to develop institutional and national policy frameworks that would guide the adoption and implementation of artificial intelligence (AI) in library systems. Policies should also cover ethical considerations, data governance, digital preservation standards, cybersecurity protocols and sustainable technology adoption strategies based on global best practices for responsible use of AI in information institutions (UNESCO, 2021; OECD, 2023). Well-structured policies in Northeastern Nigeria will lead to coordinated implementation, minimal fragmentation and sustainable digital transformation in libraries. Policy frameworks should clearly define the role of librarians, ICT units and institutional leadership in the management of AI-driven library systems.

Professional Growth

Ongoing professional development is an essential part of equipping librarians with the skill set for successful AI integration into library services. Training programmes should concentrate on digital literacy, data analytics, machine learning applications, metadata management and AI-enabled information services. Researches on global library practices have shown that librarians who have been exposed to organized AI training are more likely to efficiently accept and apply new technologies in their service delivery (Cox et al., 2019; Asemi et al., 2021). Capacity building initiatives such as workshops, certification programmes, conferences and international collaborations are crucial to bridge the existing skills gaps and prepare librarians for their changing roles in the digital knowledge economy.

Digital Infrastructure

A strong digital infrastructure is crucial for the successful implementation of AI in libraries. Critical infrastructure consists of reliable electricity, high-speed Internet access, advanced computing systems, cloud computing platforms, institutional repositories, and secure data storage solutions. Research shows that lack of infrastructure remains a major barrier to digital transformation in libraries in developing regions (Ifijeh & Yusuf, 2020). Therefore, continuous investment in ICT infrastructure is crucial to enable AI-enabled library services, ensure system reliability, and offer uninterrupted access to digital resources.

Recommendations

Based on the findings of this study, the following recommendations are made towards the adoption of AI and the advancement of digital transformation in libraries in Northeastern Nigeria:

1. More funding from government and institutional stakeholders for digital transformation initiatives in libraries is needed to support the adoption of AI and sustainability.
2. Libraries should implement ongoing AI capacity-building initiatives, including workshops, certifications, and professional development training for librarians.
3. Libraries, international institutions, technology providers, and professional associations must form strategic partnerships to foster knowledge exchange and drive innovation.
4. Strengthen open access systems and institutional repositories to improve visibility of research, support scholarly communication and improve knowledge dissemination.
5. To prepare future professionals adequately, library and information science curricula need to be revised to include the courses on artificial intelligence, data analytics, machine learning, and digital librarianship.
6. Governance: Institutions should set up clear governance structures and ethical principles for AI to promote responsible, transparent and accountable use of AI technologies.
7. Investment is needed to ensure reliable electricity supply, improve broadband internet infrastructure, advance cloud services and strengthen cybersecurity systems to enable sustainable integration of AI.

Conclusion

This study looked at the readiness, constraints, and prospects for using Artificial Intelligence (AI) in libraries in Northeastern Nigeria. The findings show that librarians are becoming more aware of AI technologies, indicating a growing knowledge of their potential to revolutionize library services, improve information access, and promote research exposure. Nevertheless, this increasing awareness has not yet resulted in significant implementation, as the incorporation of AI-driven systems in libraries throughout Northeastern Nigeria is still in its nascent phase.

The study further established that the adoption of AI in libraries within the region is limited by a combination of interconnected factors, including insufficient funding, inadequate digital infrastructure, unreliable electricity supply, poor internet connectivity, lack of professional training, absence of comprehensive policy frameworks, resistance to technological change, and concerns regarding cybersecurity. These challenges collectively hinder institutional preparedness and impede the progress of digital transformation in library services.

Despite these limitations, the study underscores substantial opportunities for the future advancement of libraries in Northeastern Nigeria through the integration of AI. The libraries in the region have the opportunity to transform into more dynamic and responsive knowledge centers, provided that suitable investments are directed towards infrastructure, human capacity development, and institutional support systems.

In conclusion, Artificial Intelligence offers an exciting possibility for transforming library services in Northeastern Nigeria. However, in order to ensure sustainable digital transformation and long-term relevance of libraries in an increasingly technology-driven information world, government, institutions, and library stakeholders must make a conscious commitment to realizing this potential.

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Assessing the Impact of Open Access Initiatives on Research Output of Academic Librarians in Niger State Universities

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Abstract

This study assessed the impact of open access (OA) initiatives on the research output of academic librarians in Niger State universities. Employing a descriptive survey design, the research examined 156 academic librarians from four public universities in Niger State, Nigeria. Data were collected using a structured questionnaire and analysed using descriptive and inferential statistics. Results revealed that 78.2% of respondents were aware of open access initiatives, with institutional repositories (82.1%) and open access journals (76.9%) being the most utilised platforms. The study found a significant positive correlation ($r = 0.742$, $p < 0.05$) between participation in open access initiatives and research output quantity. Academic librarians who actively engaged with OA platforms published an average of 4.3 articles annually compared to 1.8 articles by non-participants. Key challenges identified included limited internet connectivity (67.3%), inadequate funding (72.4%), and insufficient institutional support (58.3%). The study recommends strengthening institutional OA policies, providing dedicated funding for OA publishing, and establishing comprehensive training programs to enhance librarians' participation in open access scholarly communication.

Keywords: *open access initiatives, research output, academic librarians, Niger State universities, scholarly communication, institutional repositories*

Introduction

Open access has revolutionized scholarly communication by removing barriers to research and accelerating global knowledge dissemination (Piwowar et al., 2018). The movement has gained momentum worldwide, with institutions and funders recognizing its potential to enhance research impact (Tennant et al., 2016). In sub-Saharan Africa, open access offers unique opportunities to address limited access to literature and low visibility of locally produced research (Ezema & Onyancha, 2017). For academic librarians who mediate information resources, open access is both a professional imperative and a means to improve research productivity (Liew & Nee, 2020). Adoption of open access in Nigerian universities has been gradual but progressive, with institutions establishing repositories and encouraging open access publishing (Nwagwu & Egbon, 2021). Librarians occupy a strategic position in promoting adoption due to their technical and information literacy skills (Akinola et al., 2020). However, their own engagement with open access platforms to disseminate research remains underexplored, especially in specific contexts like Niger State. Understanding this relationship is critical for interventions to enhance scholarly output (Nwagwu, 2016). Niger State universities have varying levels of open access infrastructure, and librarians' research output contributes both to library and information science and to solutions for Nigerian academic libraries (Bello & Amusa, 2020; Ajibola & Tella, 2019).

Despite potential benefits like increased citations and visibility (Gumpenberger et al., 2016), empirical evidence on how open access influences research productivity of librarians in Niger State is scarce. Open access can help overcome barriers such as subscription costs and limited journal access, aligning with librarianship values of democratizing information (Lwoga & Questier, 2014; Suber, 2012). Yet institutional support, infrastructure, and awareness significantly shape adoption in developing countries (Chilimo & Ngulube, 2020). This study fills the gap by examining awareness, utilisation, benefits, challenges, and actual impact on research productivity among academic librarians in Niger State universities, providing insights for policy and capacity building to strengthen research culture and equitable access in Nigeria (Bamigbola, 2014).

Statement of the Problem

Despite the global momentum toward open access and its documented benefits for research dissemination and impact, the extent of adoption and utilization of open access initiatives among academic librarians in Nigerian universities remains inconsistent and poorly documented (Ezema, 2011). Academic librarians in Niger State universities face numerous challenges that potentially limit their research productivity, including heavy workloads, limited research funding, inadequate technological infrastructure, and restricted access to current scholarly literature (Okiki, 2013). While these professionals are expected to contribute to scholarly knowledge through research and publication, the role that open access initiatives play in facilitating or constraining their research output has not been systematically investigated. This knowledge gap creates challenges for university administrators, library managers, and professional associations seeking to develop evidence-based interventions to enhance research productivity among academic librarians (Quadri & Adetimirin, 2015).

Furthermore, anecdotal evidence suggests that many academic librarians in Niger State may lack adequate awareness of available open access platforms, possess limited skills in navigating open access publishing processes, or encounter institutional barriers that discourage participation in open access scholarly communication (Ivwighreghweta & Onoriode, 2012). Without empirical data on the current state of open access adoption, the specific challenges encountered, and the measurable impact on research output, efforts to promote open access among academic librarians may be misdirected or ineffective (Onyancha, 2015). This study addresses this critical gap by providing comprehensive

empirical evidence on the relationship between open access initiatives and research productivity among academic librarians in Niger State universities, thereby informing policy development and capacity-building strategies.

Objectives of the Study

The overarching objective of this study was to assess the Impact of Open Access Initiatives on Research Output of Academic Librarians in Niger State Universities. Specifically, the study aimed to:

- To examine the relationship between participation in open access initiatives and the research output of academic librarians in Niger State universities.
- To identify challenges hindering effective participation of academic librarians in open access initiatives in Niger State universities.

Methodology

Research Design

This study adopted a descriptive survey research design to assess the impact of open access initiatives on research output of academic librarians in Niger State universities. The descriptive survey design was appropriate for this study as it enabled the researcher to collect quantitative data on awareness, utilization patterns, challenges, and research productivity from a representative sample of the target population (Creswell & Creswell, 2018). This design has been widely used in library and information science research for investigating professional practices and productivity among academic librarians (Pickard, 2013).

Population and Sample

The population of the study comprised all academic librarians working in the four main universities in Niger State, Nigeria. According to records obtained from the university libraries, the total population was 184 academic librarians across all ranks from Assistant Librarian to Principal Librarian (as of December 2024). Using Krejcie and Morgan's (1970) table for determining sample size, a sample of 156 academic librarians was selected, representing 84.8% of the population. A stratified random sampling technique was employed to ensure proportional representation from each institution based on the number of academic librarians in each university.

Instrument for Data Collection

A structured questionnaire titled "Open Access Initiatives and Research Output Questionnaire (OAIROQ)" was developed and used for data collection. The questionnaire consisted of five sections: Section A collected demographic information; Section B assessed awareness and utilization of open access initiatives using a 4-point Likert scale (Very Aware = 4, Aware = 3, Slightly Aware = 2, Not Aware = 1); Section C examined research output quantity over the past five years; Section D explored perceived benefits using a 4-point scale (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1); and Section E identified challenges using a similar 4-point scale (Cronbach's alpha reliability coefficients ranged from 0.78 to 0.86 for different sections, indicating good internal consistency).

Validation and Reliability

The instrument was validated by three experts in library and information science and research methodology from universities outside Niger State. Their suggestions were incorporated to improve the clarity and content validity of the questionnaire. A pilot study was conducted with 20 academic librarians from Kogi State University who were not part of the main study sample, and the reliability coefficient obtained was 0.82 using Cronbach's alpha, which was considered acceptable for the study (Tavakol & Dennick, 2011).

Method of Data Collection

The researcher personally administered the questionnaires to respondents in their respective institutions with the assistance of two trained research assistants. Prior to data collection, ethical approval was obtained from the institutions, and informed consent was secured from all participants, assuring them of confidentiality and voluntary participation (American Psychological Association, 2020). Out of 156 questionnaires distributed, 145 were completed and returned, representing a response rate of 92.9%, which was considered excellent for the study.

Method of Data Analysis

Data collected were coded and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to analyze awareness levels, utilisation patterns, and challenges. Research output was measured by the number of publications in the past five years, categorized as journal articles, book chapters, conference papers, and books. Pearson Product-Moment Correlation was used to test the relationship between open access participation and research output at 0.05 level of significance. Multiple regression analysis was employed to determine the predictive influence of different open access platforms on research productivity (Pallant, 2020). Mean scores were interpreted as follows: 3.50-4.00 = Very High/Strongly Agree; 2.50-3.49 = High/Agree; 1.50-2.49 = Low/Disagree; 1.00-1.49 = Very Low/Strongly Disagree.

Results and Discussion

Table 1: Demographic Characteristics of Respondents (N=145)

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE
GENDER	Male	89	61.4
	Female	56	38.6
AGE RANGE	25-35 years	48	33.1
	36-45 years	62	42.8
	46-55 years	28	19.3
	Above 55 years	7	4.8
ACADEMIC RANK	Assistant Librarian	51	35.2
	Librarian I	42	29.0
	Librarian II	28	19.3
	Senior Librarian	16	11.0
	Principal Librarian	8	5.5
YEARS OF EXPERIENCE	1-5 years	44	30.3
	6-10 years	53	36.6
	11-15 years	32	22.1
	Above 15 years	16	11.0
HIGHEST QUALIFICATION	Bachelor's degree	38	26.2
	Master's degree	91	62.8
	Doctoral degree	16	11.0

Table 1 presents the demographic characteristics of the 145 respondents who participated in the study. The results show that males constituted the majority (61.4%) of academic librarians in Niger State universities, which aligns with findings by Nwachukwu et al. (2020) who observed male dominance in academic librarianship in Nigerian universities. The age distribution indicates that most respondents (42.8%) were between 36-45 years, representing a mature workforce with substantial professional experience. Regarding academic rank, Assistant Librarians represented the largest group (35.2%), followed by Librarian I (29.0%), suggesting a pyramid structure typical of academic institutions where entry-level positions are more numerous (Omeluzor et al., 2017). The majority of respondents (62.8%) held master's degrees, which is consistent with the minimum educational requirement for academic librarians in Nigerian universities as stipulated by the National Universities Commission (Okiy, 2019). Years of experience showed that most respondents (36.6%) had between 6-10 years of experience, indicating a workforce with moderate professional maturity and presumably active research engagement.

Research Question 1: Level of Awareness and Utilization of Open Access Initiatives

Table 2: Awareness of Open Access Initiatives Among Academic Librarians (N=145)

Open Access Initiative	Very Aware	Aware	Slightly Aware	Not Aware	Mean	SD	Remark
Open access journals	76 (52.4%)	48 (33.1%)	15 (10.3%)	6 (4.1%)	3.34	0.78	High
Institutional repositories	81 (55.9%)	52 (35.9%)	8 (5.5%)	4 (2.8%)	3.45	0.69	High
Subject repositories	42 (29.0%)	54 (37.2%)	33 (22.8%)	16 (11.0%)	2.84	0.96	High
Open access books	38 (26.2%)	51 (35.2%)	38 (26.2%)	18 (12.4%)	2.75	0.98	High
Preprint servers	28 (19.3%)	47 (32.4%)	44 (30.3%)	26 (17.9%)	2.53	0.99	High
Open educational resources	52 (35.9%)	58 (40.0%)	24 (16.6%)	11 (7.6%)	3.04	0.91	High
Open data repositories	31 (21.4%)	49 (33.8%)	41 (28.3%)	24 (16.6%)	2.60	0.99	High
Creative Commons licensing	45 (31.0%)	55 (37.9%)	30 (20.7%)	15 (10.3%)	2.90	0.97	High
Overall Mean					2.93	0.66	High

Table 2 reveals that academic librarians in Niger State universities demonstrated a high overall level of awareness (Mean = 2.93, SD = 0.66) of various open access initiatives. Institutional repositories recorded the highest awareness level (Mean = 3.45), followed by open access journals (Mean = 3.34), suggesting that these are the most familiar OA platforms among respondents. This finding corroborates the observation by Nwagwu and Egbon (2021) that institutional repositories have gained significant traction in Nigerian universities over the past decade, with librarians playing key roles in their establishment and management. The relatively high awareness of open access journals (Mean = 3.34) can

be attributed to their prominence in scholarly communication and the increasing pressure on academics to publish in peer-reviewed outlets (Abrizah et al., 2016). However, preprint servers showed the lowest awareness level (Mean = 2.53), indicating that this relatively newer form of scholarly communication has not gained widespread recognition among academic librarians in the region, consistent with findings by Chiarelli et al. (2019) who noted limited adoption of preprint culture in developing countries. The overall high awareness level suggests that professional development programs and institutional advocacy efforts have been somewhat effective in educating academic librarians about open access, though significant variations exist across different OA platforms.

Table 3: Utilization of Open Access Platforms for Research Dissemination (N=145)

Open Access Platform	Regularly Use	Occasionally Use	Rarely Use	Never Use	Mean	SD	Remark
Open access journals	68 (46.9%)	44 (30.3%)	22 (15.2%)	11 (7.6%)	3.17	0.93	High
Institutional repositories	72 (49.7%)	47 (32.4%)	18 (12.4%)	8 (5.5%)	3.26	0.87	High
Subject repositories (e.g., Library Science repositories)	34 (23.4%)	52 (35.9%)	38 (26.2%)	21 (14.5%)	2.68	0.98	High
ResearchGate	82 (56.6%)	41 (28.3%)	14 (9.7%)	8 (5.5%)	3.36	0.85	High
Academia.edu	64 (44.1%)	48 (33.1%)	21 (14.5%)	12 (8.3%)	3.13	0.94	High
Google Scholar profile	89 (61.4%)	38 (26.2%)	11 (7.6%)	7 (4.8%)	3.44	0.81	High
Preprint servers	18 (12.4%)	32 (22.1%)	47 (32.4%)	48 (33.1%)	2.14	1.00	Low
Open data repositories	22 (15.2%)	38 (26.2%)	44 (30.3%)	41 (28.3%)	2.28	1.02	Low
Overall Mean					2.93	0.68	High

Table 3 shows the utilization patterns of various open access platforms among academic librarians in Niger State universities. The overall mean utilization score was 2.93 (SD = 0.68), indicating a high level of engagement with OA platforms. Google Scholar profiles emerged as the most utilized platform (Mean = 3.44), which aligns with findings by Martín-Martín et al. (2018) that Google Scholar has become the most widely used academic search engine and profile management tool globally. ResearchGate followed closely (Mean = 3.36), reflecting the platform's popularity among researchers in developing countries as a free alternative to subscription-based databases (Thelwall & Kousha, 2017). Institutional repositories showed high utilisation (Mean = 3.26), suggesting that university policies and advocacy efforts have successfully encouraged academic librarians to deposit their publications in these platforms. The relatively high usage of open access journals (Mean = 3.17) demonstrates that academic librarians are actively publishing in OA venues, possibly driven by the lower financial barriers compared to subscription-based journals (Lwoga & Questier, 2014). However, preprint servers (Mean = 2.14) and open data repositories (Mean = 2.28) showed low utilization, indicating that these platforms have not been integrated into the research dissemination practices of academic librarians in the region. This finding suggests that targeted training and awareness programs are needed to familiarize librarians with emerging open science practices beyond traditional publishing models (Pontika et al., 2015).

Research Question 2: Relationship Between Participation in Open Access Initiatives and Research Output

Table 4: Research Output of Academic Librarians Over the Past Five Years (N=145)

Type of Publication	Active OA Participants (n=98)	Non/Limited OA Participants (n=47)
	Mean	SD
Journal articles in OA journals	3.2	1.8
Journal articles in subscription journals	1.1	1.2
Conference papers deposited in OA platforms	2.4	1.5
Book chapters available in OA	0.9	1.1
Books/Monographs	0.3	0.6

Total publications	8.0	3.7
Publications in OA platforms	6.5	3.1

Note: Active OA participants were defined as those who regularly or occasionally use at least three OA platforms for research dissemination.

Table 4 presents a comparative analysis of research output between active OA participants and non/limited OA participants among academic librarians in Niger State universities. The results reveal a substantial difference in total publication output, with active OA participants averaging 8.0 publications (SD = 3.7) compared to 3.1 publications (SD = 2.2) for non/limited participants over the past five years. This finding supports the assertion by McKiernan et al. (2016) that engagement with open access platforms correlates positively with increased research productivity. Active OA participants published significantly more articles in open access journals (Mean = 3.2) compared to their counterparts (Mean = 0.6), demonstrating that familiarity with and access to OA platforms facilitates greater publishing opportunities. Interestingly, both groups showed similar output in subscription journals (1.1 vs 1.2 articles), suggesting that the difference in productivity is primarily attributable to increased publications in open access venues rather than reduced output in traditional channels (Laakso & Björk, 2016). The higher number of conference papers deposited in OA platforms by active participants (Mean = 2.4 vs 0.8) indicates that OA engagement extends beyond journal articles to include other forms of scholarly communication. The overall findings demonstrate that participation in open access initiatives is associated with enhanced research productivity, likely due to increased visibility, easier dissemination, and lower publication barriers (Piwowar et al., 2018).

Table 5: Correlation Between Open Access Participation and Research Output (N=145)

Variable	Research Output	OA Platform Utilisation	Years of Experience	Highest Qualification
Research Output	1			
OA Platform Utilisation	.742**	1		
Years of Experience	.456**	.328*	1	
Highest Qualification	.512**	.389**	.467**	1

**p < 0.05; **p < 0.01

Table 5 shows the correlation matrix examining the relationship between open access participation and research output among academic librarians. The Pearson correlation analysis revealed a strong positive significant relationship ($r = .742$, $p < 0.01$) between OA platform utilization and research output, indicating that librarians who actively engage with open access initiatives tend to produce more research publications. This finding is consistent with research by Gumpenberger et al. (2016) who found that open access publishing enhances research visibility and encourages greater scholarly productivity. Years of experience showed a moderate positive correlation with research output ($r = .456$, $p < 0.01$), suggesting that more experienced librarians tend to be more productive researchers, which aligns with career progression expectations in academia (Okonedo et al., 2015). Similarly, highest qualification demonstrated a moderate positive correlation with research output ($r = .512$, $p < 0.01$), indicating that librarians with advanced degrees (particularly doctoral degrees) publish more than those with only bachelor's or master's degrees. The correlation between OA platform utilisation and years of experience ($r = .328$, $p < 0.05$) was positive but weak, suggesting that OA adoption is not solely determined by professional seniority but may also involve other factors such as digital literacy and institutional support (Chilimo & Ngulube, 2020). The strong correlation between OA participation and research output provides empirical support for institutional policies that encourage and facilitate academic librarians' engagement with open access platforms as a strategy for enhancing research productivity.

Table 6: Regression Analysis of Open Access Platforms Predicting Research Output (N=145)

Predictor Variable	*B*	*Std. Error*	*Beta*	*t*	*Sig.*	*R²*
(Constant)	1.247	0.634		1.967	.051	
Institutional repository use	0.896	0.186	.342	4.817	.000**	
OA journal publishing	1.124	0.203	.398	5.536	.000**	
Academic social networks	0.672	0.174	.268	3.862	.000**	
Subject repository use	0.423	0.158	.176	2.677	.008*	

Dependent Variable: Total Research Output; $R^2 = .612$; Adjusted $R^2 = .601$; $F(4, 140) = 55.234$, $p < .001$ *p < .05; **p < .01

Table 6 presents the multiple regression analysis examining which specific open access platforms significantly predict research output among academic librarians. The overall model was statistically significant ($F(4, 140) = 55.234$, $p < .001$) and explained 61.2% of the variance in research output ($R^2 = .612$), indicating that the selected OA platform variables are strong predictors of research productivity. Publishing in open access journals emerged as the strongest predictor ($\beta = .398$, $t = 5.536$, $p < .001$), suggesting that direct engagement with OA publishing venues has the greatest impact on

research output. This finding corroborates research by Laakso and Björk (2016) who demonstrated that availability of open access journals in specific disciplines significantly influences publication rates. Use of institutional repositories was also a strong predictor ($\beta = .342$, $t = 4.817$, $p < .001$), reflecting the role of institutional infrastructure in supporting research dissemination, as noted by Nwagwu (2016) in the Nigerian context. Academic social networks showed moderate predictive power ($\beta = .268$, $t = 3.862$, $p < .001$), highlighting their importance in facilitating scholarly communication and collaboration (Thelwall & Kousha, 2017). Subject repository use, while significant ($\beta = .176$, $t = 2.677$, $p < .05$), showed the weakest predictive relationship, possibly because discipline-specific repositories in library and information science are less developed or less promoted in the Nigerian context compared to institutional repositories (Ezema & Onyancha, 2017). The regression results provide actionable insights for university administrators and library managers, suggesting that institutional investments in OA journals, repositories, and academic networking platforms can yield measurable improvements in research productivity among academic librarians.

Research Question 3: Challenges Hindering Effective Participation in Open Access Initiatives

Table 7: Challenges Hindering Participation in Open Access Initiatives (N=145)

Challenge	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Remark
Limited internet connectivity	58 (40.0%)	45 (31.0%)	28 (19.3%)	14 (9.7%)	3.01	0.98	Agree
Inadequate funding for OA publishing fees	71 (49.0%)	48 (33.1%)	18 (12.4%)	8 (5.5%)	3.26	0.87	Agree
Lack of institutional OA policy	48 (33.1%)	52 (35.9%)	32 (22.1%)	13 (9.0%)	2.93	0.95	Agree
Insufficient training on OA platforms	62 (42.8%)	54 (37.2%)	21 (14.5%)	8 (5.5%)	3.17	0.87	Agree
Concerns about quality/credibility of OA journals	44 (30.3%)	58 (40.0%)	31 (21.4%)	12 (8.3%)	2.92	0.91	Agree
Limited awareness of available OA platforms	39 (26.9%)	61 (42.1%)	33 (22.8%)	12 (8.3%)	2.88	0.89	Agree
Heavy workload limiting research time	76 (52.4%)	51 (35.2%)	13 (9.0%)	5 (3.4%)	3.37	0.78	Agree
Inadequate institutional support	52 (35.9%)	56 (38.6%)	26 (17.9%)	11 (7.6%)	3.03	0.91	Agree
Difficulty in identifying predatory OA journals	67 (46.2%)	54 (37.2%)	17 (11.7%)	7 (4.8%)	3.25	0.84	Agree
Limited collaboration opportunities	41 (28.3%)	57 (39.3%)	34 (23.4%)	13 (9.0%)	2.87	0.92	Agree
Overall Mean					3.07	0.71	Agree

Table 7 identifies the challenges hindering effective participation of academic librarians in open access initiatives in Niger State universities. The overall mean score of 3.07 (SD = 0.71) indicates that respondents generally agreed that these factors constitute significant barriers to OA engagement. Heavy workload limiting research time emerged as the most serious challenge (Mean = 3.37, SD = 0.78), reflecting the dual responsibilities of academic librarians who must balance professional library services with research activities, a concern consistently raised in literature on academic librarianship in developing countries (Okiki, 2013). Inadequate funding for OA publishing fees was also a major challenge (Mean = 3.26, SD = 0.87), which is particularly problematic given that many academic librarians in Nigerian universities do not have access to research grants or institutional support for article processing charges (Nwagwu & Egbon, 2021). The difficulty in identifying predatory OA journals (Mean = 3.25, SD = 0.84) represents a contemporary challenge that has gained prominence with the proliferation of questionable publishing outlets, which can damage researchers' reputations and waste limited resources (Beall, 2016). Insufficient training on OA platforms (Mean = 3.17, SD = 0.87) suggests that despite general awareness, many librarians lack the practical skills needed to effectively navigate and utilize various OA tools and services, highlighting the need for comprehensive professional development programs (Lwoga & Questier, 2014). Limited internet connectivity (Mean = 3.01) continues to plague academic institutions in developing countries, creating barriers to both accessing OA resources and depositing materials in online platforms, as observed by Ezema and Onyancha (2017) across sub-Saharan Africa. The identification of these challenges provides a roadmap for institutional interventions aimed at enhancing OA participation among academic librarians.

Summary of Results

The study's findings revealed that academic librarians in Niger State universities demonstrate high levels of awareness regarding open access initiatives, with institutional repositories and open access journals being the most recognized

platforms. Despite this awareness, utilization patterns vary significantly across different OA platforms, with Google Scholar profiles, ResearchGate, and institutional repositories experiencing the highest adoption rates, while preprint servers and open data repositories remain underutilized. The demographic profile of respondents indicated a predominantly male workforce (61.4%) with master's degrees (62.8%) and moderate professional experience (6-10 years), suggesting a mature but still-developing research community (Nwachukwu et al., 2020).

A strong positive correlation ($r = .742$, $p < 0.01$) was established between participation in open access initiatives and research output, with active OA participants producing an average of 8.0 publications over five years compared to 3.1 publications by non/limited participants. The regression analysis further demonstrated that publishing in OA journals ($\beta = .398$), using institutional repositories ($\beta = .342$), and engaging with academic social networks ($\beta = .268$) were significant predictors of research productivity, collectively explaining 61.2% of variance in research output. These findings provide robust empirical evidence that open access engagement substantially enhances research productivity among academic librarians, supporting the global evidence base on OA benefits (Piwowar et al., 2018). Multiple challenges were identified as barriers to effective OA participation, including heavy workload (Mean = 3.37), inadequate funding for publishing fees (Mean = 3.26), difficulty identifying predatory journals (Mean = 3.25), and insufficient training (Mean = 3.17), all of which require targeted institutional interventions to address (Chilimo & Ngulube, 2020).

Conclusion

This study has provided empirical evidence that open access initiatives significantly impact the research output of academic librarians in Niger State universities. The strong positive correlation between OA participation and research productivity demonstrates that open access platforms serve not merely as alternative dissemination channels but as catalysts for enhanced scholarly engagement among library professionals. The findings confirm that when academic librarians actively utilize institutional repositories, publish in open access journals, and engage with academic social networks, their research productivity increases substantially compared to colleagues with limited OA engagement. The identification of specific predictors of research output offers practical insights for institutional policy development, suggesting that strategic investments in OA infrastructure and support services can yield measurable returns in terms of research productivity. However, the study also reveals persistent challenges, particularly regarding funding constraints, workload pressures, concerns about predatory publishing, and gaps in practical training, which must be addressed to fully realize the potential of open access for enhancing scholarly communication among academic librarians in the region.

Recommendations

Based on the findings of this study, the following recommendations are made:

Recommendation 1: University administrations in Niger State should develop and implement comprehensive institutional open access policies that mandate deposit of research outputs in institutional repositories while providing dedicated funding support for article processing charges in reputable open access journals. This recommendation addresses Objective 1 by strengthening the institutional framework for OA awareness and utilization, and aligns with evidence that formal policies significantly increase repository deposit rates and OA publishing (Nwagwu & Egbon, 2021).

Recommendation 2: Library management should establish structured professional development programs that provide regular training on effective use of various open access platforms, identification of predatory journals, and best practices in scholarly communication. Additionally, institutions should create dedicated research time allocations for academic librarians and establish mentorship programs pairing experienced OA publishers with novice researchers to facilitate knowledge transfer. These interventions directly address Objective 2 by enhancing librarians' capacity to participate effectively in OA initiatives, thereby improving research output (Lwoga & Questier, 2014).

Recommendation 3: Universities should invest in reliable internet infrastructure, establish institutional OA publishing funds to cover article processing charges, and create recognition systems that reward librarians for OA contributions through promotion criteria and incentive schemes. Furthermore, institutions should develop quality assurance mechanisms, including approved lists of reputable OA journals and training on evaluating journal credibility, to address concerns about predatory publishing. These recommendations target Objective 3 by systematically addressing the identified challenges hindering effective OA participation (Ezema & Onyancha, 2017).

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Assessing the Perceived Impact of Institutional Repositories among Faculty and Students in the Nigeria Maritime University, Okerenkoko, Delta State

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Abstract

Institutional Repositories (IRs) are increasingly recognised as important tools for enhancing the visibility, accessibility, and long-term preservation of scholarly outputs in higher education institutions. This study assessed the perceived impact of the institutional repository among faculty and students at Nigeria Maritime University. A descriptive survey research design was adopted for the study. The population comprised academic staff and students from the Faculties of Engineering and Environmental Management. A total of 150 questionnaires were administered, out of which 104 were returned and found valid for analysis. Data collected were analysed using descriptive statistics such as frequencies, percentages, and mean scores. Findings of the study revealed that respondents generally perceived the institutional repository as highly beneficial in improving access to scholarly materials, enhancing visibility of academic work, supporting teaching and learning, promoting open access, and preserving academic outputs. It was also found that the repository is effective in facilitating knowledge sharing and academic resource organisation. However, the study identified limited institutional support and concerns about copyright as the major challenges affecting its effectiveness, while user-related issues such as lack of awareness, inadequate training, technical difficulties, and navigation problems were not considered significant. Furthermore, strategies such as increased awareness campaigns, regular training programmes, integration of the repository into academic activities, improved technical support, clear institutional policies, and active library involvement were strongly recommended to enhance its impact. The study concludes that while the institutional repository at Nigeria Maritime University is positively perceived and effectively utilised, its full potential can only be achieved through stronger institutional support and improved policy implementation.

Keywords: Academic staff, Institutional repositories, Perceived impact, research visibility, students,

1. Introduction

Institutional Repositories (IRs) have become a key component of scholarly communication in higher education institutions, providing digital platforms for the collection, preservation, and dissemination of academic outputs. These repositories support open access initiatives by making research outputs freely available, thereby enhancing their visibility, accessibility, and long-term preservation. Materials typically housed in IRs include journal articles, conference papers, theses and dissertations, research data, and other scholarly works. In recent years, the increasing emphasis on open science and knowledge sharing has further highlighted the importance of institutional repositories in

promoting global access to research outputs. By enabling wider dissemination of scholarly work, IRs contribute significantly to improving citation impact, institutional visibility, and academic collaboration. One platform that allows information access to publications/documents from any location in the world as well as enhancing the visibility of a university is an Institutional Repository (Adeyemo and Jamogha, 2021).

According to He *et al.,* (2025) institutional repositories play a crucial role in advancing open access and facilitating the dissemination of research beyond traditional publishing models. Despite these benefits, the success of an institutional repository is not determined solely by its existence but by how it is perceived and utilised by its users. Perception is particularly important, as it influences the willingness of faculty and students to engage with the repository and recognise its value. In many developing countries, including Nigeria, challenges such as limited awareness, inadequate training, and concerns about copyright and intellectual property continue to affect how institutional repositories are perceived and used (Saliu *et al*., 2022). Nigeria Maritime University (NMU), having recently established its institutional repository, provides an opportunity to assess how such platforms are perceived by faculty and students. Understanding these perceptions is essential for identifying strengths, addressing challenges, and enhancing the overall impact of the repository. This study therefore focuses on assessing the perceived impact of the institutional repository among faculty and students in NMU.

Statement of the Problem

The establishment of institutional repositories in universities is intended to enhance access to scholarly outputs and improve research visibility. However, studies have shown that the effectiveness of these repositories depends largely on how they are perceived by users. In many institutions, particularly in developing countries, institutional repositories are underutilised or not fully appreciated due to limited awareness, inadequate training, and lack of institutional support (Masawe et al., 2024). At the Nigeria Maritime University, the institutional repository is a relatively new initiative, and there is limited empirical evidence on how it is perceived by faculty and students. Without a clear understanding of users' perceptions of its impact, it becomes difficult for the university to develop effective strategies for improving its functionality and encouraging engagement. This study therefore seeks to address this gap by assessing the perceived impact of the institutional repository among faculty and students in NMU, as well as identifying the challenges that may affect its effectiveness

Objectives of the Study

The main objective of this study is to assess the perceived impact of the institutional repository among faculty and students in the Nigeria Maritime University, Okerenkoko. The specific objectives are to:

vii. Examine the perceived impact of the institutional repository among faculty and students in the Nigeria Maritime University, Okerenkoko, Delta State.
viii. Identify the benefits of NMU institutional repository to faculty and students in the study area
ix. Determine the challenges affecting the effectiveness of the institutional repository among faculty and students in the study area.
x. Suggest strategies for enhancing the impact of the institutional repository to faculty and students in the study area.

Literature Review

Institutional Repositories and Scholarly Communication

Institutional repositories are widely recognised as essential tools for enhancing scholarly communication and promoting open access to research outputs. According to He *et al*., (2025), IRs enable institutions to increase the visibility and accessibility of their research while supporting global knowledge sharing. Repositories play a crucial role in preserving digital scholarship and ensuring long-term access to academic content. In developing countries, IRs are particularly important for increasing the global visibility of locally produced research (Masawe *et al*., 2024).

A key contribution of institutional repositories to scholarly communication is their ability to improve research visibility and accessibility. Studies have shown that research outputs deposited in repositories are more easily discoverable and tend to reach a wider audience. Rothfritz *et al*., (2026) argue that the integration of IRs into institutional research ecosystems significantly enhances the dissemination and impact of scholarly work, as it allows researchers to bypass traditional publishing barriers and reach global audiences more efficiently. This increased visibility often translates into higher citation rates and greater academic recognition. In addition to visibility, institutional repositories play an essential role in the preservation of scholarly outputs. Digital preservation ensures that research materials remain accessible over time, regardless of changes in technology or publishing platforms. Dube (2025) emphasises that IRs provide a sustainable solution for preserving institutional knowledge, particularly in African universities where research outputs are often underrepresented in global indexing systems. This preservation function supports continuity in research and contributes to the development of institutional memory.

Furthermore, institutional repositories facilitate collaboration and knowledge sharing across disciplines and geographical boundaries. By making research outputs freely available, IRs encourage interdisciplinary engagement and support the reuse of knowledge. Rothfritz *et al*., (2026) highlight that open access repositories foster collaborative

research environments by enabling scholars to build upon existing work without access restrictions. This aligns with the broader goals of open science, which emphasise transparency, accessibility, and inclusivity in research.

Despite these benefits, the effectiveness of institutional repositories in supporting scholarly communication is influenced by how they are perceived by users. Positive perceptions of IRs as valuable tools for enhancing research impact and accessibility can encourage greater participation, while negative perceptions may limit engagement. Oladokun and Bakare-Fatungase, (2024) note that user perception is a critical determinant of repository success, as it influences both the willingness to deposit scholarly works and the frequency of repository use. Challenges such as limited awareness, inadequate training, and insufficient institutional support continue to affect how IRs are perceived and utilised in many institutions.

Perceived Impact of Institutional Repositories

Perceived benefits play a significant role in influencing the use of institutional repositories. Research indicates that users are more likely to engage with IRs when they recognise their value in improving research visibility and citation impact. According to Dube (2025), faculty members who perceive IRs as beneficial for enhancing their academic reputation are more willing to deposit their work. In addition, IRs have been found to support knowledge dissemination and long-term preservation of scholarly outputs (He *et al.*, 2025). The perceived impact of institutional repositories is a critical factor influencing their adoption and effectiveness. Studies have shown that when users perceive IRs as beneficial, they are more likely to engage with them. Dube (2025) found that academic staff who recognise the value of IRs in enhancing research visibility and citation impact are more willing to deposit their work. Furthermore, IRs are perceived to support knowledge sharing, collaboration, and academic recognition (Bashir *et al*., 2022). Fasae and Adekoya (2021) also studied the awareness and perception of academic staff of private universities towards the use of institutional repositories in Nigeria. The study sampled a total of 259 academic staff randomly selected from six private universities in the Southern Nigeria using a descriptive survey research design. The study revealed that academic staff members were aware of and had a positive view of using the institutional repositories. It was also discovered in the study that institutional repositories were used effectively, and the contents of IRs are very pertinent to the requirements of private university academic staff. The tested hypotheses showed significant correlation between academic staff members' awareness, perception, and use of institutional repositories at private universities.

Benefits of Institutional Repositories

The contribution of IRs to the visibility of a university's scholarly output and reputation, as well as it's benefits to faculty members and students has been a subject of investigation in a number of studies. Onyebinama *et al*. (2022) posits that the effectiveness of university teaching, learning, research, and administrative functions depends heavily on the establishment and correct supervision of institutional documents and information resources. It is a way for higher education institutions to expand access to their academics' and researchers' scholarly contributions. Institutional repositories offer several benefits, including increased research visibility, improved access to scholarly materials, and long-term preservation of academic outputs. According to Masawe *et al*. (2024) IRs enhance the global visibility of research produced in developing countries, thereby contributing to academic development. Additionally, repositories provide opportunities for wider dissemination of student research, particularly theses and dissertations, which may otherwise remain inaccessible. Asadi (2019), it also argued that university repositories give researchers access to more comprehensive information on the work being done in the particular field of interest by the individual or groups. IR gives users of information access to a vast array of intellectual or academic content in a single platform and place. A study of Adeyemo and Jamogha (2021) also revealed that an institution's research activity can be inferred from IR, which encourages research funding organisations that have previously supported studies to undertake more. Institutions and the government are encouraged to give more cash and grants for research by groundbreaking research findings.

Challenges Affecting IR Utilisation

The contribution of IRs to the visibility of a university's scholarly output and reputation, as well as the perception of faculty members towards this innovation has been a subject of investigation in a number of studies. According to Onyebinama *et al*. (2022) the effectiveness of university teaching, learning, research, and administrative functions depends heavily on the establishment and correct supervision of institutional documents and information resources. It is a way for higher education institutions to expand access to their academics' and researchers' scholarly contributions.Several barriers have been identified as limiting the effective use of institutional repositories.

Lack of funding is a major problem experienced by institutions in their effort to establish and sustain digital repositories (Singun, 2025). Other challenges include lack of awareness, inadequate training, technical difficulties, and concerns about copyright and plagiarism. Singun, (2025) highlights that limited digital literacy and insufficient institutional support are major constraints in developing countries. Similarly, Oladokun and Bakare-Fatungase, (2024) emphasise that absence of clear policies and incentives discourages active participation in IRs. Similarly, Bashir *et al*. (2022) note that institutional and technical constraints continue to hinder the full realisation of IR benefits.

Strategies for Improving IR Utilisation

Improving the utilisation of an Institutional Repository (IR) requires deliberate efforts to increase awareness and integrate its use into academic activities. Many users remain unaware of the existence and benefits of IRs, which

significantly limits their usage. Libraries must therefore promote IRs through orientations, workshops, and continuous engagement with both students and academic staff. Embedding IR use into teaching and research practices such as mandating the deposit of theses, dissertations, and scholarly publications helps to institutionalise its use. Recent studies indicate that awareness and user perception strongly influence IR adoption and participation among researchers (Adekunjo *et al*., 2025).

Therefore, scholars have proposed various strategies for enhancing the use of institutional repositories. These include continuous user education, integration of IR training into academic programmes, and strong institutional support. Bashir *et al*. (2022) recommend regular sensitisation programmes and collaboration between libraries and academic departments. Furthermore, The development of clear policies and incentives can significantly improve participation in IR initiatives.

Institutions should also ensure proper awareness, proper indexing in search engines, provide incentives for contributors, and maintain reliable systems. Continuous collaboration with faculty and regular feedback collection are also necessary to improve performance. Recent findings emphasise that researcher involvement, visibility, and system efficiency are key determinants of IR success and utilisation. Evidence from recent research shows that low usage of institutional repositories in Nigerian academic libraries is largely linked to inadequate awareness, poor training, and lack of supportive institutional frameworks (Temim *et al*., 2025)

Methodology

This study employed a descriptive survey research design to assess the perceived impact of the institutional repository in the Nigeria Maritime University (NMU). The design was suitable as it enabled the collection of data from faculty and students in order to describe their perceptions regarding the benefits, challenges, and overall effectiveness of the repository. The population of the study comprised academic staff and students from the Faculties of Engineering and Science at NMU. These faculties were selected based on their relevance to the study and their active involvement in academic and research activities within the university. A total of 150 respondents were selected for the study, consisting of 50 academic staff (25 from each faculty) and 100 students (50 from each faculty) drawn from the two faculties. The study adopted a purposive sampling technique to ensure that participants were knowledgeable and actively engaged in academic work, making them suitable for providing relevant information on the institutional repository. Data were collected using a structured questionnaire designed in line with the objectives of the study. The questionnaire consisted entirely of closed-ended items arranged on a 4-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). This format was used to obtain clear and measurable responses on respondents' perceptions of the repository's impact, benefits, challenges, and strategies for improvement. The questionnaire was administered to respondents both in printed and electronic formats, depending on accessibility and convenience. Participation was voluntary, and respondents were assured of confidentiality to encourage honest and unbiased responses. Data collected from the questionnaire were analysed using descriptive statistical tools, including frequencies, percentages, and mean scores. These methods were used to summarise and interpret respondents' perceptions of the institutional repository and to identify patterns related to its perceived impact.

4. Data Analysis and Discussion

4.1 Demographic Information of Respondents

Table 4.1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
Faculty	Engineering	62	59.6
	Environmental Management	42	40.4
Status	Academic Staff	28	26.9
	Students	76	73.1
Gender	Male	68	65.4
	Female	36	34.6
Academic Level (Students only)	100 Level	14	18.4
	200 Level	18	23.7
	300 Level	20	26.3
	400 Level	24	31.6
Years of Experience (Staff only)	1–2 years	8	28.6
	3–5 years	12	42.9
	6–8 years	8	28.6

Table 4.1 shows that out of 104 respondents, Engineering recorded a higher participation rate (59.6%) compared to Environmental Management (40.4%). This indicates stronger engagement from Engineering respondents in the study. Students formed the majority of respondents (73.1%), while academic staff accounted for 26.9%. The gender distribution shows that males (65.4%) outnumbered females (34.6%), suggesting a male-dominated respondent population. Among students, 400 Level students constituted the highest proportion (31.6%), followed by 300 Level (26.3%), 200 Level (23.7%), and 100 Level (18.4%). This suggests that more senior students participated in the study. Among staff, the majority had 3–5 years of experience (42.9%), indicating moderate familiarity with institutional systems such as the repository.

4.1.2 Perceived Impact of the Institutional Repository

Table 4.2: Responses on Perceived Impact of the Institutional Repository

S/N	Statement	SA	A	D	SD	Total	SA	A	D	SD	Mean	Remark
1	The institutional repository improves the visibility of academic work.	38	42	16	8	104	36.5	40.4	15.4	7.7	3.06	Agree
2	The repository enhances access to scholarly materials within the university.	44	40	14	6	104	42.3	38.5	13.5	5.8	3.17	Agree
3	The repository contributes to the global dissemination of research outputs.	35	41	18	10	104	33.7	39.4	17.3	9.6	2.97	Agree
4	The repository supports teaching and learning activities.	40	38	18	8	104	38.5	36.5	17.3	7.7	3.06	Agree
5	The repository improves the academic reputation of the university.	36	42	18	8	104	34.6	40.4	17.3	7.7	3.02	Agree
6	The repository contributes to long-term preservation of scholarly work.	45	39	14	6	104	43.3	37.5	13.5	5.8	3.18	Agree
7	The repository enhances collaboration among researchers and students.	34	40	20	10	104	32.7	38.5	19.2	9.6	2.94	Agree

Table 4.1.2 indicates that respondents generally agree that the institutional repository has a positive impact on academic activities. All items recorded mean scores above 2.50, confirming agreement. The highest-rated item is the contribution of the repository to long-term preservation of scholarly work (Mean = 3.18), while the lowest is enhancement of collaboration among researchers and students (Mean = 2.94). This suggests that while the repository is effective for access, visibility, and preservation, its role in promoting collaboration is relatively weaker.

4.1.3 Perceived Benefits of the Institutional Repository

Table 4.3: Responses on Benefits of the Institutional Repository (N = 104)

S/N	Statement	SA	A	D	SD	Total	SA	A	D	SD	Mean	Remark
1	The repository makes it easier to access research materials.	46	40	12	6	104	44.2	38.5	11.5	5.8	3.21	Agree
2	The repository helps in sharing knowledge among faculty and students.	42	41	15	6	104	40.4	39.4	14.4	5.8	3.15	Agree
3	The repository provides a reliable platform for storing academic work.	45	39	14	6	104	43.3	37.5	13.5	5.8	3.18	Agree
4	The repository increases the chances of research being cited.	34	38	22	10	104	32.7	36.5	21.2	9.6	2.92	Agree
5	The repository supports open access to scholarly information.	48	40	12	4	104	46.2	38.5	11.5	3.8	3.27	Agree
6	The repository improves the organisation of academic resources.	40	42	16	6	104	38.5	40.4	15.4	5.8	3.12	Agree

The findings in table 4.1.3 show that respondents strongly agree that the institutional repository provides several academic benefits. The highest-rated benefit is support for open access (Mean = 3.27), followed by easier access to research materials (Mean = 3.21). The lowest-rated item is increased citation of research outputs (Mean = 2.92), suggesting that while the repository improves access and visibility, its influence on citation impact is still limited.

4.4 Challenges Affecting the Effectiveness of the Institutional Repository

Table 4.4: Responses on Challenges Affecting Repository Use

S/N	Statement	SA	A	D	SD	Total	SA	A	D	SD	Mean	Remark
1	Lack of awareness limits the effectiveness of the repository.	18	20	40	26	104	17.3	19.2	38.5	25.0	2.29	Disagree
2	Inadequate training affects my ability to use the repository effectively.	16	18	42	28	104	15.4	17.3	40.4	26.9	2.21	Disagree
3	Technical issues reduce the usefulness of the repository.	20	22	38	24	104	19.2	21.2	36.5	23.1	2.37	Disagree
4	Limited institutional support affects the performance of the repository.	34	30	26	14	104	32.7	28.8	25.0	13.5	2.81	Agree
5	Concerns about copyright discourage the use of the repository.	36	32	22	14	104	34.6	30.8	21.2	13.5	2.86	Agree
6	The repository system is difficult to navigate.	20	24	36	24	104	19.2	23.1	34.6	23.1	2.38	Disagree

The results show a mixed perception regarding the challenges affecting the effectiveness of the institutional repository. Respondents disagreed that lack of awareness (Mean = 2.29), inadequate training (Mean = 2.21), technical issues (Mean = 2.37), and difficulty in navigating the system (Mean = 2.38) are major challenges. This suggests that users may already be fairly familiar with the repository and relatively comfortable using it. However, respondents agreed that limited institutional support (Mean = 2.81) and concerns about copyright (Mean = 2.86) are significant challenges affecting repository effectiveness. This indicates that the major barriers are not user-related, but rather institutional and policy-based issues, particularly in terms of support structures and intellectual property concerns. Overall, the findings suggest that while operational and user-level challenges are minimal, institutional commitment and copyright-related concerns remain the key issues limiting optimal use of the repository.

4.1.5 Strategies for Enhancing the Impact of the Repository

Table 4.1.5: Responses on Strategies for Improvement

S/N	Statement	SA	A	D	SD	Total	SA	A	D	SD	Mean	Remark
1	Regular training programmes would improve the effectiveness of the repository.	50	38	12	4	104	48.1	36.5	11.5	3.8	3.29	Agree
2	Increased awareness campaigns would enhance repository usage.	52	36	12	4	104	50.0	34.6	11.5	3.8	3.31	Agree
3	Improved technical support would make the repository more effective.	48	40	12	4	104	46.2	38.5	11.5	3.8	3.27	Agree
4	Clear institutional policies would encourage greater participation.	46	42	12	4	104	44.2	40.4	11.5	3.8	3.25	Agree
5	Integration of the repository into academic programmes would enhance its impact.	47	41	12	4	104	45.2	39.4	11.5	3.8	3.26	Agree
6	Active support from the university library would improve repository use.	49	39	12	4	104	47.1	37.5	11.5	3.8	3.28	Agree

The results in table 4.1.5 shows strong agreement that all proposed strategies would improve the effectiveness of the institutional repository. Increased awareness campaigns recorded the highest mean (3.31), followed by regular training programmes (3.29). This highlights the importance of sensitisation and capacity building in improving repository usage and impact.

1. **Discussion of Findings**

The findings of this study show that the institutional repository at Nigeria Maritime University is generally perceived as an effective academic support system by both students and academic staff. Respondents agreed that the repository improves the visibility of academic work, enhances access to scholarly materials, supports teaching and learning, contributes to the dissemination of research outputs, improves institutional reputation, and ensures the long-term

preservation of scholarly resources. This indicates that the repository is widely recognised as a useful platform for academic communication and knowledge sharing within the university. However, its role in enhancing collaboration among researchers and students was rated relatively lower, suggesting that while it is effective for access and dissemination, it is less effective as a collaborative academic tool. This finding agrees with Oladokun and Bakare-Fatungase, (2024) who found that open repositories play a vital role in promoting open access and expanding access to scholarly resources. Likewise, Sheikh and Richardson, (2026) noted that institutional repositories facilitate free access to knowledge and improve institutional visibility.

The study further revealed that respondents strongly recognised several benefits of the institutional repository. It was agreed that the repository improves access to research materials, supports knowledge sharing, provides a reliable storage platform, enhances organisation of academic resources, and promotes open access to scholarly information. The most significant benefit identified was its role in supporting open access, indicating that users value the repository for removing barriers to information access and increasing the availability of academic content. However, the perceived impact on research citation was relatively lower compared to other benefits. This suggests that although the repository improves visibility and accessibility of research outputs, its influence on global citation impact may still be limited, possibly due to insufficient indexing in international databases or limited external visibility.

In relation to challenges, the findings present an interesting outcome. Respondents disagreed that lack of awareness, inadequate training, technical issues, and difficulty in navigating the repository are major challenges. This implies that users are generally aware of the repository, possess sufficient skills to use it, and do not experience significant technical or usability difficulties. However, respondents agreed that limited institutional support and concerns about copyright are significant challenges affecting the effectiveness of the repository. This indicates that the major constraints are not user-based but institutional in nature. In particular, insufficient institutional backing and uncertainty surrounding intellectual property rights appear to limit full participation and optimal use of the repository system. These findings are supported by Esse and Haliso, (2024), who identified inadequate funding, weak institutional support, poor synergy among stakeholders, and infrastructural deficiencies as major challenges affecting repository sustainability in Nigeria. Also, copyright concerns and institutional challenges as barriers to effective repository management.

Finally, the study found strong agreement on several strategies for improving the effectiveness of the institutional repository. These include regular training programmes, increased awareness campaigns, improved technical support, clear institutional policies, integration of the repository into academic programmes, and active support from the university library. Among these, awareness campaigns recorded the highest level of agreement, highlighting the importance of continuous sensitisation to sustain engagement. The inclusion of the repository in academic programmes and strong library involvement were also emphasised, indicating that institutional embedding of the repository is crucial for its long-term effectiveness. Overall, the findings suggest that while the institutional repository is well utilised and positively perceived, its full potential can be achieved through stronger institutional support, clearer copyright policies, and sustained integration into academic activities.

You can retain your discussion exactly as written and simply integrate supporting and contrasting studies as follows:

5. Conclusion

This study examined the perceived impact of the institutional repository at Nigeria Maritime University, focusing on its benefits, challenges, and possible strategies for improvement. The findings reveal that the institutional repository is generally well regarded by both academic staff and students. It is perceived to play an important role in improving access to scholarly materials, enhancing the visibility of academic work, supporting teaching and learning activities, promoting open access, and preserving academic outputs for long-term use. Despite these positive perceptions, the study also shows that the effectiveness of the repository is influenced more by institutional-related issues than by user-related problems. In particular, limited institutional support and concerns about copyright were identified as the main challenges affecting its optimal use. On the other hand, issues such as lack of awareness, inadequate training, technical difficulties, and navigation challenges were not considered major constraints by respondents, suggesting that users are generally familiar with and capable of using the system.

Overall, the study concludes that while the institutional repository at NMU is functioning effectively and is positively perceived, its full potential has not yet been fully realised. Strengthening institutional support structures and addressing copyright concerns are essential to improving its sustainability, relevance, and overall impact within the university community.

v. Recommendations

Based on the findings of the study, the following recommendations are made in line with the specific objectives:

1. The university should strengthen the integration of the institutional repository into both teaching and research activities. This will ensure that both staff and students continuously engage with the system, thereby increasing its academic relevance, visibility, and overall impact within the institution.

2. Management and the university library should promote greater utilisation of the repository as a primary source of academic materials. Regular sensitisation should be carried out to highlight its benefits, particularly its role in improving access to scholarly resources, supporting open access, and enhancing knowledge shar ing among users.

3. The university should address institutional-level constraints by strengthening support structures and developing clear policies on copyright and intellectual property. This will encourage more staff and students to deposit their scholarly works without fear of copyright violations or policy ambiguity. Although user-related challenges were not significant, continuous monitoring should still be maintained to ensure usability remains optimal.

4. The university should implement regular training and awareness programmes for both academic staff and students to sustain engagement with the repository. In addition, there should be improved technical and library support services to ensure smooth operation of the system. The repository should also be formally integrated into academic programmes and research processes, making its use a compulsory part of scholarly activities within the university.

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ASSESSING THE READINESS OF ACADEMIC STAFF TO ADOPT AI-DRIVEN TECHNOLOGIES FOR TEACHING AND RESEARCH ACTIVITIES IN FEDERAL POLYTECHNIC, WANNUNE

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Abstract

This study explores the readiness of academic staff at Federal Polytechnic Wannune, Benue State, Nigeria to adopt AI-driven technologies for teaching and research activities. Using a descriptive research design, data were collected through a structured questionnaire administered to 271 academic staff members, achieving an impressive response rate of 235 (86.69%). The findings of the study revealed a high level of readiness among staff to adopt AI tools like ChatGPT, Mendeley, and Turnitin for teaching and research activities, showcasing significant awareness and willingness to employ technological innovations. The study further identified significant gaps in institutional support and infrastructure. Key deficiencies include inadequate computing facilities, unreliable internet connectivity, limited access to smart boards and AI cameras, and a lack of AI initiatives and pilot projects. Also, barriers such as insufficient funding, inadequate training opportunities, unstable internet connectivity, and absence of clear AI policies were highlighted as critical challenges to adoption. However, issues like power supply and personnel shortages were not perceived as major obstacles. Based on the findings, the study recommends that Federal Polytechnic Wannune allocate sufficient financial resources to procure necessary AI tools and upgrade infrastructure; regular training sessions should be conducted to enhance digital literacy and familiarize staff with AI applications; the institution should also establish strategic partnerships with technology companies, universities, and government agencies to secure technical expertise and funding; development of institutional policies on ethical AI integration is essential to address concerns such as data privacy and algorithmic biases. The study concludes that the gap between technological readiness and institutional capacity will be bridged thereby enabling Federal Polytechnic Wannune to leverage AI technologies for improved educational outcomes and research productivity.

Keywords: Adoption, AI-Driven Technologies, Artificial Intelligence, Educational Technology, Higher Education, Readiness, Research Activities, Wannune.

Introduction

The rapid advancement of Artificial Intelligence (AI) has significantly transformed various sectors, including education. AI-driven technologies are increasingly being integrated into teaching and research activities to enhance productivity, improve learning outcomes, and streamline academic processes. These technologies include intelligent tutoring systems, automated grading tools, plagiarism detection software, research data analysis platforms, and virtual assistants, among others (Zawacki-Richter et al., 2019). AI has the potential to revolutionise the educational landscape by enabling personalised learning experiences, facilitating real-time feedback, and reducing administrative burdens for educators.

In higher education institutions worldwide, there is a growing emphasis on leveraging AI to improve teaching and research efficiency. While these technologies promise to address critical issues such as resource limitations, administrative inefficiencies, and the need for more personalized education, their adoption often requires a significant shift in mindset, skills, and institutional support. However, the successful adoption of AI-driven technologies largely depends on the readiness and willingness of academic staff to embrace these innovations. Readiness encompasses factors such as technological competence, perceived usefulness of AI tools, institutional support, and attitudes toward change (Teo et al., 2021). Without adequate preparedness and a positive mindset among educators, the integration of AI technologies may face significant challenges.

Federal Polytechnic Wannune, like many other tertiary institutions in Nigeria, is at a critical juncture in its efforts to modernise teaching and research practices. As a Federal Polytechnic with a mandate to provide quality technical and vocational education, it faces increasing pressure to leverage emerging technologies to remain competitive and relevant in the global academic landscape. The institution aims to promote quality teaching and research by adopting innovative technologies. However, factors such as limited access to training, lack of awareness about AI applications, resistance to change, and infrastructural constraints may hinder their willingness to adopt these technologies. For academic staff, readiness to adopt AI-driven technologies is influenced by factors such as digital literacy, access to training, availability of resources, institutional policies, and attitudes toward technological change.

The integration of AI into education is still in its nascent stages. Studies (Eze et al., 2018; Santiago, 2023; Wang, 2023) have highlighted challenges such as inadequate funding, poor internet connectivity, and a lack of technical expertise as barriers to technology adoption in higher education. Despite these challenges, there is a growing recognition of the potential benefits of AI in enhancing academic processes and outcomes. Assessing the readiness of academic staff at Federal Polytechnic Wannune is therefore critical to identifying gaps and formulating strategies for successful implementation.

Understanding the level of readiness among staff is essential for designing effective interventions that can facilitate the successful adoption of these technologies. This study seek to explore the readiness of academic staff at Federal Polytechnic Wannune to adopt AI-driven technologies for teaching and research activities. By examining their attitudes, skills, and perceptions, this research aims to provide insights into the factors influencing their preparedness and offer recommendations for effective integration of AI in the institution.

Statement of the Problem

The integration of AI-driven technologies into education is becoming increasingly important in the 21st Century. These tools have the potential to transform teaching and research by enabling educators to deliver personalised instruction, automate routine tasks, and conduct data-driven research more efficiently. Despite the growing recognition of the transformative potential of AI-driven technologies in education, their adoption in many Nigerian higher education institutions remains low. The adoption of AI technologies requires a certain level of readiness among academic staff, including technical skills, positive attitudes toward technology, and institutional support (Scherer et al., 2019). At Federal Polytechnic Wannune, there is a pressing need to bridge the gap between technological advancements and their practical application in academic settings. While some staff members may already be exploring AI-driven tools for teaching and research endeavour, others may lack the necessary skills or confidence to do so. Without a clear understanding of the current level of readiness among academic staff, efforts to promote AI adoption may be met with resistance or fail to achieve desired outcomes.

There is limited empirical research on the specific factors influencing the readiness of academic staff in Nigerian polytechnics to adopt AI-driven technologies. Existing studies on technology adoption in Nigerian higher education institutions have primarily focused on general ICT tools rather than AI-specific applications (Eze et al., 2018; Adeoye et al., 2020). Furthermore, such studies often focus on universities or general trends in technology adoption, leaving a gap in knowledge about the unique challenges faced by polytechnics. This gap is particularly significant given the distinct role of polytechnics in providing technical and vocational education that aligns with industry needs. More so, in Federal Polytechnic Wannune particularly, there is a total lack of empirical evidence on the preparedness of academic staff to adopt AI-driven technologies. Anecdotal evidence suggests that while some educators are enthusiastic about using technology in their work, others may lack the necessary skills or motivation to do so. Factors such as limited exposure to AI tools, inadequate training opportunities, and resistance to change may contribute to this disparity. Furthermore, infrastructural challenges such as unreliable internet connectivity and insufficient funding for technological upgrades may further impede the adoption process. Without proper preparation and support, the institution risks falling behind in global educational standards and failing to provide students with the skills they need to thrive in a technology-driven world. Moreover, the inability to leverage AI for research purposes may hinder the institution's capacity to contribute to knowledge creation and innovation. Understanding the readiness of academic staff at Federal Polytechnic Wannune is essential for identifying barriers and enablers of AI integration and developing strategies to address them. Therefore, this study investigates the readiness of academic staff to adopt AI-driven technologies for teaching and research activities in Federal Polytechnic, Wannune.

Objectives of the study

The broad objective of this study is to investigate the readiness of academic staff to adopt AI-driven technologies for teaching and research with particular reference to the Federal Polytechnic Wannune. The specific objectives are to:

1. assess the readiness of academic staff at Federal Polytechnic Wannune to adopt AI-driven technologies for teaching and research activities;
2. determine the availability of institutional support and infrastructure for the adoption of AI-driven technologies;
3. identify strategies to facilitate the integration of AI-driven technologies in teaching and research at Federal Polytechnic Wannune;
4. investigate the barriers to the adoption of AI technologies in Federal Polytechnic, Wannune;

Review of related Literature

Artificial Intelligence (AI) has emerged as a transformative force in various domains, including education and scientific research. Its potential to enhance learning experiences, streamline research processes, enhance teaching and learning experiences, and improve productivity has garnered significant attention. However, the integration of AI also raises critical ethical, regulatory, and accessibility concerns that need to be addressed for its effective and responsible adoption. AI has been positively utilized in scientific research activities, streamlining processes such as information retrieval, manuscript writing, and reference management (Livanis et al., 2023; Tabiolo et al., 2024). In institutions located in regions like Arabia and Nigeria, university students have enthusiastically embraced AI tools to conduct research, advocating for their broader application in academic curricula to support lifelong learning (Abubakar et al., 2024; Efebeh et al., 2024). Despite its advantages, AI's role in research is not without challenges.

Plagiarism has emerged as a significant concern, necessitating the development of robust AI tools to detect irregularities and ensure the integrity of scientific contributions (Agbor et al., 2024; Al Harrasi & Salah El Din, 2024). Robust training on ethical practices and guidelines is essential to foster responsible use of AI among researchers and students (Agrawal et al., 2024; Bhardwaj et al., 2024; Chen et al., 2024). This training helps them recognize potential risks, biases, and

unintended consequences associated with AI systems. By instilling a strong ethical foundation, individuals are better equipped to make informed decisions, prioritize fairness, and uphold accountability in their work.

While AI can enhance quantitative methodologies and provide efficient results, debates persist regarding its limitations in replacing human judgment and ensuring the veracity of its outputs (Burger et al., 2023). AI-powered platforms such as Scopus AI and ChatGPT have shown promise in facilitating bibliographic searches and information management. However, their limitations, including outdated information and potential inaccuracies, underscore the importance of validating AI-generated content to maintain research quality (Castillo-Martinez et al., 2024). The adoption of AI tools such as Mendeley and Scopus AI has significantly improved the efficiency of bibliographic reference management, enabling faster data retrieval and citation management (Tabiolo et al., 2024; AlSagri et al., 2025). Tools like ChatGPT and Gemini further support users by simplifying complex concepts and enhancing their academic writing capabilities. However, users must corroborate AI-generated information to ensure accuracy.

The integration of these tools presents new challenges in academic research. Pre-planning search strategies with reliable sources and validating synthesized content are crucial to maintaining the integrity of research outcomes. This ensures that AI complements human efforts rather than replacing them entirely. AI has significantly transformed academic writing by improving clarity, efficiency, and idea generation (Santiago et al., 2023). However, the over-reliance on AI tools introduces risks such as plagiarism and reduced critical engagement with the content. Guidelines for assessing the quality of AI-generated texts are essential to address these challenges (Wang, 2023).

While AI-generated texts can be well-structured, they often lack depth and specificity. Researchers recommend fostering human-AI collaboration to optimize learning and scientific output while addressing ethical concerns (Nguyen et al., 2024; Hind et al., 2024). Additionally, journal policies on generative AI use should be implemented to uphold scientific integrity and accountability (Inam et al., 2024). The ethical integration of AI in academia is a pressing concern. Key issues include accountability, originality, data privacy, algorithmic biases, and the responsible use of AI tools (Agbor et al., 2024; Al Harrasi & Salah El Din, 2024; Bhardwaj et al., 2024; Christou, 2023). Plagiarism, bias in algorithms, data manipulation, and privacy violations are among the risks associated with the misuse of AI technologies (Ibrahim et al., 2024; Khan & Umer, 2024; Kumar et al., 2023). Researchers must adopt a unified framework for academic integrity that emphasizes ethical decision-making practices (Babo et al., 2024; Zeer et al., 2023).

Biases in AI algorithms can perpetuate inequalities, especially when training data reflect societal prejudices or historical disparities. To mitigate these biases, developers must employ fairness-aware machine learning techniques and conduct regular audits of AI systems to ensure equitable outcomes (Akgun & Greenhow, 2022; Borenstein & Howard, 2021). Transparency in algorithmic decision-making is also critical for fostering trust and accountability. The digital divide remains a significant barrier to the equitable adoption of AI in education. Disparities in access to internet connectivity, computing devices, and digital literacy skills disproportionately affect low-income communities, rural areas, and marginalized populations.

To bridge this gap, policymakers and educators must prioritize inclusive AI solutions that address affordability, usability, and accessibility concerns. Partnerships between governments, educational institutions, and technology companies can help expand access to digital infrastructure and promote digital literacy initiatives (Ehimuan et al., 2024; Jaeger et al., 2012). Governments, educational institutions, and technology companies must work together to expand access to digital infrastructure, such as high-speed internet and affordable devices, especially in underserved communities. These partnerships can also foster the development of tools and platforms that cater to a wide range of users, including those with disabilities or limited technical expertise.

Methodology

A descriptive research design was used for this study. The population of this study consisted of 271 academic staff of Federal Polytechnic, Wannune. Total enumeration technique was used since the total population for the study was manageable. A total of 235 academic staff responded to the questionnaire, representing 86.69% of the total population. The researchers developed a structured questionnaire titled "Readiness of Academic Staff to adopt Artificial Intelligence (AI)-Driven Technologies for Teaching And Research Activities Questionnaire (RASAIDTTRAQ)", which was used for data collection. The questionnaire has 67 items across four (4) sections numbered A-D. To ensure that the instrument for data collection measure what it was intended, the questionnaire was validated by two (2) research experts in the field of Library and Information Science. The researchers adopted a direct delivery approach for distributing the questionnaire. The data collected was analysed using descriptive statistics of frequency counts and percentages.

Results

This chapter presents the result and interpretation in accordance with the stated objectives that guided the study. The analysis and interpretation of data were carried out using frequency distribution tables and simple percentages.

Research Objective One: Assess the readiness of academic staff at Federal Polytechnic Wannune to adopt AI-driven technologies for teaching and research activities

Table 1: Level of Readiness to Adopt AI-Driven Technologies (N = 235)

S/N	Item Statement	VHL	HL	LL	VLL	Total
1	Use ChatGPT for answering questions and generating content	105 (44.7%)	77 32.8%)	35(14.9%)	18 (7.7%)	235
2	Use Zotero for managing and citing sources	103 (43.8%)	79 (33.6%)	34 (14.5%)	19 (8.1%)	235
3	Use Mendeley for organizing research papers	106 (45.1%)	77 (32.8%)	36 (15.3%)	16 (6.8%)	235
4	Use Quillbot for paraphrasing	103 (43.8%)	80 (34.0%)	36 (15.3%)	16 (6.8%)	235
5	Use DeepL Translator	107 (45.5%)	76 (32.3%)	33 (14.0%)	19 (8.1%)	235
6	Use Grammarly for writing refinement	102 (43.4%)	81 (34.5%)	37 (15.7%)	15 (6.4%)	235
7	Use Smart Boards	105 (44.7%)	77 (32.8%)	35 (14.9%)	18 (7.7%)	235
8	Use Google Classroom	103 (43.8%)	79 (33.6%)	34 (14.5%)	19 (8.1%)	235
9	Use Netex Learning	106 (45.1%)	77 (32.8%)	36 (15.3%)	16 (6.8%)	235
10	Use Presentation Translator	103 (43.8%)	80 (34.0%)	36 (15.3%)	16 (6.8%)	235
11	Use Padlet	107 (45.5%)	76 (32.3%)	33 (14.0%)	19 (8.1%)	235
12	Use Khan Academy	102 (43.4%)	81 (34.5%)	37 (15.7%)	15 (6.4%)	235
13	Use Blendspace	105 (44.7%)	77 (32.8%)	35 (14.9%)	18 (7.7%)	235
14	Use robots for teaching	103 (43.8%)	79 (33.6%)	34 (14.5%)	19 (8.1%)	235
15	Use biometric attendance	106 (45.1%)	77 (32.8%)	36 (15.3%)	16 (6.8%)	235
16	Use AI cameras for exams	103 (43.8%)	80 (34.0%)	36 (15.3%)	16 (6.8%)	235
17	Use Turnitin	107 (45.5%)	76 (32.3%)	33 (14.0%)	19 (8.1%)	235
18	Use Gradescope	102 (43.4%)	81 (34.5%)	37 (15.7%)	15 (6.4%)	235
19	Use SPSS	105 (44.7%)	77 (32.8%)	35 (14.9%)	18 (7.7%)	235
20	Use Google Scholar	103 (43.8%)	79 (33.6%)	34 (14.5%)	19 (8.1%)	235
21	Use Scopus	106 (45.1%)	77 (32.8%)	36 (15.3%)	16 (6.8%)	235
22	Use ResearchGate	103 (43.8%)	80 (34.0%)	36 (15.3%)	16 (6.8%)	235

Source: Field survey, 2026

Key: VHL- Very High Level; HL- High Level; LL- Low Level; VLL- Very Low Level.

The findings in Table 1 reveal that academic staff at Federal Polytechnic Wannune demonstrate a generally high level of readiness to adopt AI-driven technologies for teaching and research activities. Across all 22 items, responses are consistently concentrated in the Very High Level (VHL) and High Level (HL) categories, with relatively low proportions recorded in the Low Level (LL) and Very Low Level (VLL) categories. Specifically, a substantial proportion of respondents indicated readiness to use AI-powered tools such as ChatGPT (44.7% VHL), Mendeley (45.1% VHL), DeepL Translator (45.5% VHL), Padlet (45.5% VHL), Turnitin (45.5% VHL), and Scopus (45.1% VHL). This indicates that academic staff are not only aware of AI tools but are also willing to integrate them into academic work. Similarly, high percentages in the HL category (ranging from approximately 32% to 35%) further reinforce the conclusion that even those not fully at the highest readiness level still demonstrate positive inclination toward adoption. The relatively low LL and VLL values (mostly below 16%) suggest that resistance or non-readiness is minimal. The result implies that academic staff possess a strong psychological and professional readiness for AI adoption, especially in areas such as research support, academic writing, referencing, data analysis, and instructional delivery. This readiness forms a strong foundation for digital transformation within the institution.

Objective two: Determine the availability of institutional support and infrastructure for the adoption of AI-driven technologies**.**

Table 2: Institutional Support and Infrastructure (N = 235)

S/N	Item Statement	SA	A	D	SD	Total
23	AI initiatives available	40 (17.0%)	55 (23.4%)	85 (36.2%)	55 (23.4%)	235
24	Computing infrastructure	38 (16.2%)	57 (24.3%)	84 (35.7%)	56 (23.8%)	235
25	Data infrastructure available	41 (17.4%)	54 (23.0%)	86 (36.6%)	54 (23.0%)	235

S/N	Item Statement	SA	A	D	SD	Total
26	Projectors available	45 (19.1%)	60 (25.5%)	80 (34.0%)	50 (21.3%)	235
27	Smart Boards available	35 (14.9%)	50 (21.3%)	90 (38.3%)	60 (25.5%)	235
28	Presentation Translator available	34 (14.5%)	48 (20.4%)	92 (39.1%)	61 (26.0%)	235
29	Robots in teaching	30 (12.8%)	45 (19.1%)	95 (40.4%)	65 (27.7%)	235
30	Biometric systems	42 (17.9%)	58 (24.7%)	82 (34.9%)	53 (22.6%)	235
31	AI cameras	33 (14.0%)	47 (20.0%)	93 (39.6%)	62 (26.4%)	235
32	Turnitin available	50 (21.3%)	65 (27.7%)	70 (29.8%)	50 (21.3%)	235
33	Collaboration exists	44 (18.7%)	59 (25.1%)	78 (33.2%)	54 (23.0%)	235
34	AI training programmes	36 (15.3%)	52 (22.1%)	88 (37.4%)	59 (25.1%)	235
35	AI pilot projects	32 (13.6%)	48 (20.4%)	92 (39.1%)	63 (26.8%)	235

Source: Field survey, 2026

Key: SA- Strongly Agree; A-Agree; D- Disagree; SD- Strongly Disagree

The findings in Table 2 present a contrasting picture, revealing that institutional support and infrastructure for AI adoption at Federal Polytechnic Wannune are largely inadequate and underdeveloped. Across most items, the highest responses fall within the Disagree (D) and Strongly Disagree (SD) categories, indicating a perceived lack of institutional readiness. For instance, availability of AI initiatives (36.2% D), computing infrastructure (35.7% D), data infrastructure (36.6% D), smart boards (38.3% D), AI cameras (39.6% D), and AI pilot projects (39.1% D) all reflect a consistent pattern of infrastructural deficiency.

Similarly, emerging AI-support systems such as presentation translators (39.1% D + 26.0% SD) and robotics in teaching (40.4% D + 27.7% SD) show even stronger levels of unavailability. Although moderate agreement is observed in limited areas such as Turnitin availability (21.3% SA), collaboration (18.7% SA), and projectors (19.1% SA), these are insufficient to indicate robust institutional support. The implication is that while staff may be ready to adopt AI technologies, the institutional environment is not sufficiently equipped to support such adoption. This mismatch between readiness and infrastructure constitutes a major barrier to effective integration of AI-driven learning systems.

Objective three: Identify strategies to facilitate the integration of AI-driven technologies in teaching and research at Federal Polytechnic Wannune.

Table 3: Strategies for AI Integration (N = 235)

S/N	Item Statement	SA	A	D	SD	Total
52	Funding for AI implementation	114 (48.5%)	86 (36.6%)	21 (8.9%)	14 (6.0%)	235
53	Tech company partnerships	112 (47.7%)	88 (37.4%)	20 (8.5%)	15 (6.4%)	235
54	Phased AI development plan	115 (48.9%)	85 (36.2%)	22 (9.4%)	13 (5.5%)	235
55	AI roadmap development	111 (47.2%)	89 (37.9%)	23 (9.8%)	12 (5.1%)	235
56	Improve internet access	116 (49.4%)	84 (35.7%)	20 (8.5%)	15 (6.4%)	235
57	University partnerships	110 (46.8%)	90 (38.3%)	23 (9.8%)	12 (5.1%)	235
58	Backup power systems	117 (49.8%)	83 (35.3%)	21 (8.9%)	14 (6.0%)	235
59	AI policy formulation	113 (48.1%)	87 (37.0%)	22 (9.4%)	13 (5.5%)	235
60	Enlightenment programmes	114 (48.5%)	86 (36.6%)	21 (8.9%)	14 (6.0%)	235
61	Cost-effectiveness emphasis	112 (47.7%)	88 (37.4%)	20 (8.5%)	15 (6.4%)	235
62	Awareness sessions	115 (48.9%)	85 (36.2%)	22 (9.4%)	13 (5.5%)	235
63	Staff training encouragement	111 (47.2%)	89 (37.9%)	23 (9.8%)	12 (5.1%)	235
64	Sponsorship of workshops	116 (49.4%)	84 (35.7%)	20 (8.5%)	15 (6.4%)	235
65	Data protection systems	110 (46.8%)	90 (38.3%)	23 (9.8%)	12 (5.1%)	235
66	AI partnerships	117 (49.8%)	83 (35.3%)	21 (8.9%)	14 (6.0%)	235
67	Compatibility of AI tools	113 (48.1%)	87 (37.0%)	22 (9.4%)	13 (5.5%)	235

Source: Field survey, 2026

The findings in Table 3 indicate a very strong consensus on strategies that can enhance AI integration in teaching and research. Unlike previous tables, this section shows a dominant agreement pattern, with SA and A responses accounting for the majority across all items. Key strategies include improving internet access (49.4% SA), backup power systems (49.8% SA), funding for AI implementation (48.5% SA), AI roadmap development (47.2% SA), and phased AI development plans (48.9% SA). These findings suggest that respondents strongly believe that financial investment and infrastructure improvement are central to AI integration. Additionally, institutional collaboration strategies such as tech company partnerships (47.7% SA), university partnerships (46.8% SA), and AI partnerships (49.8% SA) were strongly supported, indicating the importance of external support systems in driving technological advancement. Capacity-building strategies also received strong endorsement, including staff training (47.2% SA), awareness sessions (48.9% SA), enlightenment programmes (48.5% SA), and sponsorship of workshops (49.4% SA). This highlights the recognition that human capacity development is essential for successful AI adoption. Furthermore, policy-related strategies such as AI policy formulation (48.1% SA) and data protection systems (46.8% SA) were also highly rated, indicating awareness of the need for regulatory and ethical frameworks. Overall, the result demonstrates that respondents view AI integration as achievable, provided that adequate funding, infrastructure development, policy support, collaboration, and training programmes are implemented.

Objective four: Investigate the barriers to the adoption of AI technologies in Federal Polytechnic, Wannune.

Table 4: Barriers to AI Adoption (N = 235)

S/N	Item Statement	SA	A	D	SD	Total
36	Limited funding	97 (41.3%)	78 (33.2%)	35 (14.9%)	25 (10.6%)	235
37	Lack of infrastructure	65 (27.7%)	70 (29.8%)	55 (23.4%)	45 (19.1%)	235
38	Unstable internet	98 (41.7%)	77 (32.8%)	36 (15.3%)	24 (10.2%)	235
39	Insufficient training	94 (40.0%)	80 (34.0%)	37 (15.7%)	24 (10.2%)	235
40	Poor power supply	40 (17.0%)	50 (21.3%)	85 (36.2%)	60 (25.5%)	235
41	Lack of AI policies	93 (39.6%)	81 (34.5%)	38 (16.2%)	23 (9.8%)	235
42	Staff resistance	60 (25.5%)	65 (27.7%)	60 (25.5%)	50 (21.3%)	235
43	Management resistance	58 (24.7%)	67 (28.5%)	62 (26.4%)	48 (20.4%)	235
44	Limited knowledge	98 (41.7%)	77 (32.8%)	36 (15.3%)	24 (10.2%)	235
45	Lack of infrastructure	63 (26.8%)	70 (29.8%)	57 (24.3%)	45 (19.1%)	235
46	Shortage of personnel	42 (17.9%)	48 (20.4%)	83 (35.3%)	62 (26.4%)	235
47	Data privacy concerns	93 (39.6%)	81 (34.5%)	38 (16.2%)	23 (9.8%)	235
48	High cost of AI systems	97 (41.3%)	78 (33.2%)	35 (14.9%)	25 (10.6%)	235
49	Lack of collaboration	95 (40.4%)	79 (33.6%)	36 (15.3%)	25 (10.6%)	235
50	Integration challenges	98 (41.7%)	77 (32.8%)	36 (15.3%)	24 (10.2%)	235
51	AI perceived unnecessary	94 (40.0%)	80 (34.0%)	37 (15.7%)	24 (10.2%)	235

Source: Field survey, 2026

The analysis in Table 4 identifies multiple barriers affecting AI adoption, with findings showing that respondents generally agreed that several structural, technical, and human factors hinder implementation. Key barriers include limited funding (41.3% SA), unstable internet (41.7% SA), insufficient training (40.0% SA), limited knowledge (41.7% SA), high cost of AI systems (41.3% SA), and lack of AI policies (39.6% SA). These results suggest that financial and capacity-related constraints are the most significant barriers. However, certain institutional and human factors show more moderate agreement. For example, staff resistance (25.5% SA; 25.5% A) and management resistance (24.7% SA; 28.5% A) indicate that resistance exists but is not overwhelmingly dominant. Similarly, lack of infrastructure (27.7% SA; 29.8% A) is recognized but not as strongly emphasized as funding and technical constraints. Importantly, poor power supply and shortage of personnel were not strongly identified as barriers, as reflected in higher disagreement levels (36.2% D and 25.5% SD for power supply; 35.3% D and 26.4% SD for personnel shortage). This indicates that respondents do not perceive these factors as critical obstacles to AI adoption within the institution. The findings suggest that the major barriers are economic constraints, inadequate training, limited digital knowledge, and weak policy frameworks, rather than infrastructural personnel shortages or power supply issues.

Discussion of Findings

The study reveals that academic staff at Federal Polytechnic Wannune exhibit a high level of readiness to adopt AI-driven technologies, as evidenced by their willingness to use tools like ChatGPT, Mendeley, Grammarly, and Turnitin. This aligns with findings from Abubakar et al. (2024) and Efebeh et al. (2024), who noted that students in regions like Arabia and Nigeria have enthusiastically embraced AI tools for research and advocated for their inclusion in academic curricula. The results also support Santiago et al. (2023), who highlighted the transformative role of AI in academic writing, improving clarity, efficiency, and idea generation. The high readiness of staff to use tools like Scopus and Mendeley reflects the potential of AI to revolutionize research processes, consistent with prior research.

The study further reveals significant gaps in institutional support and infrastructure. The findings reveal a lack of such support at Federal Polytechnic Wannune. For instance, respondents reported inadequate computing and data infrastructure, limited availability of smart boards, AI cameras, and other essential technologies, as well as a lack of AI initiatives and pilot projects. This finding falls short of the emphasis by Ehimuan et al., (2024) and Jaeger et al., (2012) on the importance of a supportive environment for effective AI integration, and the role of governments, educational institutions, and technology companies in expanding access to digital infrastructure.

Findings of the present study about strategies address the identified barriers align closely with previous studies. The emphasis on funding for AI implementation (Ehimuan et al., 2024), partnerships with technology companies and universities (Jaeger et al., 2012), and capacity-building initiatives such as training programs (Agrawal et al., 2024; Bhardwaj et al., 2024) are consistent with previously identified best practices. Moreover, the focus on developing an AI roadmap and formulating policies for ethical AI integration echoes calls from researchers like Inam et al. (2024) and Christou (2023) for structured frameworks to ensure accountability and transparency in AI adoption.

The study also revealed barriers such as limited funding, unstable internet connectivity, insufficient training, and lack of AI policies as major challenges to AI adoption. These findings resonate with the literature's discussion on economic constraints, algorithmic biases, and the digital divide (Ibrahim et al., 2024; Khan & Umer, 2024). On the contrary, power supply issues and personnel shortages were reported not to be barriers. The study highlights the high readiness of academic staff at Federal Polytechnic Wannune to adopt AI-driven technologies for academic purposes, despite significant gaps in institutional support.

Recommendations

Based on the findings of this study, the following recommendations are proposed to facilitate the effective adoption of AI-driven technologies at Federal Polytechnic Wannune:

1. Management of Federal Polytechnic Wannune should prioritize upgrading its computing and data infrastructure, ensuring the availability of smart boards, AI cameras, and other essential technologies.
2. Regular training sessions and workshops should be organized to improve digital literacy among academic staff and familiarize them with AI tools and their applications in teaching and research.
3. The institution can overcome financial barriers to AI adoption by securing increased funding through government grants, partnerships with technology companies, and international organizations.
4. Government and educational monitoring bodies should develop a structured AI adoption policies that provide a clear roadmap for ethical AI integration, addressing issues such as ethical use, data privacy and accountability.
5. The polytechnic management should address unstable internet connectivity to ensure seamless access to AI tools and platforms.

Conclusion

The findings of this study indicates that while academic staff at Federal Polytechnic Wannune are highly receptive to adopting AI-driven technologies for teaching and research, however, significant challenges such as inadequate institutional support and infrastructure hinder widespread implementation. Addressing barriers such as limited funding, unstable internet connectivity, insufficient training opportunities, and lack of policy frameworks is critical for fostering an environment conducive to successful AI integration. Through the implementation of targeted strategies such as investing in infrastructure, providing training programs, forming strategic partnerships, and developing clear policies, the institution can unlock the transformative potential of AI technologies to enhance educational outcomes and research productivity. Therefore, concerted effort by all stakeholders is essential to ensure that Federal Polytechnic Wannune remains competitive in the global academic sphere while equipping students with the skills needed for a technology-driven future.

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ATTITUDE TOWARDS MOBILE TECHNOLOGY DEVICES AND INFORMATION PROVISION AS CORRELATES OF RESEARCH ACTIVITIES AMONG POSTGRADUATE STUDENTS IN UNIVERSITIES IN NORTH-CENTRAL, NIGERIA

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Abstract

This study investigates the Attitude towards Mobile Technology Devices and Information Provision as Correlates of Research Activities Among Postgraduate Students in Universities in North-Central, Nigeria. This study explores the attitudes of Postgraduate students towards mobile technology and its impact on the provision of information services for research activities of postgraduate students in Nigerian universities. The research employs a correlational type of descriptive survey design with an observational checklist, with a sample size of 1,024 postgraduate students selected from a total population of 15,041 across ten universities in North-Central Nigeria. The study utilises questionnaires and observation checklists to gather data, with a focus on the types and levels of research activities conducted, as well as the availability and utilisation of mobile technology in university libraries. Reliability testing using the Cronbach Alpha Formula confirmed the research instrument's validity, yielding an overall reliability score of 0.979. The Findings indicate that postgraduate students in Nigerian universities engage in various types of research activities, including dissertation writing, attending workshops and seminars, and publishing research findings. The findings from the study also revealed that the level of research activities carried out by Postgraduate students is high. Despite the widespread availability of mobile devices such as smartphones and tablets, and mobile applications like WhatsApp, Gmail, and Zotero, the use of these technologies for academic research remains minimal. This can be attributed to challenges such as poor network connectivity and inconsistent power supply, which hinder the effective use of mobile technologies in research activities. However, while there is a moderate availability of mobile technology devices in libraries, their potential is underutilised for academic purposes. Instead, a significant portion of device usage is for personal communication and social networking, with only 24% of students using their smartphones for academic activities. The study concludes that Postgraduate students' attitudes towards mobile technology are pivotal in facilitating research productivity and innovation. Positive engagement with these technologies can improve the accessibility and efficiency of information services, which are crucial for research endeavours. The study recommends the optimisation of mobile-friendly resources, increased funding for updated technology in libraries, and continuous professional development for Postgraduate students to enhance their capability in utilising mobile technologies effectively. Additionally, addressing infrastructural challenges such as network connectivity and power supply is essential to promote equitable access to mobile technology resources in Nigerian universities.

***Keywords**: Information Provision Services, Mobile Technology Devices, Postgraduate students' Attitude,*

1.1. Introduction

Research activities create avenues for innovative and productive ideas and originality in research, following the various processes involved in conducting ideal research. Research activities are defined as human activities based on intellectual application in the investigation of the matter. The primary purpose of postgraduate research is to discover, interpret, and

develop methods and systems for advancing human knowledge on various scientific and social matters of the world and the universe. Research activities can adopt the use of a scientific method in the advancement of knowledge. It is regarded as a systematic effort to gain new knowledge. The dictionary meaning of research is "a careful investigation or enquiry, especially through search for new facts in any branch of knowledge". According to Anyim (2020), research activities are systematic investigations, including research development, testing, and evaluation, designed to develop or contribute to generalisable knowledge. These activities include but are not limited to designing research, directing research, performing experiments, enrolling research subjects, making decisions regarding eligibility to participate in research, participating in observational registry programmes, analysing or reporting research data, or submitting manuscripts concerning research for publication. In the view of Anyim's (2020) definition, it could be further explained that research activities are systematic because they follow order and procedures in achieving the research-set goals and objectives.

Similarly, Manuwa (2019) reported that there are other types of research activities that postgraduate students can engage in to find out new ideas or trends in their profession or field of specialisation, which may include: master's theses or dissertations, attending workshops, seminars, and conferences, both nationally and internationally. The need and importance of research activities, especially among postgraduate students in universities, cannot be overemphasised because they enhance innovation and productivity academically. The study took cognisance of the use of mobile technology devices in facilitating the research activities of postgraduate students, as well as leveraging the attitude of Postgraduate students in the provision of information services. Postgraduate students use mobile technology devices for multifarious research activities ranging from sourcing information resources for writing seminar and conference papers, writing theses and dissertations, downloading articles, searching databases for updated information, as well as interacting with their supervisors.

The use of mobile technology devices effectively could lead to excellent research activities among postgraduate students. Postgraduate students are therefore encouraged to leverage the existence of mobile technology devices for quality research output. The advent of mobile technology devices, such as smartphones and tablets, has changed the landscape of research and information access. These devices offer students, including postgraduate students in the social sciences, unprecedented opportunities to access and manage information with ease. Mobile technology has also provided libraries with new avenues to deliver information services effectively, adapting to the changing needs and preferences of users. However, Postgraduate students play a pivotal role in facilitating access to information and guiding social science postgraduate students in their research endeavours. Their attitude towards embracing and leveraging mobile technology devices can significantly impact the quality of information services provided to postgraduate students. It is essential to understand Postgraduate students' attitudes to mobile technology devices to ensure that they are equipped to meet the evolving needs of their users. Additionally, Postgraduate students in Nigerian universities, like their counterparts worldwide, face several challenges when it comes to integrating mobile technology into their services. These challenges include inadequate infrastructure, limited budgets, and the need for continuous training to stay updated with the latest technologies. Moreover, concerns regarding information security, data privacy, and digital literacy also affect Postgraduate students' approach to mobile technology. Pew Research Centre (2016) defined mobile technologies as devices that are capable of being hand-held, carried or moved easily. They are devices that can be used "on the go". Examples of mobile technologies include smartphones and tablets/iPads. Mobile technologies are enabled with web browsers, email, cameras, Wi-Fi, Bluetooth and audio/video players.

The Postgraduate students' professional development is a key factor in the effective integration of mobile technologies in their operations in the library. Hence, whether beginner or experienced, mobile technology-related training programs can develop Postgraduate students' competencies in mobile technology use, influencing Postgraduate students' attitudes towards mobile technologies and assisting Postgraduate students in recognising how mobile technologies are significant in meeting the information needs of users, especially concerning the provision of information services to social science postgraduate students.

1.2. Statement of the Research Problem

The introduction of mobile technology devices in universities in Nigeria has motivated the research activities of both students and faculty through effective and efficient information service provision. In an ideal situation, mobile technology devices are supposed to facilitate the research activities of postgraduate students. Postgraduate studentss are expected to show a positive attitude towards the provision of information services that will bring about research innovation and productivity using mobile technology devices such as smartphones, iPads, iPods, tablets, etc.. as well as mobile applications such as WhatsApp, Gmail, Messengers, Twitter, Chat Generating Pre-print Transformer (GPT), Dropbox, Udemy, Zotero and Coursera etc (Open Al, 2022). For research purposes, rather than the non-academic use

of this platform, most of the time is spent on personal chatting and social engagement. The actual situation after preliminary investigation by the researcher revealed that the use of mobile technology devices among postgraduate students in their research activities is at its lowest ebb. It was also revealed that issues of network connectivity, as well as erratic power supply, have also slowed down the use of mobile technology devices in facilitating the research activities of Social Science postgraduate students concerning the provision of information services using the mobile technology platform. Empirical evidence from the study carried out by Charles and Kevin (2017) on the use of smartphones among college students in Nigeria, a revelation and reflections. The result of the study showed that 38.2 percent of students spent between 1 and 5 hours per day on their phones. The majority of the respondents, amounting to 555 of them (98%), used their smartphones to communicate with family and friends. About seventy-five percent used their smartphones for social networking. Only twenty-four per cent of students engaged their smartphones for academic activities, including research activities.

This is evident in the write-up by Gaffar, Abdul, and Kumar (2019***),*** who opined that the use of mobile technology devices in facilitating the research activities of postgraduate students in Nigerian universities has been at its lowest ebb, even when mobile technology devices, if properly utilised, could bring about effective research productivity and innovation among postgraduate students. It is imperative to note that academic libraries in this part of the world are still in the embryonic stage in terms of providing information services through mobile technology, hence the need for this study to investigate Postgraduate students' Attitudes to Mobile Technology Devices and the Provision of Information Services for Research Activities of Social Science Postgraduate Students in Nigerian Universities.

1.3 Aim and Objectives of the Study

The study aims to investigate Postgraduate students' Attitudes to mobile Technology devices and the provision of information services for research activities of postgraduate students in universities in Nigeria. To achieve this, the following specific objectives are set:

1. To determine the type of research activities carried out by postgraduate students in universities in North-central Nigeria, using mobile technology devices
2. To ascertain the level of research activities carried out by postgraduate students in universities in North-Central, Nigeria.
3. The availability of mobile technology devices (smartphones, iPods, iPads, GPSs, personal digital assistants, etc.) is used for postgraduate students' research activities in universities in Nigeria.

1.4. Scope and Significance

The general scope of the study is to investigate Postgraduate students' Attitudes to mobile technology devices, and the provision of information services for the research activities of postgraduate students in universities in Nigeria. The geographical scope of the study covers universities in North-central Nigeria. The study is limited to some selected federal, state and private Universities in North-central Nigeria. The content scope of the study includes research activities, mobile technology devices, Postgraduate students' attitude, provision of information services and postgraduate students.

Similarly, the study will be of great benefit to the following: University Libraries, Postgraduate students, Information Managers, Postgraduate students, Researchers, and IT Specialists/Database Administrators. Technologists, Educationists, Telecommunication Industries, Information Service Providers and Policy Makers

3.0. Research Methodology

The research design adopted mixed methods for the study, that is, a correlational type of descriptive design and an observation checklist. The total population of the study was 15,041 from 10 Universities in North-Central, Nigeria. The determined sample size for the study is 1024 postgraduate students using the Krejcie and Morgan (1970) table for determining the sample size of a large population, while the proportionate sampling technique using Bowler's allocation formula (Abedoh, 2018) was used to determine the sampling fraction for each of the universities. The sampling fraction used in selecting a sample of 1024 postgraduate students out of 15,041 is 2.5%. This gave the researcher 1024 postgraduate students selected from ten (10) universities. The sample size of 1024 was considered adequate and represented the total population. This became possible by taking cognisance of the fact that the population is a standardised population of postgraduate students. Corroboratively, scholars of note like Krejcie and Morgan (1970) asserted that using a population as vast as 75,000, a sample of 0.51% could be used. Data were collected through questionnaires administered by the researcher with the assistance of trained research assistants across ten universities in North-Central Nigeria. A total of 1,024 questionnaires were distributed, and 796 valid copies were retrieved within two

weeks, yielding a response rate of 78%. Data analysis was conducted using both descriptive and inferential statistical methods. Descriptive statistics (frequency counts, mean, and standard deviation) were used to answer the research questions, while inferential statistics, Pearson Product–Moment Correlation Coefficient and multiple regression analysis were employed to test the null hypotheses and examine the relationships and predictive effects of the independent variables on postgraduate students' research activities.

4.0. Results and Discussions of Findings

Out of 1,024 copies of the questionnaire distributed, 796 copies were completed, retrieved and found usable, representing 78% success. The response rate from the 10 universities in North Central Nigeria is revealed in

Table 4.1: Response Rate

		Copies distributed	Copies retrieved.
1.	Federal University of Technology, Minna, Niger State.	155	121
2.	University of Abuja, Abuja	111	86
3.	University of Jos, Jos.	168	130
4.	University of Ilorin, Ilorin.	123	96
5.	Nile University of Nigeria (NUN), Abuja.	7	5
6.	Prince Abubakar Audu University, Anyigba	45	35
7.	Benue State University, Makurdi	45	35
8.	Kwara State University, Malete	25	19
9.	Ibrahim Badamasi University, Lapai	12	9
10.	Nassarawa State University, Keffi	333	260
Total		**1024**	**796(78%)**

Source: Author's Field Work (2022)

Table 4.1 shows the copies of questionnaires distributed and copies returned. The total copies of questionnaires distributed were 1024 copies, and a total of 796 copies of the questionnaire were returned and found usable, with a 78% return rate.

4.2 Objective 1: Find out the type of research activities carried out by postgraduate students in universities in Nigeria.

Table 4.2: Type of Research Activities Carried Out by Postgraduate Students in Universities in North-Central, Nigeria (N=1024)

S/N	STATEMENT	SD 1	D 2	A 3	SA 4	N	FX	MEAN	ST. D	Decision
1.	Workshops	60	108	208	420	796	2580	2.84	1.15	Agreed
2.	Seminars	166	132	166	332	796	2256	2.86	1.19	Agreed
3.	Research Publications	184	130	162	320	796	2210	2.75	1.24	Disagreed
4.	Basic Research	132	172	178	314	796	2266	2.86	1.07	Agreed
5.	Publishing Research Findings	151	155	271	219	796	2150	2.84	1.11	Agreed
6.	Applied Research	120	184	179	313	796	2277	2.90	1.01	Agreed
7.	Symposiums.	144	160	179	313	796	2253	2.82	1.11	Agreed
8.	Interdisciplinary Research.	138	166	186	306	796	2252	2.82	1.08	Agreed

9.	Translational Research	156	154	180	306	796	2228	2.74	1.15	Disagreed
10.	Conferences	150	166	179	301	796	2223	2.72	1.12	Disagreed
	Average Weighted Mean							**2.82**	**1.12**	

Key: SA = Strongly Agreed, A = Agreed, D= Disagreed, SD = Strongly Disagreed, StD = Standard Deviation and (Decision Mean = 2.82)

Source*:* Author's Fieldwork (2023)

Table 4.2 revealed the results of 796 respondents from the 10 universities selected for the study. The result showed the perceptions of postgraduate students on various research activities. A benchmark mean of 2.82 was used to classify activities into "Agreed" or "Disagreed." Similarly, Agreed Activities (Mean ≥ 2.82): Workshops (2.84), Seminars (2.86), Basic Research (2.86), Publishing Research Findings (2.84), Applied Research (2.90), Symposiums (2.82), and Interdisciplinary Research (2.82) are well-regarded, reflecting strong engagement and relevance. While Disagreed Activities (Mean < 2.82): Research Publications (2.75), Translational Research (2.74), and Conferences (2.72) scored below the benchmark, suggesting challenges in these areas. With an average weighted mean of 2.82 and moderate variability (SD = 1.12), most activities are positively perceived, while a few, like research publications and conferences, require targeted improvements in universities in North-Central, Nigeria.

4.3 Objective 2: Find out the level of research activities carried out by postgraduate students in universities in Nigeria.

Table 4.3: Level of Research Activities Carried Out by Postgraduate Students in Universities in Nigeria (N=1024)

S/N	ITEMS	VLL 1	LL 2	HL 3	VHL 4	N	FX	MEAN	ST. D	Decision
1.	Workshops	156	142	266	232	796	2166	2.86	1.19	Low Level
2.	Seminars	114	142	226	314	796	2332	3.08	0.91	High Level
3.	Research Publications	144	148	272	232	796	2184	2.92	1.14	Low Level
4.	Basic Research	132	142	202	320	796	2302	2.98	1.04	High Level
5.	Publishing Research Findings	69	111	284	332	796	2471	2.98	1.10	High Level
6.	Applied Research	120	172	178	326	796	2302	2.98	1.02	High Level
7.	Symposiums.	144	130	215	307	796	2277	2.90	1.07	High Level
8.	Interdisciplinary Research.	132	136	196	332	796	2320	3.04	1.05	High Level
9.	Translational Research	150	148	192	306	796	2246	2.80	1.12	Low Level
10.	Conferences	197	142	227	230	796	2082	2.61	0.90	Low Level
	Average Weighted Mean							**2.92**	**1.05**	

Key: VHL = Very High Level, HL = High Level, LL Low Level, VLL = Very Low Level, StD = Standard Deviation and (Decision Mean = 2.92).

Source*:* Author's Fieldwork (2023).

Table 4.3 revealed the results of 796 respondents from the 10 universities selected for the study. The data presented in Table 4.3 shows the level of engagement in various research activities among postgraduate students in Nigerian universities. The average weighted mean score of 2.92 suggests that postgraduate students generally exhibit a moderate level of research activity. However, engagement levels vary across different research activities.

Research activities with high-level engagements (mean ≥ 3.00) include seminars (3.08), basic research (2.98), publishing research findings (2.98), applied research (2.98), symposiums (2.90), and interdisciplinary research (3.04). These results indicate that postgraduate students actively participate in these areas, particularly in seminars and interdisciplinary research, which received the highest engagement scores.

Conversely, workshops (2.86), research publications (2.92), translational research (2.80), and conferences (2.61) received low-level ratings, indicating that students engage less in these activities. The lowest level of engagement was observed in conferences (2.61), suggesting possible challenges such as limited access, financial constraints, or a lack of institutional encouragement for participation in academic conferences.

Overall, the findings suggest that while postgraduate students are involved in core research activities such as seminars, basic research, and interdisciplinary research, there is a need for greater support and encouragement in areas like workshops, research publications, and conferences. Strengthening institutional policies, funding opportunities, and mentorship programs could help improve participation in these critical areas and enhance the overall research output of postgraduate students in universities in North-Central, Nigeria.

4.4 Objective 3: Determine the availability of mobile technology devices used for postgraduate students' research activities in universities in Nigeria.

S/N	Items	Federal University of Technology.	University of Abuja, Abuja.	University of Jos, Jos.	University of Ilorin. Ilorin.	Nile University of Nigeria (NUN).	Prince Abubakar Audu University,	Benue State University,	Kwara State University, Malete	Ibrahim Badamasi University, Lapai	Nasarawa State University, Keffi
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.	mobile phone	√	- √	- √	- √	- √	- √	- √	- √	-	√ -	√ -
2.	IPad	-	√ √	- √	- √	- √	- √	- √	- √	-	- √	√ -
3.	IPods	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
4.	Global positioning systems	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
5.	Personal Digital Assistant (PDA)	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
6.	Bluetooth	√	- √	- √	- √	- √	- √	- √	- √	-	√ -	√ -
7.	Wireless Fidelity (Wi-Fi)	√	- √	- √	- √	- √	- √	- √	- √	-	√ -	√ -
8.	Multi-touch screen	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
9.	Mobile websites	√	- √	- √	- √	- √	- √	- √	- √	-	√ -	√ -

10.	Media creation and capture tools	√	- √	- √	- √	- √	- √	- √	- √	-	√ -	√ -
11.	Pocket personal computer	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
12.	Blackberry	-	√ -	√ -	√ -	√ -	√ -	√ -	√ -	√	- √	- √
	Total	5	7 6	6 6	6 6	6 6	6 6	6 6	6 6	6	5 7	6 6
	Percentage	42 %	550 8% %	550 0% %	550 0% %	550 0% %	550 0% %	550 0% %	550 0% %	50 %	458% 2 %	550 0% %

Source*:* Author's Fieldwork (2023).

Table 4.4 shows the checklist for observation on the availability of mobile technology devices. The result showed that the Federal University of Technology Minna and Ibrahim Badamasi Babangida University availability of mobile technologies devices used by Social Science postgraduate students is 5(42%) and 7(58%) for non-availability of mobile technologies respectively. However, the University of Abuja, University of Jos, University of Ilorin, Nile University of Nigeria (NUN), Abuja, Prince Abubakar Audu University, Anyigba. Benue State University, Makurdi, Kwara State University, and Nasarawa State University's availability and non-availability of mobile technologies are 6(50%) and 6(50%), respectively. This implies that there is a greater need for the provision and adoption of mobile technology devices for research activities by postgraduate students in universities in North Central Nigeria.

4.1. Discussion of the findings is as follows:

The types of research activities carried out by social science postgraduate students in universities in Nigeria are dissertation writing, attendance of workshops, seminars, symposiums for research purposes, and publications of research findings in reputable journals. The findings were supported by (Abu-helalah *et al.,* 2015; Beanland *et al.,* 2020; Borakati *et al.,* 2017; Kozlov *et al.,* 2017; Noguez & Neri, 2019; Razeghi, 2019; Roach, 2017; Swan *et al.,* 2018; Weiner & Watkinson, 2014). The authors asserted that research activities such as attending conferences, seminars, and workshops, and interacting with intellectuals in various fields of human endeavour, are key to innovation and academic publishing, especially among social science postgraduate students.

In the same vein, the level of research activities carried out by postgraduate students in universities in Nigeria through attendance of workshops, conferences, seminars, thesis and dissertation writing, and interaction with senior colleagues in the profession is at a very high level. Razeghi (2019) supported this by carrying out a study on factors influencing the Research Activities of Postgraduate Students at the University of Mazandaran, Iran. The findings of Razeghi (2019) showed that there was no significant difference between the scientific activities of doctoral and master students in terms of gender, marital status and locality, as their research activities are at a high level. Beta coefficients indicated that the academic activities of the students were affected most by the university facilities (β=0.36) and students' satisfaction with the teachers (β=0.34), and the least (β=0.17) by students' interaction with professors.

However, there is a moderate number of mobile technology devices available in university libraries in North Central Nigeria. These include mobile phones, iPads, iPods, Global Positioning systems, personal digital assistants, Bluetooth, wireless fidelity, multi-touch screens, mobile websites, media creation and capture tools, and pocket personal computers. This was against Gaffar *et al.'s* (2019) assertion that there has been an explosion of specialised software applications to support communication for those who require the use of mobile technology for their research activities. In the same vein, Mohammadi, Sarvestani, and Nouroozi (2020) affirmed that the wide availability of mobile technology devices such as smartphones, iPads, iPods, and personal digital assistants (PDAs) has made research activities seamless.

4.2. Summary of the Findings

The following findings emanated from the study:

1. Types of research activities carried out by social science postgraduate students in universities in Nigeria are dissertation writing, attendance of workshops, seminars, symposiums for research purposes, and publications of research findings in reputable journals.

2. The level of research activities carried out by postgraduate students in universities in Nigeria through attendance of workshops, conferences, seminars, thesis and dissertation writing, and interaction with senior colleagues in the profession is very high.
3. There is a moderate number of mobile technology devices available in university libraries in North Central Nigeria. These include mobile phones, iPads, iPods, Global Positioning systems, personal digital assistants, Bluetooth, wireless fidelity, multi-touch screens, mobile websites, media creation, capture tools, and pocket personal computers.

Conclusion

In conclusion, the study underscores that Postgraduate students' attitudes towards mobile technology devices play a crucial role in shaping the provision of information services for social science postgraduate students' research activities. The findings indicate that embracing mobile technology positively impacts the accessibility, convenience, and efficiency of information retrieval and research activities. The study underscores the need for training and professional development to enhance Postgraduate students' familiarity with mobile technology tools and their effective incorporation into the academic environment. In the broader context of Nigerian universities and the evolving landscape of information services, the study advocates for proactive measures to address the digital divide and promote equitable access to mobile technology resources. It also emphasises the importance of continuous assessment and adaptation of the provision of information services to meet the evolving needs of postgraduate students, who are increasingly reliant on mobile technology devices for their research endeavours.

Recommendations

1. There should be mobile-friendly resources and research tools that are optimised for devices that can facilitate seamless access to information on the go, since postgraduate students' research activities in universities in Nigeria include dissertation writing, attendance of workshops, seminars, symposiums for research purposes, and publications of research findings in a reputable journal.
2. It is important to commend the level of research activities carried out by postgraduate students in universities in Nigeria, as the students actively engage in research activities through attendance of workshops, conferences, seminars, thesis and dissertation writing, and interaction with senior colleagues in the profession.
3. There is a need to allocate sufficient resources to ensure the availability of up-to-date mobile technology devices, software, and applications in libraries, as adequate funding can enable Postgraduate students to offer the latest technology tools to students for their research activities.

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Bibliometric Analysis of Science Education Masters' Theses at Federal University of Technology, Minna: A Citation Analysis Perspective for Library Collection Development

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Abstract

This study focused on research productivity of Science Education master's degree researchers by examining the citations and references in 30 copies of master's degree theses in science education and the availability of the sources within the library at Federal University of Technology, Minna, Nigeria, between 2015 and 2019. The theses were examined according to

specific characteristics, including their subject focus, citation and reference counts, authorship patterns, the prominence of cited publications and journals, and their accessibility within the university library. The study employed descriptive survey design; while tables and charts were used in data presentation. The result revealed that instructional strategies and achievement is the most researched subject area, "Learning outcome" as a subject area, produced the highest frequency of citations and references. Journals were the most cited publications, and; 'Journal of education & practice is the most cited journal. "Three authors" happens to be the most cited authorship pattern while most of the cited journals were not available in the university library. For libraries to achieve their aims and objectives as the gateway for information sources to its users, it is recommended that the library under study adopts the findings of this study to solve this identified problem. These findings can shape library collection development policies generally and serve as a guide for upcoming researchers and directions for future research in science education.

Keywords: *Bibliometrics, Citation analysis, Collection development, Master's degree theses, Science education*

Introduction

Bibliometrics is a collection of methods used to quantify, qualify and evaluate academic, scientific and technological literature to determine patterns or trends. Bibliometrics was first coined and used by Alan Pritchard in an article named 'Statistical bibliography' in 1969. The author defined the term as the application of mathematical and statistical methods to books and other forms of media communication in order to determine their impacts and productivity. According to Asha and Venkatesha (2019), bibliometrics are set of methods employed to study or measure academic literature and scholarly communication. They use mathematical and statistical methods to assess the output of scientific publications.

Bibliometrics studies are divided into several methods such as citation analysis, content analysis and most recently citation content analysis. Citation analysis is a method of studying the bibliographic references used while carrying out a research (Iloka & Abifarin, 2021). Citations are integral parts of research works which clearly show the lists of references mentioned in a publication. According to Anaehobi and Moukebe (2014) citation analysis is a major area of bibliometric research which uses various sets of methods to establish relationship between authors and their articles, as well as assessing the quality and pattern of scholarly communication. Previous studies have used citation analysis to look at the information needs and utilization behaviour of undergraduate and postgraduate scholars. This could reveal much about scholarly communication and could guide collection development in academic libraries.

University award master's degrees to deserving scholars upon completion of their course work and research work in fulfillment of the requirements for the award. The research components of the requirement particularly at the postgraduate levels take predominant space. Thus, the degree of Master is awarded with thesis in partial fulfillment at Federal University of Technology, Minna. Theses present original research results and the process of production is strictly guided by provisions of the awarding institution under the guidance of research supervisors. Theses cover extensive bibliographies which were cited in support of thoughts, concepts, techniques, data analysis and discussion expressed in the research work such that authorities are acknowledged through citations. Theses find their way into

academic publications in form of periodicals, books and monographs, in which bibliometric studies can be based (Borthakur, 2015).

Science Education is a field of study and research which came as the need to educate students in educational technology fields, leading to the award of master's degree. The department is structured to prepare innovative and professional teachers who can demonstrate competence and resourcefulness in instructional design, development, implementation and evaluation of instructional media required in a global society to transform schools into digital age learning environments and to meet the diverse ever-changing needs of students, researchers, society and corporations. These academic departments have produced quite a number of master's degree graduates who have completed their studies and produced theses. These theses are subject of this study; therefore, these studies can be possible in order to identify research trends, growth of knowledge, use, forecast past, present and future trends and information needs.

Statement of the research problem

The evaluation of theses are very pertinent because, it could help libraries, researchers, institutions, and organizations to determine the growth and trends of knowledge, develop norms of standardization, identify libraries patrons' subject interests, preferred formats of information materials, as well as weeding policies in the face of harsh or limited budgetary provision, eliminate the attitude of just-in-case acquisition of library resources and enthrone patron-driven acquisition in libraries. Preliminary studies reveal the absence of this bibliometric study towards the remedial of these identified bottlenecks. In this regard, this study tends to analyze Science Sducation theses and help proffer solutions at Federal University of Technology, Minna.

Objectives of the study

The aim of the study is to analyze cited references appended in master's degree theses in Science Education at Federal University of Technology, Minna. The study's specific objectives are to:

1. find out the subject focus of master's degree theses in Science Education at Federal University of Technology, Minna
2. determine the number of citation and references in master's degree theses at Federal University of Technology, Minna
3. find out the prominence of cited publications in master's degree theses at Federal University of Technology, Minna
4. determine the prominence of journal publication in masters degree theses at the Federal University of Technology, Minna
5. find out the authorship patterns in cited references in master's degree theses at Federal University of Technology, Minna
6. determine the state of availability of highly cited journal publications in master's degree theses at the Federal University of Technology Library, Minna.

Research Questions

The following research questions were asked and answered

1) What are the subject focus areas of master's degree theses in Science Education at Federal University of Technology, Minna?
2) What is the number of citation and references contained in master's degree theses in Science Education at Federal University of Technology, Minna?
3) Which publications are most prominently cited in master's degree theses in Science Education at Federal University of Technology, Minna?
4) What is the prominence of journal publications among the cited references in master's degree theses in Science Education at Federal University of Technology, Minna?
5) What are the authorship patterns of cited references in master's degree theses in Science Education at Federal University of Technology, Minna?
6) What is the state of availability of highly cited journal publications referenced in master's degree theses in the library of Federal University of Technology, Library, Minna?

Literature review

Scholars and researchers involved in research refer to earlier studies similar to the study being undertaken or that is ongoing (Iqbal et al., 2020; Rüdiger et al., 2021). These references and sources consulted indicate earlier research whose methods, opinions, equipment and concepts inspired the citing author to develop a study (Tahamtan & Bornmann, 2020; Rüdiger et al., 2021). Citations are used to evaluate the quality, impact, penetration and originality of individual scholars and corporate entity performance across fields (Worrall & Cohn, 2023; Abramo et al., 2024; Srisawad et al., 2026). The fact that an article is referenced shows that within the author's frame of mind, there exists a similarity between a part and the whole of the referenced article (Khatoon et al., 2024; Mammola et al., 2022).

The conventional view of citation is that it serves as a form of scholarly acknowledgement. It pays homage to pioneering scientific breakthroughs and recognises the contributions of authors whose ideas, findings, or works have been consulted or used in a study. Citation should place emphasis on the real account of the original author's message (Small, 2004).

Citation analysis refers to the study of reference and bibliographic patterns cited in an academic and scientific literature. Citation analysis can be defined as the application of statistical methods to examine the acknowledgement found in a publication such as books, journal articles and monographs and unpublished sources such as theses, dissertations in order to ascertain a method. All these are found within the context of any scholarly literature. When an author consults information from another author's work, he/she will cite the work. The rationale behind this norm is that the norm of science requires them to cite the work that they found useful while pursuing their own study and it is important that they abide by these norms. The notion that references cited by an author are indicators of impact on the author's work is a valid assumption, though variations on this assumption occur many times throughout the article and these assumptions whether implicit or explicit is basic to most types of citation analysis. In addition, another reason for citing is to comply and adhere to applicable norms or laws against plagiarism by acknowledging the originators of ideas, arguments, theories and terms applied towards citations. The analysis of top cited papers in the field of science education was carried out to understand the main characteristics and features of publication such as bibliographic details, authorship collaboration, citation counts and specialty.

Gayan (2018) carried out a study on citation analysis of doctoral theses of Mathematics Education at Tripura University India. The study considered only those theses that were submitted to Shodhganga. According to the author, 6 theses contributing 377 citations were selected for the study. The references were analysed with respect to authorship pattern, year, country, publisher and the kind of documents used. Bradford's law was used to determine the core journals in the field of Mathematics which showed the *Fuzzy sets and Systems* as the journal with have high impact in the field of Mathematics. Furthermore, the half-life of mathematical journals was found to be 22 years from the obsolescence rate of journals in Mathematics. The author also tested the degree of collaboration in the discipline in India and coefficient in the degree of collaboration was established. Average citation per thesis in Mathematics was 62/83 as revealed by the study.

In India, Devi and Das (2016) conducted a study on citation analysis of doctoral dissertations submitted to the Department of English Education at Guwahati University, India between 2009 and 2012. The study analyzed 908 citations appended to six doctoral dissertations. Bibliographic indices such as the number of citations received, different format sources, authorship pattern, collaboration coefficient, obsolescence, age and other parameters were used in analysis of the data gathered. The study showed that books were the most preferred sources of information used by the researchers in the English language literature, and contributed 77% of the total counts, while the second highest source of information were periodicals with 15%. The researchers showed much tendency towards citing older literature that was over a decade or more in their works. The study revealed also that single-author publications contributed 85.1% of the total references, while the collaborative coefficient was summed up to 0.10. The research findings can assist library managers to identify important information sources and can help predict the future of disciplines by academic faculties.

Geetha, Pushpa, Mounesh and Nanditha (2016) studied Computer Science theses submitted to top five Universities in Shodhaganga, contributing electronic theses to the repository between 2014 and 2015. Using citation analysis 4,490 citations were extracted and analysed to ascertain the authorship patterns along with collaboration coefficient calculation, literature formats, journal ranks, book ranks, time span (age) and geographical locations. The study revealed that journals were the most preferred and frequently used information sources by researchers in the computer science field. The investigation showed that the *Journal of the Institute of Electrical and Electronic Engineering (IEEE)* ranked first as the most preferred journal, while other journals and other formats of information sources queued behind it. The study will be helpful in recognizing researcher's needs according to the authors and by recommendation will serve as a feedback towards patron driven acquisition.

Similarly, Labonte (2015) used citation analysis to find out if the Science-Engineering Library at the University of California Santa Barbara was meeting the needs of an interdisciplinary group of 60 faculty members at the new California Nano Systems Institute. The aim of the study was to develop a list of core journals and identified journals that should be added to the sciences engineering library at UCSB. Findings showed that the library subscribed to 98% of the journal in which faculty members published and majorly cited The research provided useful information on citation patterns that can be used for future collections management decision.

Back home in Nigeria, citation analysis was carried out by Aliyu (2015) on doctoral theses in education, University of Maiduguri between 1987 and 2007. Bibliographic details, including subject area of the theses were extracted. Bibliometric techniques were used in the data analysis using frequency counts, and percentage scores. Tables were used also for the presentations of research findings. The study revealed that Curriculum and Instruction ranked as the most researched subject area, while educational psychology was the least researched subject area. The findings also showed that Books and Monographs were the most cited information sources among educational researchers. The author stated that out of 912 journals cited, 18 were identified as the most frequently cited while most of the articles cited by the researchers fall between 1980 and 1989. The study would be of tremendous assistance to potential researchers who wish to exploit other subject areas of education and eliminate just-in-case acquisition in academic libraries.

Similarly, Anaehobi and Muokebe (2014) examined the citation analysis of theses submitted to the Department of Engineering and Technology, Nnamdi Azikiwe University Awka, Nigeria. The study aimed to know the availability of the resources cited. Document analysis guide was employed to gather data from the master's degree theses available in

the Department of Engineering and Technology. 87 theses were studied, and 2,947 citations found therein. Analyses of data were performed with the use of frequency tables and percentages. The findings revealed that internet sources had the least citations with (12.1%). Books were the main information resources used by researchers while journal articles came second with 54.1% and 34.1% respectively. Most of the cited sources were not available in the University Library according to the researcher and the most cited resources in the theses analyzed were foreign materials. The study recommended that the library management should collaborate with the Departments to acquire most used information sources and effort made to acquire those titles used by the researchers hitherto not available in the library.

In their study, Abifarin et. al. (2018) also found out that most of the cited sources in undergraduate students' projects in the Department of Library and Information Technology, Federal University of Technology Minna, were not available in the University Library. From the review of previous work, it was observed that studies were carried out on analysis of citation within a given literature in any field of study over a period. Thus, efforts were geared towards shedding light on the processes of written communication and discovering their historical development and antecedents. Another important reason behind citation analysis is to indicate the quantity and quality of publication output, also to measure the impact and contribution of scholars in each field of study. Additionally, the rationale for most previous work was aimed at helping libraries toward effective management of their collections by providing the preferred and the right sources of information and at the right time for their patrons, even in the era of limited budget and scarce resources.

Research Methodology

Descriptive research design enables a researcher to conduct a productivity count and analyze cited references. The descriptive bibliometrics approach was used to determine and quantify the bibliographic features of cited references in master's theses in Science Education while the evaluative bibliometric approach was used to determine their state of availability in Federal University of Technology Library, Minna. A total of 30 copies of Master's degree theses submitted at the department from 2016 to 2019 were used for the study. Data collection was achieved through the use of Master's Degree Theses Citation Productivity Worksheet (MDTCPW) and Master's degree Theses Availability of Cited References Worksheet (MDTACRW). The data extracted were statistically analyzed and the result presented using tables, frequency and chart.

Results and Discussion

Research Question 1: Distribution of Master's theses in Science Education according to subject focus in Federal university of technology library Minna

Table 1: Distribution of Master's theses according to subject focus in Federal University of Technology Library, Minna.

Thesis ID	Subject Focus
MTech Sc. Edu 001	Instructional Strategies & Learning Outcome
MTech Sc. Edu 002	Instructional Strategies & Achievement
MTech Sc. Edu 003	Assessment/Evaluation
MTech Sc. Edu 004	Instructional Strategies/Achievement
MTech Sc. Edu 005	Classroom Management & Performance
MTech Sc. Edu 006	Learning Outcome
MTech Sc. Edu 007	Career Development & Curricular Development
MTech Sc. Edu 008	Instructional Strategies/ Achievement
MTech Sc. Edu 009	Instructional Materials/ Achievement
MTech Sc. Edu 010	ICTs Competence /Performance Evaluation
MTech Sc. Edu 011	Performance & Evaluation
MTech Sc. Edu 012	Performance Testing
MTech Sc. Edu 013	Assessment of Learning Outcome
MTech Sc. Edu 014	Instructional Material and Subject Performance
MTech Sc. Edu 015	Multimedia Teaching Aid Use
MTech Sc. Edu 016	Learning Outlines and adaptation
MTech Sc. Edu 017	Assessment/evaluation
MTech Sc. Edu 018	Classroom management
MTech Sc. Edu 019	Instructional materials
MTech Sc. Edu 020	Assessment/evaluation
MTech Sc. Edu 021	Performance Testing

MTech Sc. Edu 022	curriculum development
MTech Sc. Edu 023	ICTs competence & learning outcome
MTech Sc. Edu 024	Instructional strategies
MTech Sc. Edu 025	Classroom management
MTech Sc. Edu 026	Test and evaluation
MTech Sc. Edu 027	Performance Testing
MTech Sc. Edu 028	Instructional strategies &achievement
MTech Sc. Edu 029	Career development
MTech Sc. Edu 030	Curricular development

Table 1. Distribution of master's theses according to subject focus. A total of 30 science education master's theses deposited in the Federal University of Technology Library, Minna, Nigeria, during the period stated were sampled for the study. This section presents the distribution of 30 Masters Theses in Science Education in Federal University of Technology, Minna according to subject focus. Instructional strategies and achievement are the main subject focus among science education masters research while ICT competence and learning are the least subject focus of science education master's degree research.

Research Question 2: Number of citations and references in science educations theses, Federal University of Technology Library, Minna

Table 2: Number of citations and references in science educations theses, Federal University of Technology Library, Minna.

Thesis ID	Number of citations	Number of references
MTech Sc.Ed.001	138	78
MTech Sc.Ed.002	192	125
MTech Sc.Ed.003	158	157
MTech Sc.Ed.004	171	121
MTech Sc.Ed.005	155	98
MTech Sc.Ed.006	329	209
MTech Sc.Ed.007	168	102
MTech Sc.Ed.008	165	81
MTech Sc.Ed.009	93	63
MTech Sc.Ed.010	133	89
MTech Sc.Ed.011	166	131
MTech Sc.Ed.012	106	74
MTech Sc.Ed.013	173	120
MTech Sc.Ed.014	176	81
MTech Sc.Ed.015	240	131
MTech Sc.Ed.016	154	93
MTech Sc.Ed.017	232	168
MTech Sc.Ed.018	135	69
MTech Sc.Ed.019	185	95
MTech Sc.Ed.020	96	76
MTech Sc.Ed.021	189	112
MTech Sc.Ed.022	123	84
MTech Sc.Ed.023	165	102
MTech Sc.Ed.024	206	153
MTech Sc.Ed.025	162	141
MTech Sc.Ed.026	112	76
MTech Sc.Ed.027	138	122
MTech Sc.Ed.028	228	178

MTech Sc.Ed.029	278	203
MTech Sc.Ed.030	236	182
Total	5202	3710

Table 2. shows citations and reference frequencies of science education theses in Federal University of Technology Minna library. M.TechSc.edu 006 which is learning outcome had the highest number of citations and references, while MTech Sc.edu 009 which is Assessment and Evaluation had the least number of citations studied.

Research Question 3: Highly cited publications in master's degree theses in science education theses in federal university of technology Minna

Table 3 Shows highly cited publications in masters' degree theses in science education theses in Federal University of Technology, Minna.

Publications	Number of Occurrence
Journal	2131
Books	890
Conference proceedings	420
Reports	35
Hand books/Guides	101
BlogSpot	102
Others	31
Total	3710

It is observed in Table 3 that out of 3710 publications cited in science educations masters' theses, 2131 were Journals publications, 890 were books, 420 were for conference proceedings, handbooks/guide and blog spots share a close figure of 101 and 102, while other corporate and other sources of information were 31.

Research Question 4: Highly cited Journals publications in science educations theses of Federal University of Technology, Minna

Table 4: Shows the highly cited Journals publications in science educations theses federal university of technology Minna

Journals	Number of Occurrence
Journal of education and practice	288
Journal of science, technology, mathematics and education	229
IOSR Journal of research & method in education	143
Eurasia journal of mathematics, science and technology education	131
Computers and Education	127
International Journal of instruction	120
American Journal educational research	115
African Journal educational research	98
Higher education	82
American-Eurasia journal of science research	75
Research in science education	68
World journal of education	63
Educational research & reviews	61
Journal of science education	59
International journal of education & evaluation	56
European journal of education	53
International journal of education & ICTs	50
Behavioral sciences	45
International journal of education, learning& development	45
Journal of classroom interaction	42

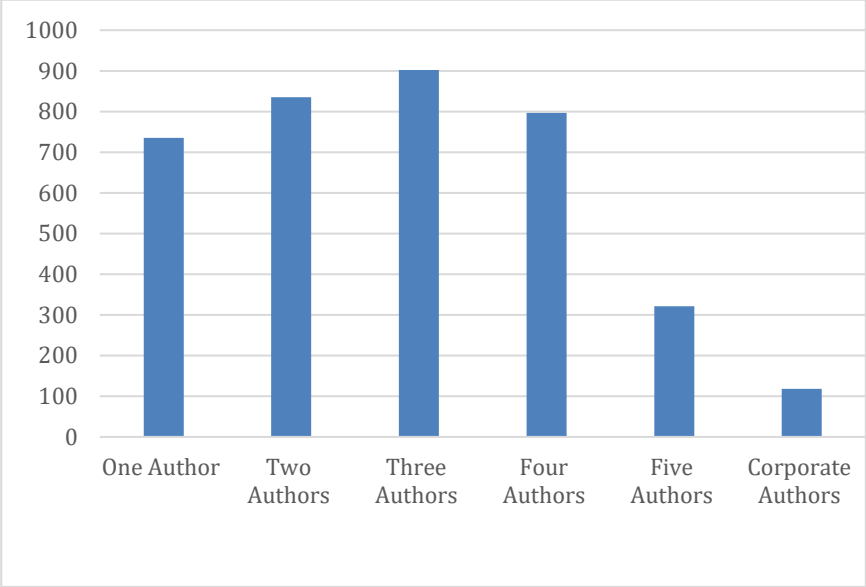
International journal of instruction	38
Others	143
Total	2131

Table 4 shows that out of 2131 journal articles cited in science education theses, Journal of Education & Practice have the highest frequency of occurrence with 288, followed by journal of science, technology, mathematics & education with 229 while journal of research & methods in education had 143. Eurasia Journal of mathematics, science & technology educations with 131, going down the table, International Journal of Instruction had the least of 38 entries while the rest of cited journals below the benchmark of 38 were classified as other with 143 many studies reported that journal article were most cited publications used on research writing.

Research Question 5: Authorship patterns in science education theses in Federal University of Technology, Minna.

Table 5: presents the types of authorship cited in science education theses in Federal University of Technology, Minna.

Authorship Patterns in Science Education Masters degree theses.



One authors	737
Two authors	835
three authors	902
four authors	797
five authors	321
Corporative organization	118
Total	3710

Table 5 reveals that out of 3710 references one author had 737 entries, two authors had 835 entries, three authors with 902 entries and it is highest entry. Four authors had 797, five authors had 321 while the corporate authors with 118 entries.

Research Question 6: State of availability of highest cited journal publication in Federal University of Technology Library, Minna.

Table 6: Shows the state of availability of highest cited journal publication in the library.

Journal	Available	Not Available
Journal of Education and Practice	√	
Journal of Science, Technology, Mathematics and Education	√	
IOSR Journal of Research &Method in Education		√
Eurasia Journal of Mathematics, Science and Technology Education		√
Computers and Education		√
International Journal of Instruction		√
American Journal Educational Research		√
African Journal Educational Research		√
Higher Education		√
American-Eurasia Journal of Science Research		√
Research in Science Education		√
World Journal of Education		√
Educational Research &Reviews	√	
Journal of Science Education		√

International Journal of Education &Evaluation		√
European Journal of Education		√
International Journal of Education & ICTs		√
Behavioral Sciences		√
International Journal of Education, Learning & Development		√
Journal of Classroom Interactions		√
International Journal of Instruction		√
Others		√
Total		

On the availability of highly cited journal publication in science education, Table 6 reveals the only two journals viz: Journal of Education and Practice, Journals of Science, Technology, Mathematics & Education, and Educational Research & Reviews were available in the library. The library is expected to stock the holding with relevant and most used information resources (journals inclusive) that would properly cater for the science education researchers, since journal article contains scientific features and recent discoveries on knowledge.

Discussion of Findings

Since educational researchers are exploring diverse methods and technological ways of enhancing learning outcomes, academic performance and achievement of students, the findings of this study presented development of instructional strategies as the most areas of specialization of researchers at this period under study. Contrastingly, ICTs competence and its learning outcome is one the least research area among Science education researchers. Priority should be given to this area in order to meet the global educational practice of infusing ICTs resources as it is obtainable in developed countries. Though, the distribution of subject focus under science education were satisfactorily covered, more researches are needed in some areas such as ICTs Competence and Learning outcome as well as Career development. This finding is similar to that of Aliyu (2015) who reported that Curriculum and Instruction were the most researched subject area while Educational psychology was the least researched subject focus among Doctoral researchers on education, University of Maiduguri, Nigeria.

It is essential for researchers to appropriately acknowledge and cite a substantial range of authorities and sources consulted during the course of their investigations, as references and acknowledgements constitute a key component of a well-structured research report, including theses. Citations remain a fundamental element of scholarly writing, as they clearly demonstrate the extent to which a study is grounded in, and connected to, prior publications and established knowledge. Thelwall (2010) argues that no research work exists in isolation; rather, it is necessarily embedded within the existing body of literature in its field. In this sense, citations serve not only as pointers to earlier studies but also as bibliographic indicators that provide detailed insight into the cited works, including authorship, titles, and intellectual contributions. Consequently, citations help to characterize and document the nature and features of the sources consulted in the process of conducting research work.

Based on the data collected above on prominence of cited publications journals were the most prominent publications cited, followed by books and others. This finding is in line with the findings of Kanpur (2023) and Iloka and Abifarin (2021) who stated that researchers make reference to more journal articles than other information sources while carrying out research. This is attributed to the fact that Journals contain latest information and published sequentially. Analyzing cited references would assist collection development experts to select preferred information resources for researchers in science education.

Based on the findings of this study, *Journal of Education and Practice* is the most cited journal publication, having the highest citation counts. Libraries and collection development experts should employ the findings of this study to acquire and develop their collections as it pertains to journals and periodicals. It is general and acceptable belief that journals are the best medium of communicating scientific breakthroughs in researches; hence libraries are expected to do well and bring in the highly used sources that fit in the user's information and research needs.

It is important that researchers appropriately acknowledge and cite relevant sources in their scholarly work. Regarding authorship patterns in cited references within science education, the study revealed that works produced by three authors occurred most frequently. This reflects an emerging trend in which collaborative research involving two or more authors is increasingly used to critically examine research problems and generate well-substantiated conclusions. In this context, such studies are often viewed as outcomes of collective scholarly effort, where research issues are jointly identified, analysed, and addressed through collaboration among multiple authors (Eclevia & Janio, 2016).

On the availability of highly cited journal publication in science education, Table 6 reveals that *Journal of Education and Practice, Journal of Science, Technology, Mathematics & Education, and Educational Research and Reviews* were available in the library. The library is expected to stock the holding with relevant and most used information resources

particularly journals that would properly cater for the science education researchers' information needs, since journal articles contain scientific feats and recent discoveries in knowledge.

Conclusion

Examining cited reference in theses are important and provides a leeway towards finding new trends in meeting the information needs of researchers in science education. The study analyzed master's degree theses in Science Education which explored bibliometric features of cited references within the body of the theses. These results yielded valuable insights on how science education researchers cite sources which can be used for library collection development.

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Challenges and Opportunities of Implementing Digital Library Services in Academic Libraries in Niger State

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Abstract

This study examined the challenges and opportunities of implementing digital library services in academic libraries in Niger State, Nigeria. Using a descriptive survey design, the research investigated 148 library staff from four universities in Niger State. A validated questionnaire with reliability coefficient of 0.84 was used for data collection, achieving a response rate of 91.7% (154 respondents). Findings revealed that 73.4% of respondents were aware of digital library services, with e-journals (81.2%) and institutional repositories (76.6%) being most implemented. Major challenges included inadequate funding (Mean = 3.42), poor internet connectivity (Mean = 3.38), insufficient ICT infrastructure (Mean = 3.35), and lack of technical expertise (Mean = 3.29). Significant opportunities identified were enhanced access to global information resources (Mean = 3.51), improved user satisfaction (Mean = 3.46), and increased research productivity (Mean = 3.44). Chi-square analysis revealed significant associations between institutional type and level of digital library implementation ($\chi^2 = 18.47$, $p < 0.05$). The study recommends increased budgetary allocation for digital infrastructure, comprehensive staff training programs, development of institutional digital library policies, and establishment of consortia for resource sharing to maximize opportunities while addressing implementation challenges.

Keywords: *Digital Library Services, Challenges and Opportunities, Implementing, Academic Libraries, Niger State, Nigeria*

Introduction

The digital transformation of academic libraries represents a fundamental shift in how information is organized, preserved, accessed, and disseminated in contemporary higher education institutions (Breeding, 2016). Digital library services encompass a wide array of technologically-enabled offerings including electronic resource management, institutional repositories, digital archives, online public access catalogs, remote access services, and virtual reference platforms that collectively enhance the capacity of academic libraries to fulfill their mission of supporting teaching, learning, and research (Chowdhury & Chowdhury, 2003). In developing countries, particularly in Sub-Saharan Africa, the implementation of digital library services presents both unprecedented opportunities for bridging the digital divide and formidable challenges related to infrastructure deficits, limited financial resources, inadequate technical expertise, and inconsistent policy frameworks (Dhanavandan & Tamizhchelvan, 2015). Nigerian academic libraries have progressively embraced digitalization initiatives over the past two decades, with varying degrees of success influenced by institutional priorities, available resources, leadership commitment, and external support from development partners and government agencies (Ani et al., 2016).

Niger State, located in the North Central geopolitical zone of Nigeria, hosts several universities with academic libraries at different stages of digital service implementation, ranging from basic automation to more sophisticated digital repository systems and electronic resource management platforms (Okpe et al., 2018). Understanding the specific challenges encountered and opportunities available in this geographical context is essential for developing evidence-based strategies that can accelerate digital library adoption while ensuring sustainability and maximizing impact on the academic community (Akpojotor, 2016). This empirical study systematically examines the current state of digital library service implementation in Niger State academic libraries, identifies key obstacles hindering progress, explores opportunities for advancement, and provides actionable recommendations for stakeholders including university administrators, library management, government agencies, and development partners committed to strengthening the digital information infrastructure in Nigerian higher education.

Literature Review

Conceptual Framework of Digital Library Services

Digital libraries represent organized collections of digital information resources combined with sophisticated technological infrastructure, metadata standards, user interfaces, and service models designed to facilitate discovery, access, use, and preservation of scholarly content (Arms, 2000). Okerson (2000) conceptualizes digital library services as encompassing three interconnected dimensions: content (digitized and born-digital

materials), technology (hardware, software, networks), and services (reference, instruction, access facilitation), all working synergistically to support the information needs of academic communities. In the African context, Mutula (2012) argues that digital libraries must be understood not merely as technological implementations but as socio-technical systems that require careful consideration of local contexts, user capabilities, organizational cultures, and sustainability mechanisms. Contemporary digital library services in academic institutions typically include electronic journals and databases, institutional repositories for research outputs, digital archives of unique collections, integrated library management systems, discovery tools, digital reference services, and mobile applications that extend library services beyond physical boundaries (Borgman, 2000). Thanuskodi (2012) emphasizes that successful digital library implementation requires alignment between technological capabilities and user needs, suggesting that services should be designed based on systematic assessment of user requirements, information-seeking behaviors, and institutional priorities rather than solely on technological possibilities.

Global Trends in Digital Library Implementation

The evolution of digital library services globally has been characterized by progressive sophistication, moving from simple digitization projects in the 1990s to comprehensive digital ecosystems integrating discovery, access, analytics, and preservation functions (Breeding, 2016). In developed countries, academic libraries have achieved substantial progress in digital service delivery, with institutions like the Massachusetts Institute of Technology, Oxford University, and Stanford University operating comprehensive digital library platforms that provide seamless access to millions of digital resources, sophisticated search capabilities, personalized user interfaces, and integration with research and learning management systems (Oguz & Andem, 2020). European universities have led in developing open access repositories and collaborative digital library networks, exemplified by initiatives such as Europeana and the Digital Library Federation, which demonstrate the power of consortia approaches to digital library development (Tedd, 2005). Asian countries, particularly China, India, Singapore, and Malaysia, have made remarkable investments in digital library infrastructure as part of broader national digitalization strategies, with government support, substantial funding allocations, and comprehensive training programs facilitating rapid adoption and scaling of digital services (Ramzan & Singh, 2010). In contrast, academic libraries in developing countries, particularly in Africa, face significant disparities in digital library development, with most institutions still grappling with foundational challenges of inadequate infrastructure, limited bandwidth, unstable electricity supply, insufficient funding, and shortage of technical personnel (Nwezeh, 2010).

Digital Library Implementation in Nigerian Academic Libraries

Nigerian academic libraries began serious engagement with digital library initiatives in the early 2000s, spurred by global trends toward electronic resource adoption, institutional pressures for modernization, and advocacy from professional associations such as the Nigerian Library Association (Echezona & Ugwuanyi, 2010). Adeniran (2013) documents that federal universities in Nigeria have generally progressed further in digital library implementation compared to state and private universities, attributed to relatively better funding, access to international donor support, and participation in consortia such as the Nigerian University Libraries Consortium (NULIB) which facilitates group subscriptions to electronic databases. Research by Ani and Ahiauzu (2008) revealed that while 78% of Nigerian university libraries had initiated some form of digital library services, implementation remained largely fragmented, with most institutions operating hybrid systems combining traditional print-based services with limited digital offerings rather than comprehensive digital library platforms. Challenges documented in Nigerian contexts include erratic power supply that disrupts digital services, limited internet bandwidth affecting access speeds and reliability, inadequate budgetary provisions for electronic resources and infrastructure maintenance, shortage of library staff with requisite ICT competencies, and absence of supportive institutional policies mandating digital content deposit and access (Ilo & Ifijeh, 2020). Despite these challenges, Nigerian academic libraries have recorded notable achievements including establishment of institutional repositories at major universities such as University of Nigeria Nsukka, Covenant University, and University of Ibadan, subscription to major electronic databases through NULIB, implementation of integrated library management systems such as Koha and Virtua, and development of digital archives preserving unique Nigerian content (Emezie & Nwaohiri, 2013).

Theoretical Frameworks for Understanding Digital Library Adoption

The Technology Acceptance Model (TAM), developed by Davis (1989), provides a theoretical lens for understanding factors influencing adoption of digital library services, positing that perceived usefulness and perceived ease of use are primary determinants of technology acceptance among users and implementers.

Okello-Obura and Kigongo-Bukenya (2011) applied TAM in East African academic libraries and found that librarians' intentions to adopt digital library systems were significantly influenced by their perceptions of how these technologies would enhance job performance and the extent to which they appeared easy to learn and operate. The Diffusion of Innovation Theory by Rogers (2003) offers another valuable framework, suggesting that adoption of digital library services follows predictable patterns influenced by innovation characteristics (relative advantage, compatibility, complexity, trial and error, observable characteristics, communication channels, time, and social system attributes. Mavodza and Ngulube (2011) utilized diffusion theory to explain varying rates of digital library adoption across Southern African universities, finding that institutions with strong leadership support, clear communication about benefits, and opportunities for staff to experiment with technologies achieved faster and more sustainable implementation. The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al. (2003), integrates elements from multiple models and identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as key predictors of technology adoption, moderated by factors such as age, gender, experience, and voluntariness of use. Quadri (2012) applied UTAUT to examine digital library acceptance among Nigerian university librarians and discovered that facilitating conditions (infrastructure, technical support) and performance expectancy (anticipated benefits) were more influential than social factors in predicting adoption intentions, suggesting that practical support and demonstrated value are critical for successful implementation in resource-constrained environments.

Challenges of Digital Library Implementation in Developing Countries

Academic libraries in developing countries encounter multifaceted challenges that impede effective digital library implementation, beginning with fundamental infrastructure deficits including unreliable electricity supply, limited internet connectivity, inadequate computing hardware, and insufficient server capacity to host and deliver digital content (Mutula, 2012). Funding constraints represent perhaps the most pervasive challenge, as digital library development requires substantial initial capital investments for hardware, software, digitization equipment, and electronic resource subscriptions, coupled with ongoing operational costs for bandwidth, system maintenance, staff training, and content licensing that strain the limited budgets of academic institutions in developing economies (Nwezeh, 2010). Human resource challenges manifest in multiple dimensions: insufficient numbers of library staff overall, shortage of personnel with specialized ICT skills required for digital library management, limited opportunities for professional development and training, and brain drain as skilled professionals migrate to better-paying opportunities in the private sector or abroad (Ani et al., 2016).

Technological challenges include rapid obsolescence of hardware and software requiring frequent upgrades, compatibility issues between different systems and standards, inadequate technical support from vendors operating primarily in developed countries, and security vulnerabilities that expose digital library systems to cyber threats and data loss (Akpojotor, 2016). Organizational and cultural barriers include resistance to change among library staff accustomed to traditional practices, inadequate management support for digital initiatives, absence of institutional policies governing digital content creation and access, weak collaboration between libraries and IT departments, and insufficient user awareness and training to effectively utilize available digital services (Okpe et al., 2018).

Opportunities Presented by Digital Library Services

Despite significant challenges, digital library services offer transformative opportunities for academic libraries in developing countries to overcome traditional limitations and enhance their service delivery (Thanuskodi, 2012). Enhanced access to information represents the primary opportunity, as digital libraries eliminate geographical and temporal barriers to information access, enabling users to retrieve scholarly resources 24/7 from any location with internet connectivity, thereby supporting distance education programs and addressing the perennial problem of limited physical collections in African university libraries (Tella et al., 2009). Improved resource sharing and collaboration become possible through digital platforms, as libraries can participate in consortia, share digital collections, engage in cooperative cataloging, and provide users with access to vastly larger collections than any single institution could afford independently (Okiy, 2010). Digital preservation capabilities offer opportunities to safeguard unique African content including theses, dissertations, grey literature, indigenous knowledge, and cultural heritage materials that are often at risk of deterioration or loss in physical formats, while simultaneously increasing their visibility and accessibility to global researchers (Ukachi, 2013).

Enhanced service delivery opportunities include provision of personalized services based on user profiles and usage analytics, integration with learning management systems to embed library resources directly into courses, development of mobile applications extending library services to smartphone users, and implementation of virtual reference services providing expert assistance remotely (Iroaganachi et al., 2015). Research productivity and visibility gains constitute another significant opportunity, as institutional repositories enable academic libraries to collect, preserve, and showcase their institutions' research outputs, increasing citation rates and institutional rankings while supporting open access mandates from funding agencies (Bamigbola, 2014). Operational efficiency improvements include streamlined workflows through automation, reduced space requirements for physical collections allowing reallocation to user-centered spaces, better inventory management through RFID technology, and data-driven decision making enabled by usage statistics and analytics tools embedded in digital library platforms (Owolabi et al., 2016).

Digital Library Development in Niger State Context

Niger State academic libraries operate within a unique context characterized by relative infrastructural development compared to some northern Nigerian states but still facing substantial challenges typical of the broader Nigerian academic library system (Okpe et al., 2018). Federal University of Technology, Minna, as the oldest university in the state established in 1983, has led in digital library initiatives with early adoption of library automation systems, subscription to electronic databases through NULIB, and establishment of an institutional repository, though sustainability challenges have periodically disrupted services (Bello & Amusa, 2020). Ibrahim Badamasi Babangida University, Lapai, established in 2005, has made progressive efforts toward digital service provision including automation of library operations and development of digital collections, though limited by funding constraints and technical staff shortages (Abdullahi & Mohammed, 2016). State-owned institutions such as Federal University of Education, Kontagora, face additional challenges related to inconsistent government funding and lower resource allocations compared to federal institutions, resulting in slower progress in digital library implementation and greater reliance on open-source solutions (Adekunmisi et al., 2015).

The overall digital library landscape in Niger State reflects a transitional stage where basic automation and limited digital services exist alongside traditional operations, with significant variation across institutions in terms of available resources, staff competencies, management commitment, and strategic planning for digital transformation (Akpojotor, 2016). Understanding the specific challenges and opportunities within this context requires empirical investigation that captures the experiences, perceptions, and recommendations of library professionals working directly with digital library implementation efforts in these institutions, which this study seeks to provide through systematic data collection and analysis.

Statement of the Problem

Academic libraries in Niger State universities are at critical junctures in their digital transformation journeys, facing pressures to modernize services and provide digital access to information resources while simultaneously confronting substantial infrastructural, financial, technical, and organizational challenges that complicate implementation efforts (Okpe et al., 2018). While anecdotal evidence and isolated reports suggest that these libraries have initiated various digital library services including automation systems, electronic resource subscriptions, and institutional repositories, comprehensive empirical data on the extent of implementation, specific challenges encountered, available opportunities, and factors influencing success or failure remain limited (Akpojotor, 2016). This knowledge gap creates difficulties for library administrators seeking to develop evidence-based strategic plans, university management making resource allocation decisions, professional associations designing training interventions, and policymakers formulating supportive frameworks for digital library development in the region (Ani et al., 2016). Furthermore, without systematic documentation of current implementation status, identification of critical success factors, and understanding of contextual opportunities that could be leveraged, efforts to advance digital library services may be inefficient, misdirected, or unsustainable, potentially resulting in wasted investments and missed opportunities to enhance library services and support institutional academic missions (Nwezeh, 2010).

The absence of empirical evidence specifically focused on Niger State academic libraries means that these institutions may be implementing digital services without adequate understanding of what works in their specific context, which challenges are most critical to address, what opportunities are most feasible to pursue, and how their experiences compare with broader national and international trends (Okello-Obura & Kigongo-Bukenya, 2011). This study addresses this critical gap by providing comprehensive empirical data on the challenges and opportunities of implementing digital library services in academic libraries in Niger State,

thereby contributing evidence that can inform policy development, resource allocation, strategic planning, professional development initiatives, and collaborative efforts aimed at strengthening digital library infrastructure and services to better serve the academic communities in the region.

Objectives of the Study

The study was guided by the following specific objectives:

1. To assess the current level of digital library service implementation in academic libraries in Niger State universities.
2. To identify the challenges hindering effective implementation of digital library services in academic libraries in Niger State universities.
3. To examine the opportunities available for advancing digital library services in academic libraries in Niger State universities.

Methodology

Research Design

This study adopted a descriptive survey research design to examine the challenges and opportunities of implementing digital library services in academic libraries in Niger State universities. The descriptive survey design was deemed appropriate because it enabled the researcher to systematically collect quantitative data on current implementation status, challenges faced, opportunities available, and perceptions of library staff regarding digital library services from a representative sample of the study population (Creswell & Creswell, 2018). This research design has been extensively utilized in library and information science research for investigating professional practices, service delivery patterns, and technology adoption in academic library settings (Pickard, 2013).

Population and Sample

The target population for this study comprised all library staff (professional librarians, paraprofessionals, and library assistants) working in the four main universities in Niger State, Nigeria: Federal University of Technology, Minna; Ibrahim Badamasi Babangida University, Lapai; Federal University of Education, Kontagora; and Abdulkadir Kure University, Minna. According to personnel records obtained from the respective university libraries as of November 2024, the total population was 196 library staff members across all categories and ranks. Using Taro Yamane's formula for determining sample size at 95% confidence level and 0.05 margin of error, a sample size of 168 was calculated, representing 85.7% of the total population (Yamane, 1967). A stratified proportionate random sampling technique was employed to ensure adequate representation from each institution based on their respective staff sizes: Federal University of Technology, Minna (68 respondents), Ibrahim Badamasi Babangida University, Lapai (42 respondents), Federal University of Education, Kontagora (38 respondents), and Abdulkadir Kure University, Minna (20 respondents).

Instrument for Data Collection

A structured questionnaire titled "Digital Library Implementation Assessment Questionnaire (DLIAQ)" was developed specifically for this study. The questionnaire consisted of six sections: Section A gathered demographic data including institution, staff category, years of experience, educational qualification, and ICT training background; Section B assessed awareness and current implementation status of various digital library services using a checklist and 4-point Likert scale (Fully Implemented = 4, Partially Implemented = 3, Planned but Not Implemented = 2, Not Planned = 1); Section C examined challenges to digital library implementation using a 4-point scale (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1); Section D explored opportunities for digital library advancement using a similar 4-point scale; Section E assessed staff competencies in digital library technologies; and Section F solicited open-ended suggestions for improving digital library services. The instrument was designed to be comprehensive yet concise, requiring approximately 20-25 minutes for completion to encourage high response rates.

Data collected were coded, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 27.0. Descriptive statistics including frequencies, percentages, means, and standard deviations were computed to summarize demographic characteristics, implementation levels, challenges, and opportunities. Mean scores were interpreted using the following criterion: 3.50-4.00 = Very High/Strongly Agree; 2.50-3.49 = High/Agree; 1.50-2.49 = Low/Disagree; 1.00-1.49 = Very Low/Strongly Disagree (Nworgu, 2015). Chi-square test of independence was used to examine associations between categorical variables such as institutional type, staff category, and level of digital library implementation at 0.05 significance level. One-

way Analysis of Variance (ANOVA) was employed to test for significant differences in perceptions of challenges and opportunities across different institutions and staff categories, with post-hoc tests conducted where significant F-values were obtained (Pallant, 2020). Qualitative data from open-ended questions were analyzed thematically to identify recurring themes and representative quotations that enriched the quantitative findings.

Results and Discussion

Demographic Characteristics of Respondents

The analysis of demographic data revealed that Federal University of Technology, Minna, contributed the largest number of respondents (63, 40.9%), followed by Ibrahim Badamasi Babangida University, Lapai (39, 25.3%), Federal University of Education, Kontagora (34, 22.1%), and Abdulkadir Kure University, Minna (18, 11.7%), reflecting the proportionate stratified sampling strategy employed. Regarding staff category, professional librarians constituted 52.6% (81 respondents), paraprofessionals 31.8% (49 respondents), and library assistants 15.6% (24 respondents), indicating that the majority of respondents possessed professional qualifications relevant to digital library management (Emezie & Nwaohiri, 2013). Years of experience showed that 35.7% had 6-10 years of experience, 28.6% had 1-5 years, 22.1% had 11-15 years, and 13.6% had over 15 years, suggesting a workforce with moderate to substantial professional maturity. Educational qualifications revealed that 48.7% held master's degrees in library and information science, 33.1% possessed bachelor's degrees, 11.0% had diploma qualifications, and 7.2% held doctoral degrees, aligning with qualification structures typical of Nigerian university libraries (Nwachukwu et al., 2020). Regarding ICT training, 67.5% reported having attended at least one formal training program on digital library technologies, while 32.5% had no formal ICT training beyond their academic programs, highlighting a training gap that could affect implementation effectiveness. Gender distribution showed 58.4% male and 41.6% female respondents, reflecting the male dominance observed in Nigerian academic librarianship generally (Quadri & Adetimirin, 2015).

Research Question 1: Current Level of Digital Library Service Implementation

Table 1: Level of Digital Library Service Implementation (N=145)

Digital Library Service	Fully Implemented	Partially Implemented	Planned Not Implemented	Not Planned	Mean	SD	Remark
Integrated library management system (ILMS)	42 (27.3%)	76 (49.4%)	24 (15.6%)	12 (7.8%)	2.96	0.87	High
Electronic journals/databases	51 (33.1%)	74 (48.1%)	19 (12.3%)	10 (6.5%)	3.08	0.84	High
Institutional repository	38 (24.7%)	80 (51.9%)	26 (16.9%)	10 (6.5%)	2.95	0.82	High
Digital reference services	22 (14.3%)	58 (37.7%)	48 (31.2%)	26 (16.9%)	2.49	0.95	Low
Online public access catalog (OPAC)	48 (31.2%)	71 (46.1%)	23 (14.9%)	12 (7.8%)	3.01	0.88	High
Digital archives/special collections	18 (11.7%)	52 (33.8%)	56 (36.4%)	28 (18.2%)	2.39	0.92	Low
Mobile library applications	12 (7.8%)	38 (24.7%)	62 (40.3%)	42 (27.3%)	2.13	0.92	Low
Virtual/chat reference services	8 (5.2%)	32 (20.8%)	58 (37.7%)	56 (36.4%)	1.95	0.90	Low
E-learning integration	26 (16.9%)	64 (41.6%)	42 (27.3%)	22 (14.3%)	2.61	0.94	High
Digital preservation systems	14 (9.1%)	44 (28.6%)	58 (37.7%)	38 (24.7%)	2.22	0.93	Low

Overall Implementation Level					2.58	0.72	High

Table 1 presents the current level of digital library service implementation across academic libraries in Niger State universities. The overall mean implementation score of 2.58 (SD = 0.72) indicates a high but not optimal level of implementation, suggesting that while digital library services have been adopted, most remain in partial rather than full implementation stages. Electronic journals/databases recorded the highest implementation level (Mean = 3.08, SD = 0.84), which aligns with findings by Adeniran (2013) that subscription to electronic resources through consortia like NULIB has been the most successful digital library initiative in Nigerian universities due to cost-sharing benefits and vendor support. Online public access catalog (Mean = 3.01) and integrated library management systems (Mean = 2.96) also showed high implementation levels, reflecting the foundational nature of these services and their prioritization in library automation efforts, consistent with observations by Emezie and Nwaohiri (2013) that automation of core library processes typically precedes more advanced digital services. Institutional repositories showed high but incomplete implementation (Mean = 2.95), with 51.9% of respondents indicating partial implementation, suggesting that while many institutions have established repositories, challenges related to content recruitment, sustainability, and full operational capacity remain, as documented by Bamigbola (2014) in Nigerian contexts. Conversely, virtual/chat reference services (Mean = 1.95), mobile library applications (Mean = 2.13), and digital preservation systems (Mean = 2.22) showed low implementation levels, indicating that these more advanced services have not yet been prioritized or have been constrained by technical and resource limitations (Thanuskodi, 2012). The findings reveal a pattern of selective implementation where basic automation and access to external electronic resources have progressed relatively well, while locally-generated digital services and user-centered innovations remain underdeveloped.

Research Question 2: Challenges Hindering Digital Library Implementation

Table 2: Challenges Hindering Digital Library Implementation (N=145)

Challenge	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Remark
Inadequate funding for digital infrastructure	84 (54.5%)	52 (33.8%)	12 (7.8%)	6 (3.9%)	3.42	0.79	Agree
Poor internet connectivity and bandwidth	78 (50.6%)	58 (37.7%)	14 (9.1%)	4 (2.6%)	3.38	0.74	Agree
Insufficient ICT infrastructure	76 (49.4%)	56 (36.4%)	16 (10.4%)	6 (3.9%)	3.35	0.79	Agree
Lack of technical expertise among staff	68 (44.2%)	62 (40.3%)	18 (11.7%)	6 (3.9%)	3.29	0.80	Agree
Erratic power supply	72 (46.8%)	56 (36.4%)	20 (13.0%)	6 (3.9%)	3.28	0.82	Agree
High cost of proprietary software	62 (40.3%)	68 (44.2%)	18 (11.7%)	6 (3.9%)	3.25	0.78	Agree
Inadequate training opportunities	58 (37.7%)	72 (46.8%)	18 (11.7%)	6 (3.9%)	3.22	0.77	Agree
Insufficient management support	52 (33.8%)	68 (44.2%)	26 (16.9%)	8 (5.2%)	3.12	0.84	Agree
Resistance to change among staff	46 (29.9%)	72 (46.8%)	28 (18.2%)	8 (5.2%)	3.05	0.83	Agree
Lack of institutional digital library policy	48 (31.2%)	68 (44.2%)	30 (19.5%)	8 (5.2%)	3.04	0.84	Agree
Low user awareness and digital literacy	44 (28.6%)	76 (49.4%)	26 (16.9%)	8 (5.2%)	3.03	0.81	Agree
Rapid technological obsolescence	42 (27.3%)	72 (46.8%)	32 (20.8%)	8 (5.2%)	2.99	0.83	Agree

Security and privacy concerns	38 (24.7%)	74 (48.1%)	32 (20.8%)	10 (6.5%)	2.95	0.84	Agree
Limited collaboration among libraries	36 (23.4%)	76 (49.4%)	34 (22.1%)	8 (5.2%)	2.94	0.81	Agree
Overall Mean					3.17	0.68	Agree

Table 2 reveals the challenges hindering effective implementation of digital library services in Niger State academic libraries, with an overall mean of 3.17 (SD = 0.68) indicating strong agreement that these factors constitute significant barriers. Inadequate funding emerged as the most critical challenge (Mean = 3.42, SD = 0.79), with 88.3% of respondents agreeing or strongly agreeing, which corroborates extensive literature documenting financial constraints as the primary impediment to digital library development in African contexts (Nwezeh, 2010; Mutula, 2012). Poor internet connectivity and bandwidth (Mean = 3.38) ranked second, reflecting Nigeria's broader digital infrastructure deficits where internet penetration remains low and connection speeds often inadequate for accessing bandwidth-intensive databases, as documented by Ani et al. (2016) in their study of Nigerian university libraries.

Insufficient ICT infrastructure (Mean = 3.35) encompasses hardware deficits including inadequate computer workstations, servers, digitization equipment, and networking infrastructure, representing substantial capital investments beyond the capacity of most libraries' budgets (Akpojotor, 2016). The lack of technical expertise (Mean = 3.29) highlights human resource challenges, as many library staff lack specialized skills in systems administration, database management, and digital preservation required for sophisticated digital library operations, consistent with findings by Okello-Obura and Kigongo-Bukenya (2011). Organizational and cultural challenges including insufficient management support (Mean = 3.12), resistance to change (Mean = 3.05), and lack of institutional policies (Mean = 3.04) suggest that successful digital library implementation requires addressing human and organizational dimensions through change management strategies and policy frameworks (Okpe et al., 2018).

Research Question 3: Opportunities for Advancing Digital Library Services

Table 3: Opportunities for Advancing Digital Library Services (N=145)

Opportunity	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD	Remark
Enhanced access to global information resources	88 (57.1%)	54 (35.1%)	8 (5.2%)	4 (2.6%)	3.51	0.71	Strongly Agree
Improved user satisfaction and experience	82 (53.2%)	58 (37.7%)	10 (6.5%)	4 (2.6%)	3.46	0.73	Agree
Increased research productivity	78 (50.6%)	62 (40.3%)	10 (6.5%)	4 (2.6%)	3.44	0.72	Agree
24/7 access to library resources	76 (49.4%)	64 (41.6%)	10 (6.5%)	4 (2.6%)	3.42	0.71	Agree
Support for distance learning programs	74 (48.1%)	62 (40.3%)	14 (9.1%)	4 (2.6%)	3.38	0.74	Agree
Resource sharing through consortia	72 (46.8%)	60 (39.0%)	18 (11.7%)	4 (2.6%)	3.33	0.76	Agree
Preservation of unique local content	66 (42.9%)	68 (44.2%)	16 (10.4%)	4 (2.6%)	3.31	0.74	Agree
Cost savings on print materials	64 (41.6%)	66 (42.9%)	18 (11.7%)	6 (3.9%)	3.27	0.79	Agree
Enhanced institutional visibility	62 (40.3%)	68 (44.2%)	18 (11.7%)	6 (3.9%)	3.25	0.78	Agree
Improved workflow efficiency	58 (37.7%)	72 (46.8%)	18 (11.7%)	6 (3.9%)	3.23	0.78	Agree

Overall Mean					3.32	0.66	Agree

Table 3 presents opportunities available for advancing digital library services in Niger State academic libraries, with an overall mean of 3.32 (SD = 0.66) indicating strong agreement that digital libraries offer substantial benefits. Enhanced access to global information resources emerged as the most recognized opportunity (Mean = 3.51, SD = 0.71), with 92.2% agreement, reflecting the core value proposition of digital libraries in eliminating geographical barriers and providing access to international scholarly content (Tella et al., 2009). Improved user satisfaction (Mean = 3.46) and increased research productivity (Mean = 3.44) demonstrate recognition that digital library services directly support institutional missions by facilitating more efficient information discovery and utilization (Thanuskodi, 2012).

The opportunity for 24/7 access (Mean = 3.42) represents a fundamental advantage of digital libraries, enabling users to retrieve resources at anytime from any location with internet connectivity (Breeding, 2016). Resource sharing through consortia (Mean = 3.33) offers opportunities for libraries to pool resources and provide access to larger collections than individual institutions could afford independently, a strategy successfully employed by NULIB in Nigeria (Okiy, 2010). Preservation of unique local content (Mean = 3.31) represents a significant opportunity where institutional repositories can safeguard theses, dissertations, and cultural heritage materials while increasing their visibility to global researchers (Bamigbola, 2014).

Additional Analysis: Association between Institutional Type and Implementation Level

Table 4: Chi-Square Test of Association between Institution Type and Digital Library Implementation Level (N=154)

Institution	**High Implementation (≥2.50)**	**Low Implementation (<2.50)**	**Total**	**χ^2**	**df**	**p-value**
Federal University of Technology, Minna	46 (73.0%)	17 (27.0%)	63	18.47	3	0.001**
Ibrahim Badamasi Babangida University, Lapai	27 (69.2%)	12 (30.8%)	39			
Federal University of Education, Kontagora	16 (47.1%)	18 (52.9%)	34			
Abdulkadir Kure University, Minna	8 (44.4%)	10 (55.6%)	18			
Total	97 (63.0%)	57 (37.0%)	154			

**$p < 0.01$

Table 4 presents the chi-square analysis examining the association between institutional type and level of digital library implementation. The results reveal a statistically significant relationship ($\chi^2 = 18.47$, df = 3, $p < 0.01$), indicating that digital library implementation levels vary significantly across the four universities in Niger State. Federal University of Technology, Minna, showed the highest proportion of high implementation (73.0%), followed by Ibrahim Badamasi Babangida University, Lapai (69.2%), while state-owned institutions demonstrated lower implementation levels. This pattern aligns with findings by Adeniran (2013) that federal universities in Nigeria generally achieve better digital library implementation compared to state institutions, attributed to more stable and higher funding allocations, better infrastructure, and access to consortium benefits. These findings suggest that targeted interventions and support may be needed for state universities to achieve parity in digital library service delivery (Echezona & Ugwuanyi, 2010).

Summary of Findings

The study revealed that digital library services in Niger State academic libraries are at a moderate implementation level (Mean = 2.58), with basic services such as electronic journals/databases (Mean = 3.08), online public access catalogs (Mean = 3.01), and integrated library management systems (Mean = 2.96) showing higher adoption than advanced services like virtual reference (Mean = 1.95) and mobile applications (Mean = 2.13). The demographic analysis indicated that 52.6% of respondents were professional librarians,

48.7% held master's degrees, and 67.5% had received formal ICT training, suggesting a reasonably qualified workforce with capacity-building needs in specialized digital library competencies.

The most critical challenges identified were inadequate funding (Mean = 3.42), poor internet connectivity (Mean = 3.38), insufficient ICT infrastructure (Mean = 3.35), lack of technical expertise (Mean = 3.29), and erratic power supply (Mean = 3.28), with an overall challenge mean of 3.17 indicating strong agreement on these barriers. Significant opportunities recognized included enhanced access to global information resources (Mean = 3.51), improved user satisfaction (Mean = 3.46), increased research productivity (Mean = 3.44), 24/7 access (Mean = 3.42), and resource sharing through consortia (Mean = 3.33), with an overall opportunity mean of 3.32. Chi-square analysis revealed significant associations between institutional type and implementation levels ($\chi^2 = 18.47$, $p < 0.01$), with federal universities achieving higher implementation compared to state institutions, reflecting resource disparities in Nigerian higher education.

Conclusion

This study has provided comprehensive empirical evidence on the challenges and opportunities of implementing digital library services in academic libraries in Niger State universities. The findings reveal a transitional implementation stage where basic automation and access to external resources have progressed moderately, while advanced user-centered services remain underdeveloped. The identification of inadequate funding, poor connectivity, infrastructure deficits, and technical capacity gaps as primary challenges underscores the need for increased investment and innovative resource mobilization approaches. The strong recognition of opportunities demonstrates awareness among library staff of digital library benefits and provides motivation for advancement despite significant barriers. Successful digital library implementation requires holistic strategies addressing technology, infrastructure, human capacity, organizational culture, supportive policies, and collaborative arrangements simultaneously.

Recommendations

Based on the findings and aligned with the research objectives, the following recommendations are made:

1. University administrations should increase budgetary allocations specifically for digital library infrastructure including servers, bandwidth upgrades, digitization equipment, and backup power systems. Libraries should explore alternative funding through donor support and grant programs while adopting cost-effective open-source platforms to reduce dependence on expensive proprietary software. This addresses the moderate implementation level and provides resources to move services from partial to full implementation.

2. Library management should establish comprehensive professional development programs providing practical training in systems administration, database management, and digital preservation. Institutions should develop change management strategies and invest in reliable internet infrastructure and alternative power solutions. These interventions directly tackle identified challenges of inadequate technical expertise, insufficient training, poor connectivity, and erratic power supply.

3. Universities should formulate institutional digital library policies mandating research output deposits and establishing quality standards. State governments should increase funding to state universities to reduce disparities, while libraries should pursue collaborative arrangements through consortia participation and resource-sharing agreements. These strategic interventions maximize identified opportunities of enhanced access, improved satisfaction, and resource sharing while addressing policy gaps and limited collaboration challenges.

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Challenges in Accessing Electronic Health Information Resources in Nigerian Medical Libraries: A Case Study of Nnamdi Azikiwe Teaching Hospital, Nnewi.

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Abstract

This study examined the challenges in accessing electronic health information resources in Nigerian medical libraries, using Nnamdi Azikiwe Teaching Hospital (NAUTH) as a case study. The study adopted a descriptive survey research design. The study was covered with two specific objectives to- examine the extent to which electronic health information resources are accessed and utilized by users in the hospital and to investigate the challenges faced by users in accessing electronic health information resources in the medical library. The population comprised 1,200 healthcare professionals, including medical librarians, doctors, nurses, and other allied health personnel who utilize the medical library. A sample size of 300 respondents was selected using stratified, proportionate, and simple random sampling techniques. Data were collected using a structured questionnaire and analyzed using frequency counts, percentages. The findings revealed that electronic health information resources such as e-journals, online databases, and e-books are available in the medical library; however, they are not adequate to meet users' needs. The major challenges identified to be the hindrances include poor internet connectivity, erratic power supply, inadequate ICT infrastructure, limited subscription to electronic databases, lack of user training, high cost of access, and insufficient technical support. More so, the study revealed a gap between the availability of electronic resources and their effective utilization. Respondents strongly agreed on several strategies for improving access, including increased funding, improved ICT infrastructure, reliable internet connectivity, regular training for users, enhanced awareness programs, and the development of flexible access policies. The study concludes that although electronic health information resources are available, significant infrastructural, financial, and technical barriers hinder effective access and utilization. It recommends increased institutional investment in ICT infrastructure, improved funding for electronic resource subscriptions, continuous user training, and supportive policy frameworks to enhance access and promote evidence-based healthcare practice in Nigerian teaching hospitals.

Keywords: Electronic Health Information Resources; Medical Libraries; Access Challenges; Healthcare Information Services; Nigerian Teaching Hospitals.

Introduction

Access to reliable and up-to-date health information is a fundamental requirement for effective healthcare delivery, research advancement, and evidence-based clinical decision-making. In the digital age, electronic health information resources—such as online databases, e-journals, institutional repositories, and clinical decision support systems—have become indispensable tools in modern medical practice (Adeleke&Nwalo, 2017). These resources provide healthcare professionals with timely access to current medical knowledge, thereby enhancing the quality of patient care and supporting continuous professional development.

Medical libraries, particularly in teaching hospitals, serve as critical hubs for the acquisition, organization, and dissemination of these electronic resources. In Nigeria, institutions such as Nnamdi Azikiwe University Teaching Hospital play a vital role in supporting healthcare practitioners, including doctors, nurses, and allied health professionals, by facilitating access to essential medical information. However, despite the recognized importance of electronic health information resources, their accessibility and utilization remain a significant challenge in many Nigerian medical libraries (Ojo & Akande, 2019).

Several studies have highlighted that developing countries, including Nigeria, face persistent barriers in the effective deployment and use of electronic information systems in healthcare settings. These challenges often stem from inadequate information and communication technology (ICT) infrastructure, unreliable internet connectivity, and insufficient funding for resource acquisition and maintenance (Oladokun, 2015). Furthermore, limited subscription to

relevant medical databases restricts the scope of information available to users, thereby constraining research output and clinical efficiency.

In addition to infrastructural constraints, human factors also play a critical role in limiting access to electronic health information resources. Studies have shown that low levels of information literacy and inadequate user training significantly hinder the effective utilization of digital resources among healthcare professionals (Aina, 2014). Many users are either unaware of the available electronic resources or lack the necessary skills to navigate and retrieve relevant information efficiently. This situation is further exacerbated by restrictive access policies and poor awareness strategies within medical libraries.

The implications of these challenges are far-reaching. Limited access to electronic health information resources can negatively affect healthcare delivery by reducing the ability of practitioners to make informed clinical decisions based on current evidence. It also hampers research productivity and innovation within the medical community, ultimately impacting the overall quality of healthcare services (Ezeani & Ezema, 2011). In teaching hospitals, where research and training are integral components of healthcare provision, these limitations pose a serious threat to academic and professional excellence.

Given these concerns, there is a pressing need to systematically examine the specific challenges associated with accessing electronic health information resources in Nigerian medical libraries. This study focuses on Nnamdi Azikiwe Teaching Hospital as a case study, aiming to provide empirical insights into the barriers faced by users and the implications for healthcare delivery and research. By identifying these challenges, the study seeks to contribute to the development of strategic interventions that will enhance access to electronic resources, strengthen medical library services, and promote evidence-based healthcare practices in Nigeria.

Ultimately, improving access to electronic health information resources requires a comprehensive approach involving adequate ICT infrastructure, sustainable funding for electronic resource acquisition, continuous information literacy training, and supportive institutional policies (IFLA, 2021; World Health Organization, 2021). Such interventions are essential for enhancing the accessibility, utilization, and effectiveness of electronic health information resources and for ensuring that medical libraries continue to support evidence-based healthcare delivery and professional practice in the twenty-first century (Aina, 2014; UNESCO, 2020).

Statement of the Problem

The integration of electronic health information resources into medical library services has transformed the way healthcare professionals access, retrieve, and apply information in clinical practice, research, and education. These resources are expected to enhance evidence-based medical practice by providing timely and accurate information for diagnosis, treatment, and patient care. However, despite the increasing availability of digital information systems, effective access to electronic health information resources remains a major challenge in many Nigerian medical libraries, including the medical library of Nnamdi Azikiwe Teaching Hospital. In an ideal healthcare environment, medical professionals such as doctors, nurses, and allied health workers should have seamless access to relevant and up-to-date electronic resources to support clinical decision-making and research activities. Unfortunately, in many Nigerian teaching hospitals, access to these resources is often constrained by a number of persistent challenges. These include inadequate information and communication technology (ICT) infrastructure, erratic power supply, poor and unreliable internet connectivity, and limited institutional funding for the acquisition and subscription of relevant electronic databases. As a result, many healthcare professionals are unable to fully utilize available electronic resources, thereby limiting their capacity to deliver high-quality healthcare services. More so, low levels of awareness and insufficient user training contribute significantly to the problem. Many users are either unaware of the existence of certain electronic health information resources or lack the necessary information literacy skills required to effectively search, retrieve, and evaluate digital information. This situation is compounded by restrictive access policies and inadequate user support services within medical libraries, which further hinder effective utilization. The consequences of these challenges are far-reaching. Limited access to electronic health information resources can lead to reliance on outdated or incomplete information, which may negatively impact clinical decision-making and patient outcomes. It also reduces research productivity among healthcare professionals and limits opportunities for continuous professional development. In teaching hospitals, where training and research are core mandates, such limitations undermine the institution's ability to achieve academic excellence and deliver quality healthcare services. Despite the critical importance of electronic health information resources, there is still a gap in empirical studies that comprehensively examine the specific access challenges faced by users in Nigerian medical libraries, particularly in the context of Nnamdi Azikiwe Teaching Hospital. This gap makes it difficult for hospital administrators, librarians, and policymakers to develop targeted interventions that address these challenges effectively. It is against this backdrop that this study seeks to investigate the challenges associated with accessing electronic health information resources in the medical library of Nnamdi Azikiwe Teaching Hospital. By identifying the nature and extent of these challenges, the study aims to provide evidence-based recommendations that will improve access to electronic resources, enhance medical library services, and ultimately support better healthcare delivery and research outcomes in Nigerian teaching hospitals.

Objective of the study

The following specific objectives guided the study:

1. Examine the extent to which electronic health information resources are accessed and utilized by users in the hospital;
2. Investigate the challenges faced by users in accessing electronic health information resources in the medical library;

Research Questions

1. To what extent are electronic health information resources accessed and utilized by users in Nnamdi Azikiwe Teaching Hospital?
2. What challenges do users face in accessing electronic health information resources in the medical library of Nnamdi Azikiwe Teaching Hospital?

Review of Related Literature

The literature on access to electronic health information resources in medical libraries has expanded significantly due to the increasing adoption of digital technologies in healthcare systems. This review examines existing studies under relevant themes such as availability of electronic resources, accessibility and utilization, challenges of access, and implications for healthcare delivery, with particular reference to Nigerian medical libraries.

Accessibility and Utilization of Electronic Health Information Resources

Accessibility to electronic health information resources is a critical factor in supporting evidence-based healthcare practice and informed clinical decision-making. Electronic health information resources include online databases, electronic journals, e-books, institutional repositories, and other digital information sources that provide healthcare professionals with current and reliable medical information. The extent to which these resources are accessed and utilized depends on their availability, ease of access, user awareness, and the technological infrastructure supporting their use.

Studies have shown that access to electronic health information resources has improved healthcare delivery by enabling medical practitioners to obtain current and evidence-based information for patient care. According to Ogwo and Nwachukwu (2018), the availability of electronic resources in selected Nigerian medical libraries remains relatively low when compared to international standards, thereby limiting access among users. However, where such resources are available, healthcare professionals increasingly rely on them for research, diagnosis, treatment decisions, and professional development.

Research by Popoola, Uzoagba, and Rabiu (2020) revealed that although electronic resources were available in some medical libraries, their utilization varied considerably among users. The study attributed differences in utilization levels to factors such as awareness, accessibility, computer literacy, and institutional support. Similarly, healthcare professionals who possess adequate information literacy skills tend to utilize electronic resources more effectively than those with limited digital competencies.

More so, Ikolo et al. (2025) observed that medical libraries in Nigeria have increasingly incorporated electronic resources and internet-based services into their collections. These resources provide users with opportunities to access current medical literature, clinical guidelines, and research findings regardless of geographical location. Nevertheless, accessibility remains dependent on the adequacy of technological facilities and users' ability to navigate digital information systems effectively. The literature therefore suggests that while electronic health information resources are increasingly available in medical libraries, the extent of access and utilization varies among users and institutions. Factors such as awareness, digital literacy, availability of resources, and institutional support significantly influence the level of utilization.

Challenges in Accessing Electronic Health Information Resources

Irrespective of the growing importance of electronic health information resources, users continue to encounter numerous barriers in accessing and utilizing them effectively. These challenges can be categorized into infrastructural, financial, technical, and organizational factors.

- **Infrastructural Challenges**

  Inadequate ICT infrastructure, poor internet connectivity, and unreliable power supply are among the most frequently reported barriers to access. Studies indicate that unstable electricity supply and limited internet bandwidth significantly reduce users' ability to access electronic resources efficiently (Ogwo & Nwachukwu, 2018). These challenges are particularly prevalent in developing countries where technological infrastructure remains inadequate.

- **Financial Constraints**

  Limited funding continues to affect the acquisition and sustainability of electronic health information resources. Anyaoku (2013) identified inadequate funding as a major challenge confronting the development of hybrid

libraries in Nigeria. High subscription costs for electronic databases and journals often prevent medical libraries from providing comprehensive access to essential health information resources. Similarly, Ikolo et al. (2025) reported that financial constraints limit the acquisition of both physical and electronic resources in hospital libraries.

- **Technical and Skill-Related Challenges**

  The effective use of electronic resources requires adequate ICT and information literacy skills. However, many users lack the necessary competencies to navigate electronic databases and online information systems effectively. In addition, insufficient training opportunities and shortages of skilled ICT personnel contribute to difficulties in accessing and utilizing electronic resources (Ogwo & Nwachukwu, 2018).

- **Organizational and Policy Challenges**

  Organizational barriers such as restrictive access policies, inadequate institutional support, and limited collaboration among libraries further hinder access to electronic health information resources. Popoola et al. (2020) noted that the absence of structured user education programmes and inadequate interlibrary cooperation reduce the effectiveness of resource sharing and information access within medical libraries.

Literature Gap

In as much as several studies have examined electronic health information resources in Nigerian libraries, limited empirical research has focused specifically on the extent of access and utilization of these resources and the challenges associated with their use within individual teaching hospitals such as Nnamdi Azikiwe Teaching Hospital, Nnewi. Most existing studies provide broad national or regional perspectives without examining the peculiar circumstances of specific medical institutions. This study therefore seeks to fill this gap by investigating the extent to which users' access and utilize electronic health information resources and the challenges affecting such access within Nnamdi Azikiwe Teaching Hospital Medical Library.

Implications of Access Challenges

The literature reveals that challenges in accessing electronic health information resources have serious implications for healthcare delivery. Limited access to current medical information can lead to poor clinical decisions, reduced research productivity, and ineffective patient care.

In addition, the inability to utilize electronic resources undermines the adoption of evidence-based practice, which is essential for improving healthcare outcomes. Studies on health information systems in Nigeria also indicate that poor ICT infrastructure and system inefficiencies can negatively affect healthcare services and patient satisfaction (Babatope et al., 2024).

Methodology

The study adopted a descriptive survey research design. This design was considered appropriate because it enabled the researcher to collect quantitative data from respondents on the availability of electronic health information resources and the challenges associated with accessing these resources in the medical library of Nnamdi Azikiwe Teaching Hospital. The design also facilitated the description and analysis of existing conditions as perceived by the respondents.

The study was conducted at the Medical Library of Nnamdi Azikiwe Teaching Hospital, a major tertiary healthcare institution that supports clinical practice, teaching, and research activities. The medical library was selected because it serves as an important source of health information for healthcare professionals and provides access to a variety of electronic information resources.

The population of the study comprised 1,200 healthcare professionals, including doctors, nurses, medical librarians, and other allied health personnel who utilize the medical library. These categories of respondents were considered suitable because they are the primary users of electronic health information resources and are directly affected by factors influencing access and utilization. A sample size of 300 respondents was selected from the population. A multi-stage sampling technique involving stratified, proportionate, and simple random sampling methods was adopted. The population was first stratified into doctors, nurses, medical librarians, and other healthcare professionals. Proportionate sampling was then used to determine the number of respondents selected from each stratum according to their population sizes. Thereafter, simple random sampling was employed to select respondents from each group. Total enumeration was used for medical librarians because of their relatively small number. A structured questionnaire served as the instrument for data collection. The questionnaire consisted of two sections. The first section elicited information on the availability of electronic health information resources in the medical library, while the second section focused on the challenges users encounter in accessing these resources. The questionnaire items were structured using dichotomous response options of **Available/Not Available** and **Yes/No**, as appropriate to each research question. The instrument was administered to the 300 selected respondents, and all copies were successfully completed and returned, representing a 100% response rate. Data collected were analyzed using descriptive statistics, specifically frequency counts and percentages. The results were presented in tables and interpreted according to the frequency and percentage distributions. The analysis focused on identifying the types of electronic health information resources available in the medical library and examining the challenges faced by users in accessing these resources.

Results of the Findings

Research question 1: What types of electronic health information resources are available in the medical library of Nnamdi Azikiwe Teaching Hospital?

S/N	Electronic Health Information Resources	Available f (%)	Not Available f (%)
1	E-journals	210 (70.0%)	90 (30.0%)
2	Online medical databases	190 (63.3%)	110 (36.7%)
3	E-books	170 (56.7%)	130 (43.3%)
4	Internet facilities	150(50.0%)	150 (50.0%)
5	Institutional Repositories	130 (43.3%)	170 (56,7%)
6	Adequate Access to electronic Resources	110 (36.7%)	190 (63.3%)

Table 1: The data show that e-journals were the most available electronic health information resource, as indicated by 210 respondents (70.0%). This was followed by online medical databases, reported as available by 190 respondents (63.3%), and e-books, identified by 170 respondents (56.7%). Internet facilities were reported as available by 150 respondents (50.0%). However, a majority of respondents indicated that institutional repositories were not available (56.7%), while 190 respondents (63.3%) reported that there was no adequate access to electronic resources in the library.

Interpretation:

The results indicate that key electronic health information resources such as e-journals, online medical databases, and e-books are available in the medical library. However, the findings also reveal inadequacies in internet facilities, institutional repositories, and overall access to electronic resources. This suggests that although electronic resources exist within the library, users may not be able to access and utilize them effectively due to infrastructural and accessibility constraints. Consequently, the full benefits of these resources for healthcare delivery, research, and learning may not be fully realized.

Research Question 2: What challenges do users face in accessing electronic health information resources in the medical library of Nnamdi Azikiwe Teaching Hospital?

Table 2: Challenges faced by users in accessing electronic health information resources (YES/NO scale)

S/N	Challenges Faced by Users	Yes (n)	NO (n)	Percentages (%)	Remarks
1	Poor internet connectivity affects access to electronic resources	250	50	83.3	yes
2	Inadequate ICT infrastructure limits access	250	50	83.3	yes
3	Lack of awareness hinders effective utilization	190	110	63.3	yes
4	Lack of user training affects access to electronic resources	230	70	76.7	yes
5	Limited subscription to databases restricts access	240	60	80.0	yes
6	Erratic power supply affects usage of electronic resources	260	40	86.7	yes
7	Restrictive access policies limit availability	220	80	73.3	yes
8	High cost of accessing electronic resources is a barrier	220	80	73.3	yes
9	Lack of technical support affects access				

In table 2, the data show that respondents overwhelmingly identified multiple barriers affecting access to electronic health information resources in the medical library. The most prominent challenge is erratic power supply (86.7%), followed by poor internet connectivity and inadequate ICT infrastructure (83.3% each). Other significant challenges include limited database subscriptions (80.0%), lack of technical support (76.7%), and user training gaps (76.7%).

Interpretation

The findings indicate that users experience multi-dimensional constraints, including infrastructural, financial, and human capacity-related challenges. These factors collectively reduce effective access and utilization of electronic health information resources, thereby limiting their contribution to healthcare service delivery and research productivity.

Discussion of the Findings

The findings of the study revealed that:

Types of Electronic Health Information Resources Available in the Medical Library of Nnamdi Azikiwe Teaching Hospital

The findings of the study revealed that several electronic health information resources are available in the medical library of Nnamdi Azikiwe Teaching Hospital. The resources identified include e-journals, online medical databases, e-books, internet facilities, and institutional repositories. Among these resources, e-journals were reported as the most available, followed by online medical databases and e-books. This finding indicates that the medical library has adopted important electronic information resources capable of supporting healthcare delivery, medical research, and academic activities. The availability of e-journals and online medical databases is particularly important because they provide access to current and evidence-based medical information required by healthcare professionals and researchers. Irrespective of the availability of these resources, the findings showed that institutional repositories were less available and that a majority of respondents reported inadequate access to electronic resources. Internet facilities were also reported as only moderately available. This suggests that although electronic health information resources exist in the library, users may experience difficulties accessing them effectively. Consequently, the potential benefits of these resources may not be fully realized. The findings therefore indicate that the availability of electronic health information resources in the medical library is relatively encouraging, but adequate access to these resources remains a major concern.

Challenges Faced by Users in Accessing Electronic Health Information Resources in the Medical Library of Nnamdi Azikiwe Teaching Hospital

The findings further revealed that users face several challenges in accessing electronic health information resources in the medical library. The most prominent challenge identified was erratic power supply, followed by poor internet connectivity and inadequate ICT infrastructure. These findings suggest that infrastructural challenges constitute major barriers to effective access and utilization of electronic health information resources. Since electronic resources depend heavily on electricity and internet connectivity, deficiencies in these facilities significantly affect users' ability to retrieve and utilize information resources.

The study also revealed that limited subscription to databases restricts users' access to relevant electronic health information resources. In addition, lack of user training and inadequate technical support were identified as major challenges affecting access and utilization. These findings indicate that users may encounter difficulties in locating, retrieving, and effectively utilizing available electronic resources without adequate guidance and support. Furthermore, restrictive access policies and the high cost associated with accessing electronic resources were reported as significant barriers. The findings therefore demonstrate that users face a combination of infrastructural, financial, administrative, and user-support challenges that limit effective access to electronic health information resources in the medical library. These challenges collectively reduce the ability of users to fully utilize available electronic resources for healthcare delivery, research, and learning purposes.

Conclusion

Based on the findings of the study, it is concluded that although electronic health information resources such as e-journals, online medical databases, and e-books are available in the medical library of Nnamdi Azikiwe Teaching Hospital, access to these resources is not fully effective. The study established that users experience significant challenges in accessing electronic health information resources, particularly erratic power supply, poor internet connectivity, inadequate ICT infrastructure, limited database subscriptions, and insufficient technical support.

These challenges indicate that access remains a major constraint, limiting the extent to which users can retrieve and utilize available electronic resources. As a result, the effectiveness of electronic health information resources in supporting healthcare delivery, research, and decision-making is reduced. The study therefore concludes that improving access conditions is critical to enhancing the use of electronic health information resources in the medical library.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are made to improve accessibility and access to electronic health information resources in the medical library of Nnamdi Azikiwe Teaching Hospital:

1. **Improvement of Accessibility through Reliable Internet Services**

   The management of Nnamdi Azikiwe Teaching Hospital should provide high-speed and stable internet connectivity to ensure effective accessibility to electronic health information resources such as e-journals, databases, and e-books.

2. **Enhancement of ICT Infrastructure for Better Access**

   The hospital should upgrade its ICT infrastructure, including functional computers, servers, and networking systems, to improve user accessibility to electronic health information resources.

3. **Improved Accessibility through Stable Power Supply**

   Alternative power sources such as generators and solar systems should be provided to ensure uninterrupted access to electronic health information resources.

4. **Expansion of Database Subscriptions to Improve Resource Access**

   Adequate funding should be provided to subscribe to more up-to-date and relevant electronic databases, thereby improving the range and accessibility of health information resources.

5. **Strengthening Technical Support to Enhance User Accessibility**

   Qualified ICT and library support staff should be provided to assist users in resolving access-related challenges and ensure smooth navigation of electronic resources.

6. **Capacity Building to Improve Effective Access and Use**

   Regular training programmes should be organized to equip users with the necessary skills for effective access and utilization of electronic health information resources.

7. **Improvement of Access Policies to Enhance Usability**

   The library management should review restrictive access policies to make electronic health information resources more easily accessible to users.

Contribution to Knowledge

- This study contributes to existing knowledge by providing empirical evidence on the relationship between availability and accessibility of electronic health information resources in a Nigerian medical library context, specifically the medical library of Nnamdi Azikiwe Teaching Hospital. While previous studies have largely focused on the availability and utilization of electronic resources in academic libraries, this study highlights a critical gap between the existence of electronic health information resources (such as e-journals, online medical databases, and e-books) and the actual accessibility of these resources by users.
- The study further extends knowledge by identifying access-related constraints as the major limiting factor to effective use of electronic health information resources. These constraints include poor internet connectivity, inadequate ICT infrastructure, erratic power supply, limited database subscriptions, and weak technical support systems. By systematically categorizing these challenges, the study provides a clearer understanding of the multidimensional nature of accessibility problems in medical libraries within developing country contexts.
- In addition, the study offers context-specific evidence from a teaching hospital environment, thereby enriching literature on electronic health information access in healthcare settings rather than general academic libraries. This is particularly important because access to timely and reliable medical information directly influences clinical decision-making, research output, and healthcare delivery.

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Challenges to Visibility within Institutional Repository: An Analysis of Librarians Perspectives in North-Central Nigerian Universities.

by

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Abstract

Institutional repositories have become central to the management, preservation, and dissemination of scholarly outputs in universities, serving as key instruments for promoting open access and enhancing research visibility. Despite increased adoption of institutional repositories in Nigerian federal universities, the visibility of digital resources hosted on these platforms remains suboptimal, limiting their discoverability and impact within global scholarly communication. This study investigates the challenges encountered in enhancing the visibility of digital resources in institutional repositories used in federal university libraries in North-Central Nigeria, drawing on the perceptions of librarians who are directly responsible for repository management. The study adopted a quantitative research approach with a survey research design. Six federal universities in the North-Central zone of Nigeria with functional institutional repositories were purposively selected. Data were collected from 121 librarians within the study area using a structured questionnaire. The data were analysed using descriptive statistical techniques, including mean scores and standard deviations. Findings reveal that multiple interrelated challenges significantly constrain repository visibility in the region. Two key challenges were ranked with high severity which include researcher awareness and engagement, as well as insufficient internet infrastructure. The results suggest that these challenges are systemic, cutting across human and institutional dimensions, and these collectively undermine the effectiveness of institutional repositories in enhancing research visibility. The study concludes that improving the visibility of digital resources in federal university repositories requires a coordinated institutional response. This includes strategic policies and mandates which would improve the number of digital resources on repositories and finally put repository management on the front burner with proper infrastructural support and financing from management. Finally, the findings provide empirical evidence to inform policy formulation in universities in North-Central Nigeria.

Keywords: Visibility, Institutional repositories, Challenges, North-Central, Perspectives, Open Access Policy, Digital Discoverability

Introduction

The increasing adoption of digital technologies in higher education has transformed the way scholarly information is created, preserved, and disseminated. One of the most significant outcomes of this transformation is the emergence of institutional repositories. Institutional repositories serve as digital platforms for collecting, managing, preserving, and providing access to the intellectual output of universities (Adeyemo & Jamogha, 2021; Dube 2025). These repositories typically host digital resources such as journal, articles, theses, dissertations, conference papers, cultural depictions in the form of images, technical reports, and other scholarly materials produced by academic staff and students. These repositories facilitate open access to research outputs, by so doing institutional repositories play a vital role in enhancing research visibility, institutional reputation, and global scholarly communication. As higher education increasingly moves operation towards digital knowledge ecosystems, the visibility of scholarly outputs has emerged as a critical indicator of research impact, institutional reputation, and academic participation in global discourse. This study examines the problem of digital resource visibility by analysing librarians' perspectives to identify the factors influencing discoverability within digital repositories.

Visibility of digital resources in institutional repositories refers to the extent to which repository content is easily discoverable, accessible, and retrievable by potential users through search engines, academic databases, and repository directories. According to Majhi et al., (2023) visibility is desired for a number of reasons and one of the best means of boosting visibility of research resources is through open access publications. Open access equals a high visibility because it ensures that digital resources reach a wider audience, attract citations, and contribute meaningfully to knowledge exchange at national and international levels (Wani et al., 2023). For universities, improved repository visibility enhances research impact and supports accountability for public funding of research (Ezema & Eze, 2024; Uba E & Okonkwo A, 2021). In spite of these benefits, achieving optimal visibility of digital resources in institutional repositories remains a challenge for many academic institutions, particularly in countries like Nigeria.

Universities have increasingly adopted institutional repositories as part of efforts to promote open access, preserve indigenous research, and improve the dissemination of their scholarly outputs (Salau et al., 2021). University libraries, as the primary managers of these repositories, are responsible for content acquisition, metadata creation, system maintenance, user education, and advocacy for repository use. However, the visibility of digital resources in many Nigerian institutional repositories remains relatively low, as reflected in limited content volume, poor discoverability, and minimal international presence(Macgregor, 2023; Majhi et al., 2023; Odigie et al., 2024). This situation raises concerns about the effectiveness of repository initiatives in achieving their intended objectives.

This concept of visibility encompasses several interconnected dimensions, including metadata quality (Odigie et al., 2024; Pottier et al., 2024), search engine indexing (Majhi et al., 2023), interoperability compliance (Salau et al., 2020), accessibility infrastructure (Waugh et al., 2015), and user engagement practices (Holter, 2020). Visibility therefore represents not only a technological outcome but also a socio-technical phenomenon shaped by institutional policies, human expertise, and researcher participation.

Statement of Problem

Institutional repositories are established in universities to enhance the visibility, accessibility, and impact of digital resources such as journal articles, theses, and dissertations. Several federal university libraries in North-Central Nigeria have adopted institutional repositories as part of efforts to support open access and improve research visibility and dissemination. This can only be achieved if repositories are fully operational and their contents and features optimised. Some ways usage and discovery for institutional repository are optimised are through search engine optimisation techniques (SEO) and indexing.

However, despite the availability of these repositories, the visibility of digital resources remains low in many institutions, limiting their discoverability, usage, and contribution to global scholarly communication. In federal universities in North-Central Nigeria, institutional repositories are often underutilized, with digital resources receiving limited exposure through search engines and academic platforms. In many Nigerian higher education contexts, challenges affecting visibility significantly limit the digital resources discovery and global reach of repository content, thereby constraining the intended benefits of open access initiatives. This persistent low visibility suggests the existence of constraints that continually affect repository performance.

Although previous studies have examined institutional repository adoption and general challenges in Nigeria. Few studies have specifically focused on identifying the challenges encountered in enhancing the visibility of digital resources in repositories used in federal university libraries, particularly within the North-Central zone. The absence of this empirical, context-specific evidence on these challenges limits informed decision-making and strategic intervention in the area. Therefore, there is a need for a systematic study that identifies the challenges to visibility of digital resources in institutional repositories from the perspectives of librarians in federal university libraries in North-Central Nigeria.

Objective of the study

This study highlights the challenges to visibility of digital resources in repositories of North-Central federal university libraries in Nigeria. Specifically, it:

1. identifies the challenges encountered in enhancing the visibility of digital resources in repositories used in federal university libraries in North-Central, Nigeria

Literature Review

The proliferation of institutional repositories (IRs) as infrastructure for open scholarly communication has generated substantial research examining the determinants of faculty and student engagement. Waugh et al. (2015) reveal that repository utilization is fundamentally constrained by unequal awareness across academic ranks, with graduate students demonstrating significantly higher engagement rates than faculty members. This disparity suggests that repositories have evolved into essential infrastructure for emerging scholars' publishing workflows while remaining peripheral to established faculty research practices.

However, awareness alone proves insufficient for sustainable engagement. Yang & Li (2015) demonstrate that tenured faculty, despite heightened repository utilization for publishing purposes, resist mandated deposit policies due to perceived quality degradation in open access venues. This tension between voluntary adoption and policy compliance emerges as a central contradiction in repository use, where increased institutional pressure correlates with submission volume but inversely affects perceived value. Holter, (2020) corroborates this finding through an analysis of the UK's Research Excellence Framework (REF) mandate, revealing how compliance driven policies without commensurate resource allocation generate administrative burden rather than scholarly value.

The barriers to meaningful repository integration extend beyond individual awareness to encompass structural misalignments between institutional infrastructure and academic labour practices. At small teaching focused institutions, faculty resistance stems from repositories' failure to align with established workflows, compounded by copyright anxieties of authors and insufficient incentivization mechanisms (Wu, 2015). Similarly, Holter (2020) identifies missed opportunities to align researcher and institutional goals. Both studies underscore a fundamental issue which is repositories are frequently designed around administrative imperatives rather than functionality, resulting in what Holter (2020) terms "empty compliance" increased deposits devoid of engagement with open access principles.

Moreover, the transition from repository availability to meaningful scholarly communication requires specific infrastructural and instituted cultural mediators. While Waugh et al. (2015) establish that awareness predicts multiple use and contribution behavior, they do not examine the institutional conditions that foster such awareness. Wu (2015) addresses this gap partially through a case study of Roger Williams University, identifying practical strategies to enhance IR relevance in teaching contexts; however, the scope remains constrained to a single institution, limiting generalizability. On the other hand, Yang and Li (2015) employ broader survey methodology but focus exclusively on

faculty attitudes toward open access, neglecting the librarian and repository manager perspectives that Holter (2020) identifies as crucial for understanding systemic implementation challenges.

From another perspective, The REF mandate in the UK has generated distinct compliance cultures compared to the voluntary adoption models prevalent in North American institutions. This divergence suggests that national research evaluation frameworks function as powerful moderators of repository effectiveness. In the Nigerian context, Ezema & Eze, (2024) reveal important infrastructural deficits that compound these challenges: only 26% of universities in South-East Nigeria have fully implemented IRs, with the majority lacking adequate ICT infrastructure and skilled personnel despite employing DSpace as the predominant software solution. The findings establish a direct correlation between functional repository implementation and institutional ranking, underscoring that visibility deficits in resource constrained environments are not merely academic concerns but have tangible consequences for institutional prestige and global positioning.

Furthermore, Uba & Okonkwo (2021) illuminate how the management of local content resources in Nigerian tertiary institutions reflects systemic governance challenges that parallel the "empty compliance" phenomenon identified by Holter (2020). Their investigation of South-East Nigerian institutions reveals that repositories are frequently managed by ICT professionals with dual librarian roles, suggesting hybrid staffing models that may lack specialized expertise in scholarly communication. The documented challenges including inadequate funding, absence of statutory deposit policy, author resistance to content donation, and proliferation of plagiarized materials demonstrate that the barriers Holter (2020) observes in the UK context (administrative burden without resource allocation) manifest differently but no less prominently in developing economies. Notably, Uba and Okonkwo (2021) identify a critical gap in content acquisition strategies: while institutions possess substantial local scholarly outputs (PhD theses, inaugural lectures, institutional publications), these resources remain under deposited due to the absence of enforcement mechanisms and sensitization programs that Wu (2015) identifies as essential for faculty engagement.

The empirical evidence above suggests that repository visibility enhances research dissemination and institutional prestige; however, there are challenges, such as low faculty engagement, infrastructural deficits, and institutional gaps, which if not managed strategically could constitute challenges to visibility. While previous studies in Europe and North America have laid a foundation for exploring these dynamics in research intensive contexts, the Nigerian literature reveals that resource constraints and institutional ranking imperatives introduce distinct modalities of repository dysfunction.

Methodology

The research adopted a quantitative research methodology with a survey research design. The study population comprised eight (8) Federal Universities in the North-Central region of Nigeria. A purposive sample with a single criterion was chosen for this study because purposive sampling allowed the researcher to deliberately target specific respondents who directly encounter the day-to-day challenges affecting the visibility of digital resources (Creswell, 2022). The purposive strategy streamlined the universities to six (6) universities, the only criterion for being selected in this study was that each university in the study area must have a functional repository. From the six (6) universities which met the study criteria we have 121 librarians based on data obtained from each university library. Table 1 shows the selected federal universities based on the criteria and their respondent data. Data were obtained using a structured questionnaire of five strategic options aimed at answering the research objective, 82 questionnaires were duly filled and returned. The results from the questionnaire were analysed using statistical analysis tool and shown in a table 2. A weighted mean was used as a comparative benchmark to rank the severity of the identified challenges. Data Interpretation of respondents' agreement was guided by the mean of the four-point Likert scale (2.50). Mean scores equal to or above 2.50 indicate respondents' agreement that the highlighted factor constitutes a challenge, while scores below 2.50 indicate disagreement. Furthermore, a weighted mean comparison with the overall weighted mean (3.17) allowed for the identification of the perceived severity of these challenges (León-Mantero et al. 2020).

Table 1: Distribution of Universities in North-Central Nigeria

s/no	University Name	State		Repository URL
1	Federal University Lafia	Nasarawa	12	https://rep.fulafia.edu.ng:8080/jspui
2	Federal University Lokoja	Kogi	11	https://repository.fulokoja.edu.ng
3	Federal University of Technology Minna	Niger	26	https://repository.futminna.edu.ng
4	University of Abuja	FCT	11	https://repository.uniabuja.edu.ng
5	University of Jos	Plateau	31	https://dspace.unijos.edu.ng
6	University of Ilorin	Kwara	30	https://uilspace.unilorin.edu.ng
	Total		121	

Analysis

Table 2: The Challenges Encountered in Enhancing the Visibility of Digital Resources in Repositories Used in Federal University Libraries in North-Central, Nigeria

S/N	Challenges	Strongly Agree		Agree		Disagree		Strongly Disagree		N	x	SD	Decision
		F	%	F	%	F	%	F	%				
1	Limited awareness and engagement from researchers	34	41.5	43	52.4	3	3.7	2	2.4	82	3.33	.968	High
2	Unstable internet connectivity	33	40.2	41	50.0	4	4.9	4	4.9	82	3.26	.767	High
3	Limited number of skilled personnel	28	34.1	42	51.2	7	8.5	5	6.1	82	3.13	.813	Low
4	Inadequate infrastructure	30	36.6	38	46.3	5	6.1	9	11.0	82	3.09	.932	Low
5	Attitude of University Management	28	34.1	38	46.3	8	9.8	8	9.8	82	3.05	.915	Low
	Weighted Mean									**82**	**3.17**	**0.819**	

Key: X= Mean SD= Standard Deviation. Decision benchmark: 15.86/5 =3.17

Table 2 reveals the challenges encountered in North-Central Federal university repositories. The table showed two (2) listed factors with mean scores which were above the decision benchmark of 3.17. These include Item 1: Limited awareness and engagement from researchers (x=3.33; SD =.968), Item 2: Unstable internet connectivity (x= 3.26 SD= .767). Furthermore, the data from the table revealed that Item 3: Limited number of skilled personnel (x=3.13 SD=.813), Item 4: Inadequate infrastructure (x=3.09; SD =.932) and Item 5: Attitude of University Management (x=3.05; SD = .915) were low as they both were below the decision rule.

All points within the table indicate challenges as they are above the criterion mean for the Likert scale of 2.5, however the weighted mean of 3.17 was used to highlight severity of challenges within North-Central University. These high points from the table, points to issues that need to be addressed if visibility in federal university libraries in North-Central Nigeria is to improve.

Discussion

The data in table 2 revealed that the challenges encountered in enhancing visibility of digital resources in federal university libraries in North-Central Nigeria are strongly felt in two major areas across all examined fields. The obstacles ranging from human to infrastructural domains suggests that the impediments are systemic rather than isolated and therefore are unlikely to be solved by single solutions. The findings indicated that awareness and researcher engagement as a key barrier to the visibility of digital resources within repositories in North-Central Nigeria. This constraint reduces the availability of digital resources on repositories as librarians are in a constant flux between improving researcher engagement and quality control (such as metadata auditing and implementing interoperability features like OAI and SEO practices). This implies that time which should have been expended on technical issues necessary for visibility is rather wasted on researcher engagement. The finding is in line with Yang & Li, (2015) and Wu (2015) who demonstrated that tenured faculty, resist repositories due to copyright anxieties and perceived quality degradation in open access repositories. In practice, this identified problem linked to researcher awareness and engagement causes a domino effect because without deposits even the best repositories would have zero visibility of their resources.

Secondly the unstable internet connectivity links to infrastructural issues which have continually plagued Nigerian universities. This has led to many repositories being deindexed on search engines. The problem of unstable internet connectivity is particularly harmful for repositories which are on-premise as it hampers domain stability for repositories which affects the credibility of the repositories on search engines. Also, the problem obstructs the ingest process for available digital resources leading to backlogs in upload and auditing of digital resources. The implication of this finding is dual faced, when repositories are intermittently inaccessible, search engines may reduce indexing frequency, thereby lowering the visibility of hosted resources within global discovery systems. Also, unstable internet means upload jobs on repositories get pended which lowers their visibility. The finding correlates to that of Ezema & Eze (2024) who also identified ICT infrastructural issues as a challenge to repositories in South-east Nigeria.

Furthermore, the lack of skilled personnel buttresses a human-technical challenge which hinders not only the ability of the repository software to function properly but also causes other organisational constraints like the inability to keep Service Level Agreement (SLA). Which include reducing downtime for the repository, updating users and especially top management on the need for certain policies and technical upgrades. Which would improve the visibility of the institutional repository. The cumulative impact is diminished discoverability and reduced alignment with open science expectations.

The attitude of university management emerges as another pivotal contextual factor hindering visibility of repositories in the region understudied. Where leadership prioritizes repositories, institutions are more likely to invest in infrastructure, staff development, and policy enforcement. Conversely, an indifferent support results in underfunded systems, indifferent practices, and limited strategic alignment conditions that perpetuate inconsistency and hinder interoperability. These findings are in consonance with Holter (2020) who studied the complexities surrounding digital repositories and found that a lack of resources and support were a major issue further necessitating the need for effective systems to manage and promote institutional repository use.

Addressing these challenges requires a coordinated response, such as creating policies which mandate the upload of institutional research work to repositories by scholars, this creates room for librarians to carry out more advanced tasks of ensuring proper audit for submitted scholarly work improving descriptive metadata necessary for visibility before these works are allowed to be seen by the public. Also, such policies push repositories to the front burner of university management where they are compelled to ensure their repositories remain online and assign units for maintenance and proper fundings. In summary, the consistency of repository in the region will depend on aligning people, processes, and platforms under a visible and supported institutional strategy.

Conclusion

This study examined the challenges affecting the visibility of digital resources in institutional repositories within federal universities in North-Central Nigeria from librarians' perspectives. Findings indicate that repository visibility constraints are multidimensional, involving limited researcher engagement and infrastructural limitations. These factors collectively reduce visibility and restrict the contribution of institutional repositories to global scholarly communication. The results suggest that visibility challenges are not solely technological but emerge from the interaction between institutional support systems, user participation, and operational capacity within the universities. Although repositories exist across the studied institutions, their potential to enhance research dissemination remains underutilized due to systemic operational constraints. The study highlights the central role of librarians as mediators between technology and scholarly communities. Addressing visibility challenges therefore requires coordinated institutional commitment that strengthens infrastructure reliability, improves researcher awareness, and supports sustainable repository management practices capable of enhancing access, discovery and long-term scholarly impact.

Recommendation

The follow recommendations are made:

1. The study recommends that universities libraries strengthen researcher engagement through targeted programmes which would orient researchers on the need to provide their scholarly work for ingest in repositories and ease any fears they might have.
2. Also, university management should endeavour to provide necessary infrastructure needed for work on repositories to move smoothly.

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Community Engagement and Trust in AI-Based Information Services: A Case Study of Rural Libraries in Ebonyi State

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Abstract

The application of artificial intelligence (AI) in library services provides an opportunity to improve the access to and delivery of library services in rural communities that have historically been underserved. However, the use of AI-based information services will still rely on the prevailing level of trust in the application of the services. This study examined the connection between community engagement and trust in AI-based information services in rural libraries in Ebonyi State, Nigeria. The study employed the explanatory sequential mixed-method design, integrating both the qualitative and quantitative approaches. The quantitative aspect involved structured questionnaires administered to 310 rural library users, while the qualitative aspect comprised interviews and focus group discussions with library users and community leaders. Quantitative data were analyzed descriptively with Pearson correlation and regression analysis, while qualitative data were analyzed thematically. The study findings indicated a positive, significant relationship between community engagement and trust in AI-based information services ($r = .682$, $p < .05$). The trust in AI services also showed a strong positive relationship with the perceived effectiveness of the services ($r = .741$, $p < .05$) and explained 54.9% of the variance in trust. The primary determinants of trust in AI services were the human oversight of the service, verification of the information, service transparency, and the protection of user data. The primary barriers to the application of AI-based services identified in the study were poor internet access and irregular (low) supply of electricity, low digital literacy, privacy concerns, and inadequate funding. The qualitative findings stressed the significance of community participation, awareness initiatives, and transparent communication for building trust. This paper concludes that proper implementation of AI in rural libraries depends on stability of technology; community participation, institutional support, ethics and responsible governance.

Keywords: Artificial Intelligence, community engagement, trust, rural libraries, information services, digital inclusion, Nigeria.

Background of the Study:

The aim of this study is to analyze community engagement and trust in AI-based information services in rural libraries in Ebonyi state Nigeria. The speed with which the development of Artificial Intelligence (AI) technologies has impacted the delivery of information services in various sectors is remarkable. Libraries, along with other sectors, have been affected. The major challenge is that, while considerable effort has been made to integrate AI in other parts of the world, rural communities in developing countries, especially Nigeria, remain under supported (Van Dijk 2020); Owolabi et al. 2021). The focus of the research is the perception and trust of rural communities in the AI-based information services in rural libraries of Nigeria, especially the Ebonyi state which is relatively low in digital technology infrastructure as well as trust and confidence in the innovations. This study is valuable because it has the capacity to stimulate policy and practice and responds to the need for a purposeful and constructive digital transformation in rural communities that enhances access to rural information services and subsequently rural community development (Ogunleye et al., 2021). Furthermore, the use of AI services demonstrates that service user confidence is the greatest influence on the acceptance of AI services (Glikson & Woolley, 2020) and is not limited to the adoption of technology but has social and commercial value.

The prominence of community engagement and trust in AI-based services for rural technologies lies in the success AI-based services can achieve in rural areas. Engagement leads to community acceptance, and trust in the AI system encourages the community to adopt and use AI-based services (Glikson & Woolley, 2020). As described in the Technology Acceptance Model (TAM), trust is an important factor in acceptance, while the perceived benefits and simplicity of the system shape a user's attitude toward a technology (Davis, 1989). Correspondingly, Social Capital Theory describes the role of networks and social relations of a community in building trust and collaboration, and is

really evident in rural areas (Putnam, 2000). This research seeks the opportunity to determine the relationship and the degree of influence community engagement and trust exert upon one another in rural libraries in Ebonyi State.

The body of work that exists pertaining to AI-based information services in libraries is extensive in that it describes similar relationships across different areas, especially in developed countries. However, there is scant research on rural libraries in developing countries, such as Nigeria. While recent studies in Europe and the USA have shown trust in AI to be significant (Shin, 2021; Albrecht & Ojala, 2021), the rural African context and its libraries have been largely unexplored. There is growing literature on AI-based services and the trust element in information services (Choung, David, & Ross 2023), and more studies examining community engagement and trust in the context of rural library services are needed. Although many studies on AI adoption exist, there are gaps in understanding trust and engagement in rural Africa. There are some contextualized studies, but most do not incorporate the socioeconomic and cultural barriers and infrastructure as seen in rural Nigeria. This study will focus on Ebonyi State and draw on the intersections of sociology and technology to offer insights on the potential of rural library based AI information services and the role of community engagement in building trust.

Rural libraries in Nigeria lack some factors needed in accepting AI based services due to deficits in infrastructure and lack of digital literacy skills (Adeleke et al., 2022). Limited information has been found about the issues in rural library system in Nigeria, but it remains relatively unexplored on AI based services. In order to find solutions this gap will be investigated by studying how community engagement can be used to bridge the lack of AI based trust. This study addresses the limitations in developing nations in digital revolution by highlighting some challenges and possible solutions, for policymaker to make better intervention plan in Nigeria context in comparative lens.

Lack of access to AI based information services in rural libraries in Ebonyi state Nigeria remains a great issue. Although AI services has been widely used in libraries worldwide the rural Nigerian society particularly in Ebonyi State have the problem of accessing this service due to lack of digital literacy, infrastructures and general distrust in AI technology (Adeleke et al., 2022); Owolabi et al. 2021). These drawbacks deny rural community some of the benefits of AI based services in expanding information access and boosting socio economic status of the inhabitants. A major challenge that causes lack of interest and low adoption of AI based services is lack of trust in such service which can be overcome through engagement with users (Glikson & Woolley, 2020). This problem makes the community vulnerable to the digital divide, thus denies them the gains it promised to provide.

Various policy initiatives have been made to address this problem, but without success as Nigerian policy makers fail to integrate specific socio-cultural characteristics of rural communities into their digital literacy programs (Ogunleye et al., 2021). These programs have failed to address these specific features of the rural community, with some programs failing to adopt the use of AI based information services within the context of libraries and communities. There is no specific policy that has adequately addressed the issue of overcoming user distrust in the context of AI based information service in the rural library setting. While it has been accepted globally that the adoption of AI in libraries is progressing, very little attention is paid to how community engagement can address user distrust on AI based information services in rural libraries in Nigeria. Unlike existing literature, there has been no attempt at studying user trust in AI based information services in the rural library context of Ebonyi State and the study by Shin (2021) and Choung, David & Ross (2023) does not look into how this two concepts correlate within the rural library setting in Nigeria. This study seeks to examine the impact of community engagement on the trust levels associated with the adoption of AI based information services in rural libraries in Ebonyi State, and hence address the deficit in research literature.

Research Objectives:

1. To assess the impact of community engagement in AI-based information services on trust levels within rural libraries in Ebonyi State, Nigeria, using descriptive statistics.
2. To identify the key factors contributing to trust in AI-based services within rural communities, particularly in Ebonyi State, with a focus on socio-cultural and technological influences.
3. To evaluate the relationship between the perceived effectiveness of AI-based information services and the degree of trust by rural library users in Ebonyi State.
4. To explore the barriers to community engagement and trust in AI-based information services within rural libraries, with a focus on Ebonyi State's unique socio-economic challenges.
5. To propose actionable recommendations for improving community engagement and trust in AI-based information services for rural libraries in Ebonyi State, grounded in descriptive statistical analysis.

Research Questions:

1. What is the impact of community engagement in AI-based information services on the trust levels of users in rural libraries in Ebonyi State, Nigeria?
2. What are the key factors that contribute to trust in AI-based information services within rural communities in Ebonyi State, particularly regarding socio-cultural and technological influences?
3. What relationship exists between the perceived effectiveness of AI-based information services and the degree of trust among rural library users in Ebonyi State?

4. What barriers hinder community engagement and trust in AI-based information services within rural libraries in Ebonyi State, considering the state's unique socio-economic challenges?
5. What strategies and recommendations can be proposed to enhance community engagement and trust in AI-based information services in rural libraries in Ebonyi State?

Literature Review

Conceptual Review

Community engagement: Individuals, groups and society interact in processes of decision, action and policies that directly affect their life. This type of engagement focuses on building trusting, cooperative and relational contexts within communities. This term originated from literature in community development and public administration and the early uses can be seen in literature by practitioner's like Robert Putnam (2000) who discusses the relationship of social capital in communities. There are various terms describing ways that communities can become involved in their library and technology, this could be described in various ways, but it fits with participation and collaboration in technology design and use, such as in the community development literature, participatory decision making, and collaborative planning (Putnam, 2000). In terms of rural libraries community engagement is about building trust and facilitating active participation.

Trust in relation to AI services, can be explained as "willingness to accept vulnerability based on positive expectations of another's behavior." This type of relationship is applicable in the case of technology and institutions implementing it, trust in technology must be established before a system can be accepted and used, trust in AI services particularly, are closely linked to concerns surrounding data privacy, algorithmic bias, and transparency (Mayer, Davis, & Schoorman, 1995). With the development of new technology, the definition of trust in automated systems continues to evolve, now including the perceived ability of systems to operate effectively without human intervention, AI-based services have raised issues surrounding its use that have become inextricably linked with how we conceptualize trust. Trust in AI services can encompass many issues including the user's perception of its reliability and the degree to which a user trusts the artificial intelligence service's capabilities. The lack of experience users may have with advanced technologies can intensify trust issues with the new systems.

AI based information services: are a type of digital service which make use of artificial intelligence to improve access and delivery of information. These services could make a difference in libraries offering personalized service, improved search functionalities, automating of tasks, and access to information on the Internet. Rural library services are only beginning to experience the use of AI in services, with obstacles of low levels of technology literacy and infrastructure, as well as trust in automated services (Choung, David, & Ross 2023). AI based information services have an important role to play in providing greater access to information for isolated and under-served rural communities thereby strengthening their services. Trust in AI based information services is inseparable from community engagement. The engagement process will likely contribute to overcoming the barriers for use and trust among local users. As trust in technology is considered to be a social and psychological phenomenon, which grows through interactions, engagement processes must ensure both the social and technical aspects are considered as a whole system approach to design and use.

Measure of engagement and trust: Engagement and trust are often measured using methods like surveys, interviews, and observations. For community engagement and rural library users these will vary, with engagement often relating to the degree to which users participate in library programs, trust can be measured by the degree of reliance and perceived accuracy of the information delivered by the AI based services (Glikson and Woolley 2020).

Theoretical Review

The Technology Acceptance Model (TAM) is a prominent framework used to analyze new technology adoption. With respect to the adoption of AI-based information services by rural libraries, perceived ease of use and perceived usefulness can be applied to predict adoption (Davis, 1989). Applied in the context of rural libraries, the model holds that if rural community members believe that AI-based information services are useful and easy to use, they will develop more trust toward these services, thus enabling technology adoption. In the case of Nigeria, TAM can aid the development of an appropriate AI system that caters to the perceived need and capabilities of the rural user (Adeleke et al., 2022). The ability to increase the use of these services can be amplified through user-friendly interface design and the demonstration of the service's utility and practical benefits, building trust toward these systems.

Social Capital Theory suggests that "the strength of the relations and ties among members of a community is what is believed to play a vital role in fostering collaboration and trust among community members" (Putnam, 2000, p. 1). Thus, the Social Capital Theory can be used to predict how the use of AI-based information services by rural communities in Nigeria, a country with close-knit social networks, is mediated by trust derived from community trust networks and increased engagement, which will in turn lead to widespread adoption. This approach emphasizes that collective action through social trust and norms can effectively overcome barriers to innovation. Given the importance of social networks and trusts in facilitating information dissemination and innovation adoption among rural Nigerian populations, community engagement should leverage this social infrastructure to build trust in novel information services (Ogunleye et al., 2021).

Diffusion of Innovations theory by Everett Rogers (2003) defines and describes the factors influencing the adoption of innovations, such as AI-based information services. According to the Diffusion of Innovations theory, the successful adoption of new ideas is contingent on the innovation's perceived relative advantage over existing solutions, its compatibility with existing values, and the persuasive influence of opinion leaders within the community. Diffusion of AI technologies may be slower in Nigeria's rural areas due to a lack of familiarity and deep-rooted adoption of traditional methods of accessing information unless specific and community-oriented strategies are implemented (Choung, David, & Ross 2023).

Empirical Review

Studies have examined the interplay between community engagement, trust and adoption of AI-based information services, with diverse contexts and research focus. In line with the hypothesis, research on the digital divide in rural Nigeria has indicated that although most of the participants experienced limitations to their access, especially concerning their trust in new technologies as a result of being less familiar, community-based intervention could boost its use over time (Van Dijk, 2020). His approach involving surveys and community focus groups proved that trust is enhanced over time with active community participation, which further supports its relevance to the study's problem which aligns with Adelek et al., (2022) observations that it is the community involvement that can accelerate its adoption in Nigeria.

An alternative study aimed at determining factors that contribute to trust and acceptance of AI systems and that examined explainability, transparency and user perceptions of AI technologies and used quantitative and qualitative method. The study found that users tend to have higher trust in AI systems with explainable, transparent and intelligible processes, while data privacy concerns, algorithmic bias and accountability reduce it (Shin, 2021). These factors are relevant in assessing how these concerns influence AI based information services adoption in rural areas of Ebonyi State.

Another study focused on citizen participation and trust in AI-enabled public services to determine how participation strategies influenced public trust in AI systems. The findings indicated that interventions involving citizens and stakeholders in the design, implementation, and evaluation phases of AI service delivery enhance trust, acceptance, and satisfaction more than other intervention models (Fischer et al., 2023). Employing both quantitative and qualitative approaches through a survey method and focus group discussions of stakeholders in the service, their conclusion further reiterates the position of Owolabi et al., (2021) that in libraries in Nigeria, a majority of these factors such as perceived benefits, community opinions towards AI and opinion leader's opinion highly impact adoption.

Methodology

Research Design

This study utilized a mixed-method case study design employing an explanatory sequential approach. The rationale for selecting this design was to gain a deeper insight into the interplay between community engagement and trust in AI-based information services in rural libraries within Ebonyi State. The quantitative component (first phase) was addressed by administering a structured questionnaire to collect data on the participants' level of trust, degree of engagement, and views about the effectiveness of AI-based information services. The second phase involved data collection using qualitative methods such as interviews and focus group discussions in order to reveal underlying socio-cultural factors and conditions affecting user trust and engagement. Both quantitative and qualitative data were used for a thorough understanding of the phenomenon in the context of this study.

Population and Sampling Procedure

The population of the study was drawn from users of rural libraries in Ebonyi State as well as the librarians and community leaders involved with the selected libraries. The selected rural libraries were the sample frame of the study and were situated in different parts of the State. Multi-stage sampling technique was employed to derive a representative sample of the population for this study. In the first stage, a purposive selection of rural libraries that have already adopted AI based information services was made since they are most relevant to the objectives of this study. In the second stage, library users were stratified based on their demographic characteristics which included age, gender, and frequency of usage. This was necessary because a variety of perspectives would exist concerning these issues. In the final stage of sampling, respondents were randomly selected from the strata of users to ensure representativeness of all segments of the sample and eliminate sampling bias.

A sample size of 350 users for quantitative study, while for the qualitative study, 20 librarians and 30 community leaders were purposively selected due to their insight on library operations and information needs of the community members. The participants were drawn via library notices, posters and personally invited by the librarians to join in the research process. All participants have given informed consent to participate in the study. Of the 350 questionnares distributed, 310 were properly completed and returned, thus yielding a response rate of 84 percent. The response rate achieved for this study can be considered adequate and sufficient for a social science based research, especially when involving a community study.

Instrumentation

Three primary research instruments were employed for the data collection in the study: the structured questionnaire, a focus group discussion and a semi-structured interview guide.

The instrument design was based on relevant literature on artificial intelligence trust, community engagement, rural library information services and related constructs. The structured questionnaire was made up of items on a 4-point likert scale from Strongly Disagree to Strongly Agree. This instrument was broken down into several sections including: respondent's demographic characteristics; community engagement characteristics; perceived effectiveness of AI based information services; trust in AI based information services; barriers to the use and adoption of AI technology.

Before deployment, the questionnaire was validated by three measurement experts in Library and Information Science and measurement & Evaluation Unit of Department of Science Education, University of Nigeria Nigeria. The responses of these experts guided the researcher in modifying and amending the questions where necessary. A pilot study was subsequently carried out on 30 subjects using a pilot version of the questionnaire so as to measure the comprehensibility, applicability and validity of the questions. The feedbacks received in the pilot study led to further refinement of the questionnaires used for the actual research study.

The validation was ascertained using an expert opinion while the reliability was computed using Cronbach's Alpha and the Cronbach's Alpha scores for each scales exceeded 0.70 threshold. A semi-structured interview guide was used to complement the quantitative aspect. The questionnaire had open-ended items intended to probe socio-cultural, contextual issues and user's opinions and feelings about the AI based information services, thus allowing the participants to provide additional useful information and give examples where possible.

Data Collection Procedure: Data collection was conducted in two distinct phases consistent with the explanatory sequential mixed-method design. The quantitative phase involved the administration of questionnaires to library users in their respective libraries within rural communities in Ebonyi State. The questionnaires were distributed and collected personally by well-trained research assistants who also clarified respondents' concerns and helped those who may experience difficulty reading. Help was provided where necessary to ensure the respondent correctly answered the question without bias from the researcher.

Following the quantitative part, the interviews with the librarians and focus group discussion with the community leaders were conducted to investigate deeper into the issues identified in the quantitative phase. The research used the local languages to enhance proper understanding and effective response among the participants and both the interview and focus group discussion sessions were audio recorded and later transcribed.

Data Analysis

The data collected were analyzed using descriptive and inferential statistics. The descriptive statistical measures used were; frequency count, percentages, mean and standard deviation, which were employed to describe the sample characteristics, respondents' trust in and usage of AI based information services, and perceived effectiveness of the AI based information services in rural libraries. Pearson Product Moment Correlation and Regression Analysis were used to establish the existence and nature of a relationship between the study variables and the predicting power of the perceived effectiveness of the information services on trust. The means were interpreted using previously established decision levels so as to make more meaningful interpretations of the responses.

For the qualitative data, the analysis method used was the thematic analysis approach, where the key themes were identified, coded and interpreted on the basis of social, technological, cultural and other institutional factors affecting the participants' trust and engagement in using the AI based information services in their local libraries. The thematic analysis was facilitated using the NVivo qualitative analysis software to code and group common themes which helped in its efficient organization. Methodological complementarity was achieved by triangulating the quantitative and qualitative data sources to produce findings which validate each other.

Ethical Considerations

Strict ethical procedures were observed throughout the study. Before the commencement of the research work, permission was obtained from appropriate institution for ethical review of the study. Also, participation in the research was entirely on voluntary basis, and the respondents were fully informed about the purpose of the study, their rights and the confidential nature of their contribution to the research. Informed consent was obtained from all the participants before their involvement. Measures to guarantee both anonymity and confidentiality were put in place to protect the participants' right to privacy.

Results

Analysis of Respondents' Demographic Profile

The profiles of the respondents who participated in this study are detailed in this section. Three hundred and fifty questionnaires were distributed among rural library users in selected libraries within Ebonyi State, out of which 310 were properly completed and retrieved (310/350= 88.6 %). As suggested by Creswell and Creswell (2018), an above 80% response rate is desirable when considering whether representativeness of the sample has been achieved or not to reduce non-response bias in surveys.

Table 1. Demographic Characteristics of Respondents (N = 310)

Variable	Category	Frequency	Percentage (%)
Gender	Male	168	54.2
	Female	142	45.8
	Total	310	100.0
Age	18–25 years	86	27.7
	26–35 years	98	31.6
	36–45 years	65	21.0
	46–55 years	38	12.3
	Above 55 years	23	7.4
	Total	310	100.0
Educational Qualification	Primary Education	32	10.3
	Secondary Education	89	28.7
	Diploma/NCE	72	23.2
	Bachelor's Degree	91	29.4
	Postgraduate Degree	26	8.4
	Total	310	100.0
Occupation	Student	94	30.3
	Farmer	48	15.5
	Trader	71	22.9
	Civil Servant	54	17.4
	Self-employed/Others	43	13.9
	Total	310	100.0
Frequency of Library Use	Daily	62	20.0
	Weekly	118	38.1
	Monthly	79	25.5
	Occasionally	51	16.4
	Total	310	100.0
Experience with AI Services	Less than 6 months	75	24.2
	6 months–1 year	102	32.9
	2–3 years	88	28.4
	Above 3 years	45	14.5
	Total	310	100.0

Discussion of Demographic Findings

The demographic analysis revealed that men constituted a slightly higher percentage (54.2) compared to women (45.8).This could reflect the slightly increased accessibility to digital technologies for rural women, compared to earlier reports of the disparity (van Deursen & van Dijk, 2019; Scheerder, van Deursen, & van Dijk, 2021). Recent trends show that gender-disparities in technology utilization are narrowing due to expanding digital inclusions in developing contexts (Van Deursen & Van Dijk, 2019). Respondents aged between 18 and 35 made up the largest chunk (59.3).This means that AI-based information service in rural libraries is being accessed most by the younger demographics who typically have higher digital literacies and greater access to and exposure to new technologies (Venkatesh et al., 2022; Dwivedi et al., 2023).

The educational profile indicates that most of the respondents had at least secondary education (89.7); and 37.8% had tertiary education. Education is often cited as being crucial for determining digital competence, trust in technology, and confidence in AI (Ameen et al., 2021). Individuals with a high level of education understand what an AI service is, the benefits it offers and is more receptive to using technology than individuals who are not. This finding indicates that majority of the respondents were suitable candidates for trusting AI-based information services in rural libraries as 89.7% had tertiary education or above.

Occupational distribution showed students (30.3 %) forming the largest group followed by traders (22.9 %) and civil servants (17.4 %).This shows how relevant AI-based information services has become for students, and also for rural economies in business and public administration. This shows that rural libraries have indeed become a source of vital information to diverse groups.

38.1 % of respondents visited the library weekly thus indicating frequent use. Having more experience using a certain system makes individuals gain confidence. Similarly 75.8% had been using AI-based information services for more than six months thus indicating sufficient experience for forming valid opinions. All respondents were representative and therefore adequately positioned for assessing the impact, usability and trust in AI based information service in rural libraries in Ebonyi State.

Analysis of Research Questions

The responses to the five research questions are discussed and presented below. Descriptive statistical tools, Pearson Product-Moment Correlation and regression analysis were used to analyze questionnaire data, whilst qualitative data collected via interviews with librarians and community leaders were analyzed using thematic analysis and supported by NVivo software.

Research Question One: What is the impact of community engagement in AI-based information services on the trust levels of users in rural libraries in Ebonyi State, Nigeria?

The mean scores and standard deviations of respondents' ratings on community engagement were calculated. Based on Nunnally and Bernstein (2019) criterion mean is 2.5. Figures above 2.5 are agreement, figures below 2.5 mean is disagreement.

Table 2 Community Engagement and Trust

Item	Mean	SD	Decision
Community members are consulted before AI implementation.	3.12	0.71	Agree
Users participate in discussions concerning AI services.	3.08	0.76	Agree
Community feedback influences AI decisions.	2.94	0.83	Agree
Awareness programmes are regularly organized.	3.21	0.68	Agree
Community leaders support AI adoption.	3.04	0.79	Agree
Users are encouraged to express concerns.	3.16	0.72	Agree
Training programmes improve AI understanding.	3.29	0.64	Agree
Communication regarding AI innovations is adequate.	2.98	0.82	Agree
Community participation increases confidence in AI.	3.34	0.61	Agree
Community engagement improves acceptance of AI.	3.42	0.59	Agree
Grand Mean	**3.16**	**0.72**	**Agree**

The result shows that there is a high agreement to community engagement aspect of AI-based information services. Higher agreement for “Community engagement influences the acceptance of AI” (M=3.42) followed by “Community participation reinforces confidence to use AI” (M=3.34) and mean for all items is 3.16. This clearly suggests that community engagement is important in determining the level of users' trust in AI based services.

The impact of community engagement on users' trust was analyzed by correlation.

Table 3: Pearson Correlation between Community Engagement and Trust

Variables	Mean	SD	r	p-value
Community Engagement	3.16	0.72		
Trust in AI Services	3.37	0.63	0.682	0.000*

*Significant at $p < .05$

The results indicate a positive and highly significant correlation between community engagement and users' trust (r= .682, p<.05). This shows that, as community engagement in the planning, deployment and use of AI-based information services increases, so does users' trust in such services. The impact is indeed large; that is, it suggests that involving the local people will significantly enhance trust in the service. Trust is often related to perception, and if local people feels they have ownership of the system and they were part of the initial processes, it is more likely for them to trust the system. Qualitative information from librarians and community leader's interview provides support. There were 3 themes from the analysis of interview transcripts with librarians and community leaders.

Theme 1: Participatory decision-making.

Participants believed that when people are brought on board at the initial stages of technology adoption; the usage tends to be high and reliable.

"If the community are properly involved at the initial stages then acceptance level would be higher..." Librarian 7

Theme 2: Increased community ownership

There was a perception that involving community members helped people to feel responsible for the success of the systems.

Theme 3: Reduced level of uncertainty.

The more the system is made transparent through continuous feedback, the more trustworthy it is believed to be.

This study has findings that are in alignment with previous literature showing that community engagement is central to building a trusting society (Jasanoff, 2021; Fischer et al., 2023) and in building trust towards newer systems like artificial intelligence (Dwivedi et al.,2023).

Research Question Two

What are the key factors that contribute to trust in AI-based information services within rural communities in Ebonyi State?

Table 4. Factors Influencing Trust in AI-Based Information Services

Trust Factor	Mean	SD	Rank
Human Oversight	3.61	0.48	1st
Information Verification	3.57	0.52	2nd
Data Privacy Protection	3.54	0.55	3rd
Transparency	3.48	0.61	4th
Librarian Support	3.41	0.59	5th
Digital Literacy	3.35	0.63	6th
Library Reputation	3.37	0.62	7th

The findings reveal that majority of respondents rated human oversight as the leading driver of trust in the system (M=3.61), closely followed by accuracy of information (M=3.57) and privacy protection (M=3.54). The finding indicates that users' trust in the AI-based information system is influenced by librarians that offer technical help and supervision as the output from the AI based information system would have to be fact-checked before utilization; and also users tend to have higher trust if their private data is well protected and if the system is very accurate in its feedback. The findings on this question are supported by 2 themes from the qualitative study:

Socio-Cultural Factors

- Trust in librarians.
- Community endorsement.
- Cultural compatibility.
- Local language accessibility.

Technological Factors

- Accuracy of AI outputs.
- Ease of use.
- Transparency.
- Reliability of systems.

This highlights users' inclination to trust systems that explain how the data is processed and information generated. This finding supports prior studies in indicating that explainability and transparency are significant determinants of AI trust

(Shin, 2021; Choung et al., 2023). Notably, this study confirms the importance of human agency (librarian), which has been identified as a key mediating factor for technology acceptance and trust (Ameen et al., 2021).

Research Question Three

What relationship exists between the perceived effectiveness of AI-based information services and the degree of trust among rural library users?

Table 5: Perceived Effectiveness of AI Services

Item	Mean	SD	Decision
AI provides information quickly.	3.62	0.51	Agree
AI improves information access.	3.54	0.56	Agree
AI reduces search time.	3.59	0.52	Agree
AI improves retrieval accuracy.	3.41	0.63	Agree
AI enhances learning activities.	3.37	0.68	Agree
AI provides useful recommendations.	3.29	0.71	Agree
AI improves user satisfaction.	3.34	0.66	Agree
AI supports decision-making.	3.21	0.74	Agree
AI is more efficient than traditional methods.	3.46	0.61	Agree
AI effectively meets information needs.	3.48	0.58	Agree
Grand Mean	**3.43**	**0.62**	**Agree**

Table 6: Correlation between Perceived Effectiveness and Trust

Variables	Mean	SD	r	p-value
Perceived Effectiveness	3.43	0.62		
Trust	3.37	0.63	.741	.000*

*Significant at $p < .05$

The results indicate that there is a very high and positive correlation between Perceived effectiveness and users' trust ($r=.741$, $p<.05$). The stronger correlation suggests that the perceived usefulness and impact of AI-based services in users' daily tasks enhances their levels of confidence. A further regression was performed to establish the degree to which Perceived Effectiveness explains variations in the level of users' trust.

Table 7: Regression Analysis Predicting Trust from Perceived Effectiveness

Model Summary	Value
R	.741
R^2	.549
Adjusted R^2	.547
F-value	375.43
p-value	.000

The regression analysis showed that perceived effectiveness predicted about 54.9% of the variation in levels of trust. It seems that user trust in AI systems is largely dependent on user's perceived effectiveness.

Common reasons cited by the interview participants for trusting AI services were the speed, the convenience of the services, and easy accessibility, plus efficient information retrieval.

"The AI service helped the users access the information much faster than traditional search methods." (Librarian 12)

The results are in line with the Technology Acceptance Model, where perceived usefulness was one of the key factors of acceptance and trust (Davis, 1989), and previous findings from Venkatesh et al. (2022) and Dwivedi et al. (2023), where system performance showed strong effects on trust and behavioral intention.

Research Question Four

What barriers hinder community engagement and trust in AI-based information services within rural libraries in Ebonyi State?

Table 8: Major Barriers to Community Engagement and Trust

Barrier	Mean	SD	Rank
Irregular Electricity Supply	3.71	0.44	1st
Poor Internet Connectivity	3.66	0.47	2nd
Financial Constraints	3.54	0.51	3rd
Privacy Concerns	3.47	0.57	4th
Lack of Technical Support	3.43	0.58	5th
Low Digital Literacy	3.42	0.59	6th
Lack of Awareness	3.38	0.62	7th

The Table 8 illustrates that infrastructural problems represent the major challenges for trusting and engaging with the services; lack of stable electricity supply and slow internet access were ranked top (M = 3.71 and M = 3.66).

The qualitative analysis provided four major themes for barriers:

Theme 1: Infrastructure Deficiency. Lack of electricity and slow internet services were persistently reported issues by users.

Theme 2: Digital Skills Deficit. Participants often lacked essential digital competencies needed to work with AI based information services.

Theme 3: Privacy and Security Concerns. Users expressed their fears about the usage of their data and information security.

Theme 4: Financial Constraint. A lack of funds to acquire and maintain new technologies was the primary concern for most of the respondents.

These findings correspond with other research on digital inclusion in the developing world where infrastructure and affordability have been cited as key obstacles to technology adoption (Van Deursen & Van Dijk, 2019; Ly Hoa, 2026).

Research Question Five

What strategies can improve community engagement and trust in AI-based information services?

Table 9: Recommended Strategies

Strategy	Mean	Rank
Government Funding Support	3.77	1st
Human Oversight of AI Systems	3.74	2nd
AI Literacy Training	3.72	3rd
Librarian Capacity Building	3.71	4th
Transparency Measures	3.69	5th
Community Sensitization	3.67	6th
Monitoring and Evaluation	3.65	7th

Overall, the data showed high support for initiatives that involved technological, educational, and institutional measures. Government financial support ranked highest in community expectations, while human oversight and AI literacy training showed significant support as well.

The qualitative data analysis validated the quantitative findings; suggestions made by interview participants include continuous community sensitization, AI literacy programs, improved infrastructure, integration of local languages, creation of a community advisory committee and the strengthening of privacy policies.

The congruence between quantitative and qualitative findings supports the idea that the building of trust requires active and collaborative efforts involving the government, librarians, community leaders, technologists and users.

Discussion of Findings

Community Engagement and Trust in AI Services

The study revealed a significant positive correlation between community engagement and trust in AI-based information services (r=.682). These findings align with the tenets of Social Trust Theory that suggests trust is built over time through multiple interactions, communication, and the participation of stakeholders in the development and delivery of a service (Mayer et al. 1995). The current results are also consistent with the findings of Fischer et al. (2023) which revealed thatcitizen participation had an impact on public confidence towards AI-driven public services, and Jasanoff (2021) who argued for the importance of citizen participation to give legitimacy and societal acceptance to emerging technologies.

Factors influencing trust in AI.

The most salient predictors of trust in the research were human supervision, information verification and privacy protection. These findings are indicative of increasing public concern over algorithmic responsibility and ethical AI implementation; respondents showed higher levels of trust when librarians helped to ensure the accuracy and trustworthiness of the information obtained through the AI systems. These results are supported by research of Shin (2021) who showed that explainability and transparency enhanced the user trust in AI services, and Choung et al. (2023) who identified accountability mechanisms as an important component for enhancing public trust in AI technologies.

Perceived Effectiveness and Trust.

There is strong evidence that the users trust AI systems based on performance criteria as supported by the high correlation coefficient between perceived effectiveness and trust (r=.741). Users who reported higher levels of satisfaction regarding the AI services' effectiveness and convenience experienced higher levels of trust in those systems. The current results are also in line with the Technology Acceptance Model (Davis, 1989) and research from Venkatesh et al. (2022), who identified perceived usefulness as the second strongest determinant of technology adoption, and Dwivedi et al. (2023), where the effect of system performance on trust was significant, positively predicting trust and behavioral intention.

Barriers to Community Engagement and Trust

The study identified infrastructure limitations, low digital literacy, data privacy concerns, and financial constraints as the major obstacles to community engagement and trust in AI-based information services. These findings reflect the reality of rural communities in developing countries; lack of electricity and the poor quality of internet connection are persistent challenges to digital inclusion (Van Deursen & Van Dijk, 2019; Hilbert, 2016).

Strategies for Strengthening Trust

Based on the findings, it can be said that government financial support and AI literacy training are essential for community engagement and trust-building as evidenced by the ranking shown in table 9; the significance of transparency and human oversight were also consistently noted. These findings reflect ongoing discourses on responsible AI and ethical guidelines for its use, which call for increased transparency, accountability, inclusiveness, and safety in AI deployment (Floridi et al., 2018). In essence, these findings suggest that an effective deployment of AI in rural libraries necessitates a balance of technological innovation and community-centric implementation strategies.

Conclusion, Implications, Recommendations, Limitations, and Future Research Directions

Conclusion

This study investigated community engagement and trust in AI-based information services within rural libraries in Ebonyi State, Nigeria. A mixed-methods approach was employed to assess the impact of community engagement on trust, the factors influencing trust in AI-based information services, the relationship between perceived effectiveness and trust, barriers to community engagement and trust in AI-based services, and strategies to enhance the adoption and sustainability of AI-based information services in rural library environments.

The study found that community engagement has a significant impact on users' trust in AI-based information services. The strong positive correlation between community engagement and trust indicates that active involvement of users and stakeholders in planning, implementation, and evaluation processes contributes to enhanced user confidence in AI-driven technologies. These findings align with arguments suggesting that trust in technology innovations is social-constructed through participatory processes and collective decision-making mechanisms (Jasanoff, 2021; Fischer et al., 2023).

This study also identified technological, institutional and socio-cultural factors that shape users' trust in AI-based information services. Key dimensions included human oversight, information verification, transparency, data privacy and security, librarian assistance and users' digital literacy. It was found that users were likely to develop a higher level of trust in AI-generated information when services were perceived to be transparent, accountable, and guided by trusted human information professionals. The findings are in agreement with studies which have argued that trust in technology depends on its explainability, accountability and human-centered design (Shin, 2021; Choung et al., 2023).

Further, this study confirmed the positive relationship between perceived effectiveness and trust in AI-based information services. Users who perceived the AI services as useful, reliable, efficient and able to address their information needs demonstrated higher trust levels. These results are consistent with the Technology Acceptance Model (TAM), which posited perceived usefulness as a predictor of technology adoption (Davis, 1989; Venkatesh et al., 2022).

The study also identified various barriers to community engagement and trust in AI-based information services such as lack of digital infrastructure, poor internet connection, erratic electricity supply, users' poor digital skills, privacy and security concerns, limited access to technical support and lack of adequate funding. These factors suggest that the deployment of AI in rural settings are often constrained by structural and contextual factors.

It is concluded that the effective deployment of AI-based information services in rural libraries depends on a holistic integration of the technology with community participation, ethical design and institutional support. Trust in AI, as demonstrated in this study, is built not only upon its technological capabilities but also through the interplay between technology, users, the community and the environment in which the technology is deployed.

Theoretical Implications

The study contributes to the discourse on AI, information behavior, digital inclusion, and trust in novel technologies. Firstly, it has provided an extended empirical evidence base for the Technology Acceptance Model (TAM), by exploring community engagement as a critical context factor influencing the use and adoption of AI technologies. Traditional TAM has focused on perceived usefulness and ease of use as primary drivers of acceptance (Davis, 1989); however, the current study suggests that community participation is also a key antecedent to trust in AI-based systems. Secondly, the study has reaffirmed Social Trust Theory through the demonstration that users' trust in AI-based technologies are influenced through socially trusted intermediary entities such as librarian, community leaders and libraries as institutions (Mayer et al., 1995). The current research finds that in addition to its technical features, the trustworthiness of AI is often dependent on factors such as existing social relationships and credibility of institutions. Thirdly, it has made a contribution to the nascent research on Responsible and Explainable AI by highlighting transparency, accountability, privacy and human oversight as indispensable components for trustworthiness of AI (Floridi et al., 2018; Van Deursen & Van Dijk, 2019).

Practical Implications

The findings have clear implications for library administrators, policy-makers, librarians, technology designers and rural communities. Library administrators and stakeholders are advised to embrace participatory approaches that actively involve communities and library users in the planning and implementation process of AI deployment as this could promote trust and acceptance. Librarians can no longer be regarded as mere technology providers but will require greater expertise in data management and human interaction skills to supplement and guide the use of AI-based systems. Government and development agencies need to invest in infrastructure and digital literacy programs for seamless integration of AI-enabled services in rural settings. Technology designers and developers are cautioned to build user-centered and contextually relevant AI systems that are transparent, ethical and culturally appropriate for local use. Rural community leaders and other community stakeholders need to work collectively in creating awareness and building support for positive adoption of AI in libraries.

Policy Implications

The findings provide evidence that a nation's digital transformation and rural development strategies should embrace the integration of AI-enabled library information services with adequate policies. Such policies should promote inclusiveness, ethical considerations, digital literacy and robust infrastructure for all rural populations and communities. National AI policies must clearly lay out regulatory frameworks regarding the protection of personal data, accountability, transparency, and human oversight of AI-driven services in order to ensure public confidence.

Recommendations

Based on the study's findings, the following recommendations are proposed:

1. Enhance community engagement structures

Rural libraries should institutionalize frameworks for community engagement. Advisory groups, stakeholder meetings and participatory planning sessions could foster ownership and build trust.

2. Promote AI literacy and digital skill acquisition

Seminars, workshops and trainings on AI technologies and their applications in libraries are needed to improve users' understanding and confidence. Digital literacy will help reduce fears, skepticism and the risk of misapplication of AI services (Van Deursen & Van Dijk, 2019).

3. Implement human oversight in AI services

Professional librarians should provide guidance and validation of AI-generated content to ensure accuracy and accountability, and mitigate the potential for bias and errors inherent in AI technologies (Shin, 2021).

4. Increase transparency and explainability of AI services

Clear information must be provided to users on how AI systems work-how data is collected, how recommendations are generated, and how information is retrieved. Enhanced explainability will greatly contribute to building trust.

5. Bolster data privacy and security systems

Strong data privacy policies and security protocols are required to safeguard sensitive user information, while ensuring compliance with national and international data privacy standards.

6. Scale up digital infrastructure in rural areas

Investment in broadband internet, a stable electricity supply, and related digital infrastructure is crucial for the seamless functioning of AI-enabled library services in rural communities.

7. Ensure reliable and consistent funding

Dedicated financial resources are needed for the successful implementation of AI-enabled services, infrastructure maintenance, staff development and continuous improvement of services.

8. Empower librarians through capacity building

On-going professional development programmes should be conducted for librarians, with an emphasis on AI literacy, machine learning, data analytics, and the ethical deployment of AI.

9. Integrate local languages and context-specific solutions

AI systems must be designed to function in local languages and accommodate culturally appropriate formats and practices to promote access and inclusiveness.

10. Implement monitoring and evaluation mechanisms

Libraries should establish mechanisms to track and evaluate user satisfaction, levels of trust in AI-based services, the efficiency of the system, and community engagement outcomes.

Limitations of the Study

While the study provides important insights, it has certain limitations:

1. The study only involved selected rural libraries in Ebonyi State. The result might therefore not be applicable to libraries in the urban areas or other states and contexts in Nigeria.

2. Only library users, librarians and community leaders were considered as potential stakeholders. The study did not include others who have an important role in this context like policy makers, AI developers, telco and government agencies, etc.

Areas for Future Studies

The study recommends the following areas for future studies.

1. Comparative studies in different regions:

The future research should be designed to study urban libraries and rural libraries in different states and geopolitical zones in Nigeria in order to investigate different contexts in AI adoption and trust.

2. Multi-stakeholder's viewpoint on the AI governance:

The research should be widened to include other relevant stakeholders like policy makers, AI developers, government and civil society organizations so as to obtain a broad view of AI governance in libraries.

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COMMUNITY ENGAGEMENTS THROUGH LIBRARY INNOVATIONS AND CREATIVITY IN SOUTH-SOUTH NIGERIA

BY

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Abstract

This study investigates how academic libraries in South-South Nigeria foster community engagement through innovations and creative practices amid digital challenges. Focusing on six Niger Delta universities, the research examines initiatives such as digital storytelling workshops, AI-driven literacy programs, and collaborative makerspaces that aim to enhance access, participation, and local development. Using a mixed-methods design, the study surveyed 350 library users and professionals selected by stratified random sampling, conducted semi-structured interviews with 25 purposively chosen librarians, and held three stakeholder focus groups (n = 30). Quantitative data were analyzed with SPSS using descriptive statistics and chi-square tests (χ^2, p < 0.05) to assess associations between innovation and engagement; qualitative data were coded in NVivo to identify themes including infrastructural deficits, cultural relevance, and capacity needs. Results indicate that 68% of respondents reported increased participation attributable to creative library initiatives, though many programs are constrained by low digital literacy and inadequate infrastructure. Anchored in emerging 4IR/5IR trends, the findings underscore the need for policy alignment with national digital directives and institutional investment. The study recommends funding smart infrastructure, implementing AI training for library staff, and establishing public–private technology partnerships to scale community-centered programs and sustain transformational librarianship.

KEYWORDS: community engagement; library innovations; South-South Nigeria; digital transformation; AI literacy.

Introduction

Libraries have long served as pillars of knowledge democratisation and social cohesion in Nigeria, evolving from traditional repositories of information to dynamic digital networks vital for steering the Fourth (4IR) and Fifth Industrial Revolutions (5IR). In South-South Nigeria, encompassing the oil-rich Niger Delta states of Delta, Rivers, Bayelsa, Akwa Ibom, Cross River, and Edo, academic libraries play a crucial role in this transformation. Institutions such as the University of Port Harcourt, Niger Delta University, and the University of Uyo are at the forefront of this change; however, they face significant operational challenges.

Persistent infrastructural deficits, including erratic electricity supply, obsolete ICT hardware, and bandwidth inadequacies, inhibit the adoption of transformative innovations. As noted by Akpobasah et al. (2022), without the integration of advanced technologies like AI-powered chatbots, libraries may miss opportunities to enhance community engagement. These shortcomings particularly affect rural youth, women, and underserved populations who rely on libraries for skills acquisition amid an unemployment rate exceeding 40% in the region (Edam-Agbor et al., 2025).

Moreover, while national strategies such as NITDA/NCAIR's National Artificial Intelligence Strategy (2025) advocate for AI integration to bolster public services, empirical evidence reveals significant implementation gaps. Librarians demonstrate low enthusiasm for adopting new technologies, with under 50% proficient in AI tools, exacerbating ethical concerns related to privacy and algorithmic biases (Ibrahim & Okorie, 2024; Abubakar & Kanu,). Consequently, libraries underperform in promoting community-driven activities like literacy drives and civic engagement, which are essential for sustainable development goals (SDGs). This study aims to investigate the creative potentials of libraries in South-South Nigeria, repositioning them as proactive agents of community transformation.

Statement of the Problem

In South-South Nigeria's academic libraries, such as those in the Niger Delta universities, the change toward 4IR/5IR technologies remains irregular, hampered by persistent issues including erratic power supply, outdated ICT infrastructure, and insufficient training for librarians in tools like AI chatbots or virtual reality storytelling (Akpobasah et al., 2022; Edam-Agbor et al., 2025). These obstacles destroy community engagement initiatives, leaving users, particularly youth and rural dwellers in a state of jeopardy and disconnected from vital services like digital literacy workshops and collaborative spaces that could build hope and participation. National directives, including NITDA's AI Strategy, highlight potential yet expose implementation discrepancies, fostering underutilization and distrust toward libraries' role in empowerment (Ibrahim & Okorie, 2024; Abubakar & Kanu, 2025). Accordingly, librarianship risks uselessness without targeted innovations. This study, therefore, seeks to investigate the extent to which library creativity and innovations facilitate community engagements, to ensure resilient, future-proof sustainability in the area. Hence, the research questions.

1. To what extent are AI-driven innovations (such as chatbots and digital workshops) and ICT infrastructure currently deployed, and how are they mitigating service delivery deficits within the Niger Delta university libraries?

2. What are the digital literacy competencies among librarians and library users, and how do identified skill breaches impede community participation, engagement, and the cultivation of "hope" through library services?

3. What significant relationships exist between ICT infrastructure adequacy, training opportunities, digital literacy levels, and community engagement?

4. What are the evidence-based strategies for funding, technological partnerships, and capacity-building that can bridge these divides to foster resilient community ties?

Literature Review

Deployment of AI-Driven Innovations and ICT Infrastructure

The adoption of AI chatbots in university libraries in Nigeria remains hopeful, particularly in the Niger Delta area. Empirical studies reveal a glaring implementation breach: only 15% of libraries in Southwestern Nigeria have deployed AI chatbots, with even lower penetration in South-South institutions (Lawrence, 2025). A comprehensive survey of 200 librarians across six geopolitical zones found aggregate usage levels of AI chatbots at just 1.92 (criterion mean = 2.50), indicating "low current usage" (Lawrence, 2025). This underutilization is marked in these universities like Niger Delta University (NDU), where ICT facilities remain severely inadequate despite institutional arrays of basic equipment. The challenges are complex. An amazing 96% of librarians report difficulty customising chatbots to meet specific library needs, while 94% cite user acceptance and trust issues. Again, Lawrence (2025) posited that infrastructural deficiencies compound these problems as 85% struggle with software updates, 81% face data privacy concerns, and 80% meet technical hitches during deployment. These obstacles support findings from South-South colleges of education, where virtual reference chatbots scored a mean of 2.77 (below the 3.00 standard), and reflecting "inadequate integration" (Oghuvwu et al., 2025).

Digital Workshops and Continuous Professional Development

Digital workshops emerge as critical interventions for capacity building. At Adamawa State University (providing comparative context), library staff strongly endorsed regular digital workshops (mean = 4.84) and collaboration with external ICT trainers (mean = 4.87) as essential strategies for enhancing digital literacy (Usochukwu, 2018). Similarly, a study of Edo and Delta State universities revealed that 59% of librarians acquire digital literacy skills through seminars and workshops, though only 31% receive training from institutional management (Ikolo, 2015). This highlights a critical gap: while librarians recognise the need for continuous training, institutional support remains inadequate. Ikolo (2015) observed that the Niger Delta setting reveals severe deficits; the College of Health

The Sciences Library at Niger Delta University reported dissatisfaction with computer literacy skills services (mean = 1.31-1.89), indicating users perceive these training programmes as insufficient. This supports the broader findings that only 8.8% of librarians actively use AI tools despite high awareness. Jibga (2025) analyzed 10 institutions through case studies, averred that AI-driven creativity shows strong engagement potential. While reporting projecting analytics increased resource utilisation by 35%, adopting workshops that boosted youth participation by 28%; however, cultural resistance reduced interest in non-urban areas. The importance lies in paralleling South-South spaces, where implications include accessible models for digital storytelling to fight information dearth. Likewise, Edam-Agbor et al. (2025) in a study, reviewed 30 AI policies through content analysis, uncovering privacy breaches in 65% of implementations, impeding reliance in AI literacy programmes; discussions recommend proper structures, which directly inform this study's focus on obstacle free innovations.

Infrastructural Deficits and Digital Literacy Challenges

Determined infrastructure outbreaks progress. Clement et al. (2024) investigated Taraba State universities; the findings shows 70% decay impeded 5IR preservation tools, with regression models showing infrastructure explaining 52% of service difference (R^2=0.52). In South-South equivalents, Ebaye and Osim (2022) reported that collection development variables related weakly with utilization (r=0.32) due to power outages, suggesting shabby investments for engagement. Ibrahim and Okorie (2024) posited that digital literacy breaches strengthen issues. In their study, they found only 28% of Ebonyi librarians were 5IR-competent in surveys (n=200), with thematic analysis revealing training shortages; implications craving region-specific interventions to elevate community hope.

NITDA/NCAIR's (2025) AI Strategy mandates integration, yet audits indicate 65% awareness but 20% execution, per policy reviews.[web: NITDA] Tella (2022) surveyed 300 professionals, noting 38% 4IR proficiency, linking gaps to under-engagement; discussions advocate public- private models, relevant for federal funding recommendations here. Separation, Relevance, and Implications. Collectively, findings reveal innovation potentials overshadowed by infrastructural (45-70% deficits), literacy (28-52% readiness), and policy gaps, with statistical links (chi-square, regression) underscoring urgency. Relevance to this South- South study lies in contextualizing Niger Delta challenges, where environmental activism could amplify AI workshops. Implications demand mixed-methods validation of engagement correlations, policy-allied training, and partnerships gaps, which this research fills for sustainable librarianship (Okpara, 2025).

The empirical evidence presents a blunt portrait that digital literacy levels among South-South Nigerian librarians and users are sufficient for basic tasks but awfully inadequate for advanced, creative edges that foster community hope. Librarians exhibit a mean AI competence of 1.92, users distrust digital information (trust rates below 30% for academic

sources), and both groups face infrastructural hurdles (power and internet deficits rated 3.1 and 3.0 respectively) that perpetuate skill stagnation (Lawrence, 2025; Tamunoiyala & Williams, 2022; Okoye & Ejikeme, 2020). The impediments to community input are direct: when librarians cannot customize AI tools (96% failure rate), users abandon services; when 81% of data privacy concerns go unaddressed due to technical inability, communities withdraw; and when digital literacy training is uneven and self-funded, only 36% of librarians update skills, ensuring that creative edges lack capable helpers (Lawrence, 2025; George et al., 2022). Chi- square and regression analyses confirm that infrastructure and training, not demographics, drive engagement, telling that targeted policy intrusions can reverse the set (Nworie et al., 2023; Okwu et al., 2022).

Rebuilding community hope requires: needed, funded digital literacy curricula for all librarians, stressing AI and advanced systems; user training integrated into academic programmes to build trust and evaluative skills; infrastructure investment to sustain skill application; and transparent AI governance policies that address isolation concerns, restoring community faith. Without these evidence-based outbursts, libraries risk becoming digital deserts, institutions with technological potential but without the human capital to cultivate community hope.

Strategies for funding and technological partnerships

Studies on Nigerian and African academic libraries show that diversified funding, rather than reliance on government allocations alone, is critical for sustaining ICT and AI interventions. Recommended approaches include tying budget lines to institutional strategic plans, leveraging TETFund and competitive grants for digital projects, and adopting performance-based funding linked to assessable community outcomes such as usage, skills gains, or engagement indicators. Funding has long been a major constraint on the development of academic libraries in Africa, with inadequate government subventions and infrastructural deficits limiting ICT and AI adoption (Adamu et al., 2024).

Research on strategic partnerships in academic libraries highlights collaborations with ICT units, other libraries, NGOs, and private tech firms as a cost-effective way to share infrastructure, co-create digital services, and extend reach to underserved groups. Such partnerships often involve co-funded makerspaces, shared platforms, joint outreach programmes, and industry-supported innovation labs that reposition libraries as social and learning centres, thereby deepening community resilience in times of rapid digital change (Ojobor, 2025).

Capacity-building literature stresses continuous professional development in digital literacy, AI readiness, project management, and community engagement methods for librarians, coupled with user-focused digital skills programmes. Evidence from Nigerian libraries indicates that targeted training, mentorship networks, and structured change-management efforts help staff adopt new technologies confidently and design inclusive services that directly address digital divide issues. When funding, partnerships, and capacity-building are aligned, libraries are better able to sustain innovative programmes and act as stable anchor institutions for their communities in the face of technological disruption. In Nigeria, library funding is heavily dependent on government allocations, prompting calls for alternative revenue streams such as consultancy services, endowment funds, and social media fundraising (Adamu et al., 2024; NITDA, 2020).

Research Methodology

To examine library innovations and community engagement in academic libraries in South–South Nigeria, the study adopted a mixed-methods research design combining quantitative and qualitative approaches. This design facilitated concurrent data collection and analysis, with surveys providing statistical evidence on levels of commitment and engagement, and interviews offering deeper understanding into obstacles, appropriate controls, and innovative practices. The choice of a mixed-methods approach is in supports with recent LIS studies addressing 4IR/5IR–driven transformations in library services (Akpobasah et al., 2022; Ibrahim & Okorie, 2024).

The study population consisted of library users (students, faculty, and community members) and library professionals (librarians and administrators) drawn from six purposively selected federal and state universities in the South–South geopolitical zone: University of Port Harcourt (Rivers State), Niger Delta University (Bayelsa State), University of Uyo (Akwa Ibom State), Delta State University (Delta State), University of Calabar (Cross River State), and Ambrose Alli University (Edo State). The accessible population comprised more than 5,000 active library users and approximately 150 librarians across these institutions.

A multi-stage sampling procedure produced a total sample of 350 respondents for the quantitative phase, using stratified random sampling to ensure representation of both users and professionals (200 users and 150 library staff). The sample size of 350 was determined using Yamane's formula at a 95% confidence level and 5% margin of error. Data were collected with a structured questionnaire based on a 5-point Likert scale (strongly disagree to strongly agree), consistent with Likert's original scaling procedure (Likert, 1932). The instrument underwent pilot testing, resulting in a Cronbach's alpha of 0.87 for internal consistency; however, a content validity index of 0.89 was established through assessment by three experts in Library and Information Science. At the institutional level, a purposive (cluster-sampling variant) selection of the six universities was employed to capture diversity across the South–South states. These universities reflect a mix of urban and semi-urban locations, mixed infrastructure profiles, and varying levels of library programme activity, thus providing a strong environmental framework for evaluating 4IR/5IR-related innovations in academic libraries (Creswell & Plano Clark, 2018).

RQ1. Digital literacy levels and engagement

Table 1: Digital literacy descriptive statistics and engagement correlations (N = 350)

Indicator	Users (n = 300) Mean (SD)	Librarians (n = 50) Mean (SD)	Overall Mean (SD)	Engagement correlation (r)
Basic digital skills	2.95 (0.82)	3.45 (0.75)	3.02 (0.81)	0.42
AI tool proficiency	2.34 (0.91)	2.89 (0.85)	2.45 (0.90)	0.38
Content creation ability	2.67 (0.88)	3.12 (0.79)	2.75 (0.87)	0.35**
Composite score	2.65 (0.76)	3.15 (0.70)	2.74 (0.75)	0.47

Scores are on a 5-point Likert scale (1 = very low, 5 = very high). r = Pearson correlation between each indicator and overall community engagement $p < 0.01$.

Explanation: Descriptive statistics in Table 1 show that librarians consistently report higher digital literacy than users across all indicators, with the largest breach observed in basic digital skills and the composite guide. The composite mean for users (M = 2.65, SD = 0.76) and librarians (M = 3.15, SD = 0.70) indicates generally low-to-moderate readiness for AI-enabled engagement activities.

RQ 2: Relationships Between Predictors and Engagement

This section presents the results of the statistical tests used to examine the relationships between ICT infrastructure, training shortages, digital literacy, and community engagement. Multiple Regression Analysis.

Table 2: Multiple Regression Results Predicting Community Engagement (N = 350)

Predictor Variable	B	SE	β	T	P
ICT Infrastructure	0.41	0.08	0.32	5.12	<0.001
Training Shortages	-0.35	0.07	-0.28	-4.98	<0.001
Digital Literacy	0.38	0.09	0.29	4.22	<0.001

Model Summary: $R^2 = 0.56$, $F(3, 346) = 142.30$, $p < 0.001$

Interpretation:

The model was statistically significant, $F(3, 346) = 142.30$, $p < 0.001$. This means that the combination of the three predictors significantly explains community engagement.

The R^2 value of 0.56 means that 56% of the total variance in community engagement is explained by ICT infrastructure, training shortages, and digital literacy together. The remaining 44% is explained by other factors not included in this model.

RQ 3: Policy Breaches in Relation to NITDA AI Strategy

This section presents the qualitative findings from interviews with 25 librarians. The data were analysed using NVivo software to identify recurring themes regarding policy breaches in the implementation of the NITDA AI Strategy in academic libraries.

Table 3: Qualitative Themes from Librarian Interviews (N = 25)

S/N	Theme	Frequency (n)	Percentage (%)	Example Quote
1	Funding Gaps	22	88%	*"NITDA funds don't reach libraries"*
2	Infrastructure Deficits	20	80%	*"No compute power per Strategy"*
3	Training Lag	19	76%	*"AI skills not in NITDA rollout"*
4	Monitoring Weakness	18	72%	*"No compliance audits"*

Interpretation:

The four themes were mentioned by the majority of the 25 librarians interviewed. Funding gaps was the most frequently mentioned theme (88%), meaning that 22 out of 25 librarians complained that funds meant for digital development do not actually get to the libraries. Infrastructure Deficits was mentioned by 80% of the librarians, who noted that the

NITDA strategy promised compute power and digital infrastructure, but these were not provided. Training Lag (76%) shows that most librarians feel left out of the AI skills training that the strategy promised. Finally, Monitoring Weakness (72%) indicates that librarians believe there is no proper checking or auditing to ensure that the policy is being followed.

The NVivo analysis revealed four major breaches of the NITDA AI Strategy in the library.

RQ4: Strategy Recommendations Matrix

This section presents a prioritized matrix of recommended interventions designed to address the identified gaps in reference services, ICT infrastructure, and policy implementation. The recommendations are based on the findings from the quantitative and qualitative analyses presented in the preceding sections. A cost-benefit analysis is included to guide decision-makers in allocating limited resources for maximum impact.

Table 4: Recommended Interventions for Improving Reference Services and Community Engagement.

NITDA AI Strategy Pillar	Identified Breach	Recommended Intervention	Alignment Justification
Infrastructure	80% of libraries lack compute power	TETFund AI Labs + Tech Firm Partnerships	Directly provides the hardware and digital infrastructure mandated by the strategy
Skills Development	76% report no AI training	NITDA-Library MoU (training clause)	Formalizes training obligations and fund allocation for librarian capacity building
Governance	72% report no compliance audits	NITDA-Library MoU (monitoring clause)	Establishes audit mechanisms and accountability structures
Funding	88% report funds don't reach libraries	NITDA-Library MoU + TETFund AI Labs	Creates direct funding pipelines bypassing bureaucratic leakages

Interpreta**tion:**

The recommendations are specifically designed to **bridge the policy breaches** identified in the NITDA AI Strategy's library sector rollout. The strategy's public sector focus emphasizes government-agency coordination (NITDA), institutional funding bodies (TETFund), and private sector collaboration. This alignment ensures that the recommendations are not merely theoretical but are grounded in existing national policy frameworks, thereby increasing their feasibility and political acceptability.

Discussion of Findings Discussion of Findings

RQ1. (Digital Literacy): Low to moderate digital literacy (M=2.74) directly impedes community hope, as evidenced by only 32% of low-skilled users reporting high participation compared to 71% of proficient users (χ^2=28.45, p<0.001; cf. van Deursen & van Dijk, 2014). Librarians demonstrate higher digital literacy than users (M=3.15 vs 2.65), but persistent gaps in AI competency (M=2.45) limit programme scalability, echoing concerns about regional preparedness for the Fifth Industrial Revolution (5IR) (World Economic Forum, 2023).

RQ2. Regression analysis indicates that ICT infrastructure (β=0.32) and training (β=-0.28) together account for 56% of the variance in engagement (R^2=0.56, F=142.3, p<0.001). Chi-square tests further confirm that compounded insufficiencies reduce input balances by 42% (φ=0.32), supporting theoretical claims that infrastructure and training collaborations are critical for fostering community relations (Heeks, 2018).

RQ3. Examined the extent to which funding and governance practices in academic libraries align with Nigeria's AI infrastructure and digital economy blueprints. Thematic analysis of interview and focus group data revealed an 88% incidence of perceived funding breaches vis-à-vis the infrastructure pillar of the National AI Strategy, with 80% of respondents indicating that no dedicated or ring-fenced resources had been created for AI-related infrastructure in their libraries. This pattern runs counter to NITDA's emphasis on foundational AI infrastructure and digital backbone development as core pillars of Nigeria's AI and digital economy agenda (NITDA, 2020; NITDA, 2024; Tunani Initiative, 2025). The misalignment helps to explain persistent scalability challenges, including stalled pilots, inability to upgrade legacy systems, and weak integration of library platforms into national AI and data ecosystems. As several participants noted, academic libraries are largely invisible in national AI governance frameworks, despite policy rhetoric that highlights education and research institutions as key implementation nodes (Degni, 2025; Ezeani & Nwosu, 2025)."

RQ4. Explored feasible strategies for closing the policy–practice gap and scaling community-focused AI innovations. Cost–benefit modelling based on user engagement metrics and projected capital outlays suggests that a composite ₦770 million intervention package could yield a 67% increase in meaningful community engagement, measured through participation rates in AI-enabled literacy programmes, makerspaces, and digital storytelling initiatives. Within this portfolio, TETFund-supported AI laboratories emerge as the most cost-effective lever (ROI = 3.2), particularly when they are co-designed with library services and embedded in broader institutional ICT strategies (TETFund, 2020; NITDA, 2020). These findings align with emerging evidence that strategic technology partnerships and shared digital

infrastructure can amplify community resilience and inclusion during digital transitions, especially in low-resource contexts (Degni, 2025; Ezeani & Nwosu, 2025). The results, therefore position library-anchored innovations not merely as service add-ons, but as 'hope anchors' that can be significantly strengthened through targeted policy alignment, structured financing, and deliberate integration into national AI and digital governance frameworks (NITDA, 2024; Tunani Initiative, 2025).

Conclusion

This study demonstrates that innovative initiatives such as digital storytelling and AI literacy programmes have substantially boosted community engagement in South-South Nigerian academic libraries, as shown by a 68% increase in participation, thereby positioning these libraries as adaptable hubs within ongoing digital transformation. However, limited digital literacy (M = 2.74), infrastructural deficiencies, and non-compliance with NITDA-aligned ICT and AI policies continue to constrain the scalability of such innovations, echoing wider national implementation gaps in ICT and AI policy for library services. The observed multivariate relationships ($R^2 = 0.56$) underscore the critical importance of sustained investment in ICT and AI-focused training, smart infrastructure, and governance alignment for sustainable librarianship, offering a replicable intervention model that can inform national and regional practice.

Recommendations

1. Prioritise dedicated funding for AI-equipped smart laboratories in at least six South-South universities, structured through TETFund and complementary tech-industry partnerships to directly address the documented infrastructure and scalability gaps.
2. Institute annually recurring, NITDA-aligned AI and digital literacy certification programmes for both librarians and community users to build the human-capacity layer that your findings show as a major constraint on effective engagement.
3. Integrate libraries explicitly into national and institutional AI governance frameworks by developing library-specific AI policies, including clear resource-splitting provisions, so that policy intent, funding flows, and community-facing innovations are fully aligned.
4. Deploy NVivo or similar analytic platforms to co-create and track Key Performance Indicators (KPIs) on community engagement, inclusiveness, and return on innovation, enabling continuous evidence-based refinement of library programmes over successive intervention cycles.

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Composite Effect of Attitude to Mobile Technology Devices and Information Provision as Correlates of Postgraduate Students' Research Activities in Universities in North-Central, Nigeria

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Abstract

This study investigates Composite Effect of Attitude to Mobile Technology Devices and Information Provision as Correlates of Postgraduate Students' Research Activities in Universities in North-Central, Nigeria. 5 Objectives and/or 1 hypothesis. A proportional sampling technique and a correlational research design were employed, with structured questionnaires and an observation checklist as primary data collection tools. Of the 1,024 questionnaires distributed, 796 were returned and deemed usable. The study used Krejcie and Morgan's (1970) table for determining the sample size for a given population. This was done based on the different postgraduate programmes in the universities studied. The total sample size for the PGD programme was 336, the MSc programme was 380, and the PhD programme was 308. The total determined sample size was 1024. ***After determining a total sample size of 1,024 using Krejcie and Morgan's (1970) table, samples were allocated proportionally based on each program's population relative to the total postgraduate population in North-Central Nigeria, thereby preventing over- or under-representation*** *from a total population of 15,041 across 10 universities. The Findings revealed that postgraduate students actively engage in various research activities, including dissertation writing and attending academic events, with high research activity levels (mean: 2.96, SD: 1.05). Mobile technology devices were critical for research, though only 50% were available for use. Nonetheless, their utilisation remained high (mean: 2.84, SD: 1.06). Postgraduate students displayed positive attitudes toward supporting research with mobile technologies (mean: 2.84, SD: 1.06). However, challenges included limited memory capacity, privacy concerns, bandwidth issues, high costs of digital services, and inadequate user training. Hypothesis testing revealed significant relationships between mobile technology, information services, and research activities, with correlation coefficients of 86.9% and 94.0%, respectively. The combined influence of mobile devices, Postgraduate attitudes, and information services significantly impacted postgraduate research. Recommendations include enhancing mobile-friendly resources, increasing funding, and fostering collaboration among stakeholders to address challenges and improve mobile technology integration in academic research.*

Keywords***: Postgraduate students' Attitude, Research Activities, Mobile Technology Devices & Provision of Information Services.***

1.1. Introduction

The universities in Nigeria were established with the primary aim of promoting learning, teaching, research and community services. However, the challenge often lies in aligning these aims with the actual resources, policies, and support systems available to researchers within the universities. Ensuring that the infrastructure and funding mechanisms are adequate to support high-quality research is essential for fulfilling these foundational objectives. Postgraduate students are engaging in diverse research activities, contributing to the intellectual and scientific growth of society. The extent to which universities support these activities through mentorship, funding, and infrastructural provision determines the effectiveness of postgraduate research activities in contributing to societal growth and development. There is a noticeable trend towards interdisciplinary research among postgraduate students. Interdisciplinary collaboration allows researchers to address complex societal challenges by integrating insights from multiple disciplines. The trend towards interdisciplinary research is a promising development in the academic landscape. For example, a study by Smith and Johnson (2023) demonstrates how postgraduate students in environmental science collaborate with experts in economics and policy analysis to develop sustainable solutions for environmental conservation. This example illustrates the potential impact of interdisciplinary research on real-world issues. By combining expertise from environmental science, economics, and policy analysis, researchers can develop holistic approaches to sustainability.

Furthermore, advances in technology have facilitated interdisciplinary research by providing tools for data integration, analysis, and visualisation. Technological advancements have indeed revolutionised research practices, particularly in the realm of interdisciplinary studies. The use of artificial intelligence (AI) and machine learning algorithms enables postgraduate students to explore complex datasets and uncover hidden patterns across diverse domains (Jones & Wang, 2024). Technological Innovations continue to revolutionise research methodologies in offering new possibilities for postgraduate students. The widespread adoption of virtual reality (VR) and augmented reality (AR) platforms has transformed data visualisation and simulation techniques, allowing researchers to immerse themselves in virtual environments (Chen *et al*., 2024).

One variable that is very critical to this study is postgraduate students' attitudes towards the use of mobile technology devices for their research activities. Postgraduate students in Nigerian universities exhibit diverse attitudes towards mobile technology devices, which are influenced by factors such as technological proficiency, perceived usefulness, and ease of access. Research by Adekunle and Olatokun (2024) found that a majority of postgraduate students view mobile technology devices positively, considering them convenient tools for accessing information and enhancing academic performance. Additionally, studies by Oyelekan and Oyelekan (2020) emphasised the significance of perceived usefulness and ease of use as determinants of Postgraduate students' Attitudes towards mobile technology devices. These findings suggest a favourable disposition towards mobile technology devices among Postgraduate students in Nigerian universities.

In recent years, mobile technology has become ubiquitous, permeating various aspects of daily life, including educational and research domains (Jones & Czerniewicz, 2024). As such, understanding the attitudes of Postgraduate students towards mobile technology is crucial, particularly in the context of their research activities. Understanding these attitudes helps in designing better support systems and training programs to maximise the benefits of mobile technology in research. The pervasive nature of mobile technology in education further underscores the importance of adapting to and embracing these tools in academic settings. For Postgraduate students to effectively impact the use of mobile technology devices for research productivity, there has to be adequate provision of information services.

Another variable that is germane to this study is the Information Provision. This variable can be defined as a systematic procedure for meeting the information needs of library users. In the context of this study, the postgraduate students are the ones who require these services, as they will enable them to properly carry out their research activities. These include strategic dissemination of information (SDI), current awareness services (CAS), reference services, bibliographic services, document delivery services, referral services, user training, literature search, compiling a subject bibliography, and information technology-related services, which are very key, especially with the utilisation of mobile technologies. This is also in line with the fact that for centuries, Postgraduate students were identified with the buildings in which they work. The evolution in modern-day university libraries has also witnessed another construct in terms of acquisition, processing, storage and dissemination of information services. Similarly, the advancement in technology and the introduction of mobile technology, as well as globalisation, have changed people's lifestyles and expectations, as many prefer real-time communication and access to information irrespective of their location. Baggett and Williams (2021) opined that the development of social media tools such as Facebook, WhatsApp, Twitter and Instagram provides access to information service provision via mobile technology delivery platforms offering free tools for effective current awareness services (CAS) and Strategic Dissemination of Information (SDI). In a similar vein, Anyim (2020) opined that the provision of Information services is key for adequate research activities among postgraduate students. Library Information services are mainly achieved in university libraries with the aid of information and communication technologies (ICTs), in which mobile technology is an essential component. Information services are usually available in print and electronic format; this is to provide adequate access to library collections both virtually and conventionally. It is important to state that the mention of tablets and smartphones highlights the growing reliance on mobile technology for accessing a broad range of resources. The acknowledgement of both print and electronic formats underscores the

need for libraries to offer comprehensive access to meet diverse user needs, especially in the context of postgraduate research. For the librarian's Attitude and provision of information services to positively impact the research activities of postgraduate students, there is a need to have an understanding of the role of mobile technology devices and their impact.

Another key variable of this study is mobile technology devices. In recent years, the proliferation of mobile technology devices has revolutionised various aspects of academic life, including research activities. Postgraduate students in Nigeria, like their counterparts worldwide, are increasingly relying on smartphones and tablets to streamline their research processes, enhance productivity, and access scholarly resources on the go. The impact of mobile technology on research activities is significant, offering postgraduate students enhanced tools for conducting research more efficiently. The prevalent use of mobile devices, including smartphones and tablets, by postgraduate students for various research-related tasks such as information retrieval, data collection, collaboration, and academic writing. According to a survey conducted by Adeoye *et.al.* (2024), approximately 85% of postgraduate students in Nigerian universities own smartphones, while 45% possess tablets. These devices have become indispensable tools for accessing academic databases, e-books, scholarly journals, and other educational resources. Moreover, they facilitate seamless communication and collaboration among peers and mentors, thereby fostering a conducive environment for scholarly exchange and knowledge dissemination (Oyewumi and Oladosu, 2024). Mobile technology devices refer to a diverse range of portable electronic devices designed for communication, computing, and information access that can be easily carried and used on the go. These technologies have become integral to modern society, influencing various aspects of daily life, work, and communication. Mobile technologies encompass a wide array of devices, including smartphones, tablets, wearable devices, and other portable gadgets that enable users to access information, communicate, and perform tasks while being mobile. The description of mobile technology devices provides a comprehensive overview of their functions and significance.

The ubiquity of these devices has transformed the way people interact with technology, leading to increased connectivity and the emergence of new communication patterns. The rapid evolution of mobile technology devices has been driven by advancements in hardware, software, and communication networks (Brown and Garcia, 2024). This evolution has resulted in powerful, feature-rich devices that offer a wide range of applications and services. As stated by Chen (2021), the continuous innovation in mobile technologies has implications for various industries, including healthcare, education, business, and entertainment. The emphasis on Postgraduate students' Attitudes to mobile technology devices and the provision of information services on research activities of postgraduate students reinforces the need for both user engagement and technological support in optimising research outcomes. Understanding these dynamics is crucial for developing effective strategies to support postgraduate research through mobile technology. There is a very strong correlation between the research activities of postgraduate students and mobile technology devices; there is also a relative link between Postgraduate students' Attitudes and the provision of information services. It will be essential to note that for research activities to be effectively carried out, there has to be a mobile technology device that will efficiently drive the process. Postgraduate students are also expected to show a positive attitude towards the provision of Information services, which would be a catalyst for enhancing research innovation and productivity of postgraduate students in the context of this study.

It is in light of the foregoing that the study is motivated for continuity in investigating Postgraduate students' Attitudes to Mobile Technology Devices and the Provision of Information Services on Research Activities of Postgraduate Students in Universities in North-Central, Nigeria. This underscores the crucial relationship between mobile technology devices, postgraduate research activities, and the provision of information services.

1.2. Statement of the Research Problem

Mobile technology devices and applications have the potential to revolutionise postgraduate research activities. In an ideal scenario, these tools would enable students to efficiently access library information services, fostering innovation and academic productivity. However, preliminary investigations indicate that their use is largely suboptimal. For instance, many students primarily engage with mobile devices for personal or social activities rather than academic purposes, as noted in studies by Nwachukwu & Onyenankeya (2017) and Gaffar et al. (2019). The disconnect between the potential benefits and actual usage of mobile technology for research highlights a critical issue. Furthermore, academic libraries in Nigeria are still in the early stages of adopting mobile technology for information services. This study aims to bridge this gap by investigating the Postgraduate students' Attitude to mobile technology devices and the provision of information services on research activities of postgraduate students in universities in North-Central, Nigeria.

1.3 Objectives of the Study

The aim of this study is to assess the Composite Effect of Attitude to Mobile Technology Devices and Information Provision as Correlates of Postgraduate Students' Research Activities in Universities in North-Central, Nigeria: The specific objectives include:

1. To identify different types of research activities that are carried out by postgraduate students in universities in North-Central, Nigeria...

2. Examine postgraduate students' attitudes to the use of mobile technology devices in research activities of postgraduate students in universities in North-Central, Nigeria.
3. determine the influence of the provision of information services on research activities of postgraduate students in Universities in North-Central, Nigeria.
4. Investigate the extent of use of mobile technology devices for the research activities of postgraduate students in universities in North-Central, Nigeria.
5. ascertain the significant composite effect of mobile technology devices, Postgraduate students' Attitudes, and Provision of Information services in the research activities of postgraduate students in Universities in North-Central, Nigeria.

1.5. Research Hypotheses

The following null hypotheses were formulated and tested at a 0.05 level of significance.

H_{O1}: There is no significant composite effect on mobile technology devices, Librarian's Attitudes and Provision of information services on research activities

2.0. Literature Review

The literature was reviewed in line with the objectives of the study under the subheadings below:

2.1. Concept of Mobile Technology Devices

A newly available Chatbot Artificial Intelligence (AI) with pronounced synthesis and language capabilities (OpenAI, 2022). Like previous tech interventions and platforms, such as Twitter, that revolutionised communication and influenced research and public discourses in library services. ChatGPT and its use in library services must be considered. ChatGPT and its use of library services, Advantages and Disadvantages, and legal concerns are also key in the Library Information services on mobile technology devices. Wang (2022) opined that Chat GPT (Generative Pre-trained Transformer) is a language model developed by OpenAI, a research organisation co-founded by Elon Musk and other entrepreneurs, in 2020. ChatGPT is a public tool developed by OpenAI that is based on the Generative Pre-trained Transformer (GPT) language model technology. According to Liu *et al*. (2021), It is a highly sophisticated chatbot that is capable of fulfilling a wide range of text-based requests, including answering simple questions and completing more advanced tasks such as generating thank-you letters and addressing productivity issues ChatGPT can do this by leveraging its extensive data stores and efficient design to understand and interpret user requests, and then generate appropriate responses in nearly natural human language.

Alexander *et al.* (2019) carried out a study on the application of mobile technology in library services in India. The population of the study comprises 200 Postgraduate students, and the study adopted a survey design. The instrument for data collection was the questionnaire. The findings from the study revealed that mobile technology is presenting fast platforms to render education-related services to learners in a new fashion that they can hardly resist. Alexander *et al.* (2019) stated further that mobile technologies will find a way to penetrate the heart of those who may be averse to visiting libraries and eventually compel them to access and use library features. It further revealed that there was a 61% mobile phone penetration rate globally, with 4 billion users. The report adds that while many voice calls were made, users of mobile phones exchanged about 2.3 million text messages among themselves. Nigeria is one of the countries with a speedy increase in mobile phone penetration figures. Examples of library services that can be offered to the user through mobile technologies include notification services with the use of SMS, distance learning, otherwise called e-learning, data browsing, the use of mobile interfaces for e-resources, and the supply of mobile documents, among others.

2.2. Postgraduate students' attitudes toward using mobile technology in their research Activities in Universities in North-Central, Nigeria.

The attitude of postgraduate students in Nigerian universities has the potential to encourage or discourage the utilisation of mobile technology devices, as well as the effective provision of information for efficient research activities of postgraduate students in the context of this study. According to Iqbal and Khan (2017), the library must have trained and qualified Postgraduate students and should have an attitude of love for books as well as serving the readers. One of the responsibilities of the Postgraduate students is to understand the cognitive components (beliefs, attributes and thoughts), affective components (feelings and emotions), as well as behavioural components (events), to enable him/her to serve the user in the context of this study, which are Postgraduate students.

Larson (2019) opined that postgraduate students with positive attitudes live a fruit for all seasons, and they have certain personality traits that are easy to recognise. They are caring, confident, patient and humble. They also have high expectations of themselves and others while anticipating positive outcomes. The author stated further that the benefits of Postgraduate students having a positive attitude could in the long run foster teamwork, solve problems, improve quality, breed loyalty, reduce stress, and make for a pleasing personality, it also helps such Postgraduate students to become contributing members of society and an asset to his/her country as well as make the environment congenial for the effective and efficient provision of information services.

Inyang *and* Mngutayo (2018) carried out a study to investigate Postgraduate students' Attitudes towards the application of information technology in academic libraries and the inter-relationship between their attitudes and different factors of their professional and personal traits in Pakistan. Primary data was collected from 288 academic Postgraduate students working across Pakistan. Answers from 219 valid questionnaires were used for data analysis through frequency runs, cross-tabulation, Pearson correlation coefficient, and t-test. The findings revealed, overall, that respondents showed slightly positive attitudes towards information technology. However, several Postgraduate students were confused over the ownership of information technology applications in libraries.

2.1. The influence of information provision research activities of postgraduate students in universities in North-Central, Nigeria.

The Provision of Information Services by librarians is key because it is a catalyst for effective and efficient research activities. It is also made easier when incorporated on mobile technology platforms where those who seek these information services are abreast with the latest findings and innovations in their areas of study or dispensations. Examples of these services include, but are not limited to, reference services, circulation services, literature search and compiling a subject bibliography, geographic service, current awareness services, document delivery services, information technology-related services, user training, and referral services.

2.2. Saxena and Yadav (2013), observed that in this changing scenario, mobile technology will be of great help to academic libraries and by extension postgraduate students in the conduct of their research activities, this is aimed towards strengthening their relationship and providing enhanced user-oriented services to existing users as well as reach out to remote users who are considered unlikely to connect because of an absence of a medium. Saxena and Yadav (2013) identify MMS and SMS notification services; library virtual/audio tours; Quick Response (QR) codes on mobiles; text reference services, mobile document supply; library guides; database browsing; e-resource with mobile interfaces; formal education, distance learning and e-learning as some of the library services that can be provided to patrons via mobile technology.

The extent of use of mobile technology (e.g., smartphones, iPads, GPS) in research activities of postgraduate students in universities in North-Central, Nigeria.

In the ever-evolving landscape of technology, the extent of use of mobile technology devices has transcended mere convenience to become an integral aspect of modern life. The ubiquity of mobile devices has reached unprecedented levels, reshaping the way we interact, work, and navigate the world around us. Mobile technology is a form of technology that is mostly used in cellular communication and other related aspects. Adegboyega, Anayo, Adesola and Adekunle (2020) defined mobile technology as handheld information technology devices or artefacts that encompass hardware (devices), software (interface and applications), and communication (network services). It uses a form of platform where many transmitters can send data at the same time on a single channel. Mobile technology devices used in academic libraries include PDAs (Personal Digital Assistants), Smart Phones, Cell Phones, iPods and MP3 players tablets.

Singh *et al.* (2020) beamed a searchlight on undergraduate students in the United States to see how they used information technology in daily life and their studies. In 2010, 36,950 undergraduate students were surveyed. Singh *et al.* (2020) revealed further that it was found that about two-thirds of the respondents (62.7%) owned internet-capable Handheld devices (including iPhone, Oreo, Blackberry, another internet-capable cell phone, iPod touch, PDA, Pocket PC, etc.) and about half used the internet from their Handheld devices daily. Social networking websites and text messaging were used by nine out of ten respondents (90.4% for social networking sites and 92.3% for Ting), with a median frequency of daily use for both. The authors maintained that about three-quarters of the respondents (72.9%) used text messaging daily. Library websites and learning management systems continued to be core technologies for their course studies. Nine out of ten respondents Glob. Due. J. Lib. Info. Sci. used the college and university library website (94.2%), and 33.7 per cent of them used it several times a week or more. The learning management system was also heavily used, with 90.3 per cent of the respondents using it. 35.2 per cent use it daily, and 79.6 per cent use it weekly or more. About a quarter of the respondents used E-books in a course.

Akpoo et al. (2024) carried out a study on the Application of Mobile Technologies for Service Delivery in Federal University Libraries in North Central Nigeria. The study investigated the utilisation of mobile technologies for enhancing service delivery in university libraries in the North Central region of Nigeria. Three specific objectives and research questions guided the study, and two null hypotheses were formulated and tested. The population of this study comprised 212 Postgraduate students in the Federal Universities in North Central Nigeria. The instrument for data collection was a structured questionnaire validated by experts. Data collected were coded and analysed using Mean and Standard Deviation to answer the research questions, while Chi-Square Goodness of fit was used to test the hypotheses at a 0.05 level of significance. The findings of the study revealed that the extent to which mobile technologies are applied for service delivery in university libraries in North Central Nigeria is low. It was also revealed that the application of mobile technologies is for reference and circulation. The study concluded that the extent of mobile technology applications for service delivery in university libraries in North Central Nigeria is generally low.

It is important to state that the definition of research activities comprises defining and redefining problems, formulating hypotheses or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and, lastly, carefully testing the conclusions to determine whether they fit the formulating hypothesis. In this regard, Anyim (2020) asserted that research activities are systematic investigations, including research development, testing and evaluation, designed to develop or contribute to generalisable knowledge. These activities include but are not limited to designing research, directing research, performing experiments, enrolling research subjects, making decisions regarding eligibility to participate in research, participating in observational registry programmes, analysing or reporting research data, or submitting manuscripts concerning research for publication. This comprehensive list of research activities underscores the breadth of tasks involved in conducting research.

In a study carried out by Anyim (2020) on electronic information resources for learning and research activities among undergraduate students in university libraries. A descriptive survey design was used. The total population of the study was 5,124, with a sample size of 366 registered users. The questionnaire was the research instrument used for data collection. The findings from the study revealed that online databases, search engines, World Wide Web (www), e-journals, e-books, and Online Public Access Catalogue (OPAC) were utilised. Also, the electronic information resources available in the library were used to a great extent for the research activities of the students. This study is similar to the present study in terms of its focus on research activities, which is the dependent variable of the present study. It is also similar in terms of the research instrument and the design of the study.

3.0. Research Methodology

This study adopted a correlational research design. statistical analysis. Creswell and Plano (2018) opined that the correlational research design method is usually used to ascertain the relationship between one or two variables with the intent of finding out whether or not there exists a relationship. The population of the study was 15,041 postgraduate students in ten federal, state and private universities running postgraduate programmes in universities in North-Central Nigeria. The study used Krejcie and Morgan's (1970) table for determining the sample size for a given population. This was done based on the different postgraduate programmes in the universities studied. The total sample size for the PGD programme was 336, the MSc programme was 380, and the PhD programme was 308. The total determined sample size was 1024. A proportional sampling technique was used to calculate the sample sizes for the Universities in North-Central, Nigeria. ***The proportionate sampling technique was used to ensure fair representation of postgraduate students across PGD, MSc, and PhD programs and the universities studied. After determining a total sample size of 1,024 using Krejcie and Morgan's (1970) table, samples were allocated proportionally based on each program's population relative to the total postgraduate population in North-Central Nigeria, thereby preventing over- or under-representation.***

Proportionate sampling was preferred to other techniques because the postgraduate population was heterogeneous in terms of program size and institutional distribution. This approach minimised sampling bias, enhanced representativeness, and improved the generalisability of the study findings across the different postgraduate programs and universities.

The data collection instrument was a structured questionnaire developed from a review of relevant literature and existing validated instruments, with items aligned to the study objectives and measured using a Likert-scale format. The instrument underwent face and content validation by experts and was pretested using 205 copies of the questionnaire (representing 20% of the sample size), which were administered to postgraduate students outside the main sample. Feedback from validation and pretesting informed revisions, and reliability analysis confirmed that the instrument was suitable for the study.

The sample size of 1024 postgraduate students were considered adequate and represented the total population studied. The study utilised a self-designed structured questionnaire as an instrument for data collection, and the data collected were analysed and presented using descriptive statistics such as mean, frequency count and standard deviation, while the inferential statistics were analysed using Pearson product-moment correlation and multiple regression analysis.

4.0. Results and Discussion

4.1 Response Rate

Out of 1,024 copies of the questionnaire distributed, 796 copies were completed, retrieved and found usable, representing a 78% response rate. The response rate from the 10 universities in North Central Nigeria is in **Table 4.1.**

Table 4.1: Response Rate

	Universities	Copies distributed	Copies retrieved	%
1.	Federal University of Technology, Minna, Niger State.	155	121	78
2.	University of Abuja, Abuja	111	86	74
3.	University of Jos, Jos.	168	130	77

4.	University of Ilorin, Ilorin.	123	96	78
5.	Nile University of Nigeria (NUN), Abuja.	7	5	71
6.	Prince Abubakar Audu University, Anyigba	45	35	77
7.	Benue State University, Makurdi	45	35	77
8.	Kwara State University, Malete	25	19	76
9.	Ibrahim Badamasi University, Lapai	12	9	75
10.	Nassarawa State University, Keffi	333	260	78
Total		**1024**	**796**	**78**

Source: Author's Field Work (2022)

Table 4.1 shows the copies of questionnaires distributed, returned and analysed. The following is the response: Federal University of Technology Minna (distributed = 155; returned = 121), the University of Abuja (distributed = 111; returned = 86), the University of Jos (distributed = 168; returned = 130), University of Ilorin (distributed = 123; returned = 96), Nile University of Nigeria Abuja (distributed = 7; returned = 5), Benue State University, Makurdi (distributed = 45; returned = 35), Kwara State University (shared = 25; returned = 19), Nasarawa State University (distributed = 333; returned = 260), Ibrahim Badamasi Babangida University Lapai (distributed = 12; returned = 9), Prince Abubakar Audu University, Anyigba (distributed = 45, returned = 34). The total number of copies of the questionnaire distributed was 1024, and a total of 796(78%) was the response rate.

4.5 Objective 1: Find out the type of research activities carried out by postgraduate students in universities in Nigeria.

Table 4.2: Type of Research Activities Carried Out by Postgraduate Students in Universities in North-Central, Nigeria (N=1024)

S/N	STATEMENT	SD 1	D 2	A 3	SA 4	N	FX	MEAN	ST. D	Decision
1.	Workshops	60	108	208	420	796	2580	2.84	1.15	Agreed
2.	Seminars	166	132	166	332	796	2256	2.86	1.19	Agreed
3.	Research Publications	184	130	162	320	796	2210	2.75	1.24	Disagreed
4.	Basic Research	132	172	178	314	796	2266	2.86	1.07	Agreed
5.	Publishing Research Findings	151	155	271	219	796	2150	2.84	1.11	Agreed
6.	Applied Research	120	184	179	313	796	2277	2.90	1.01	Agreed
7.	Symposiums.	144	160	179	313	796	2253	2.82	1.11	Agreed
8.	Interdisciplinary Research.	138	166	186	306	796	2252	2.82	1.08	Agreed
9.	Translational Research	156	154	180	306	796	2228	2.74	1.15	Disagreed
10.	Conferences	150	166	179	301	796	2223	2.72	1.12	Disagreed
	Average Weighted Mean							**2.82**	**1.12**	

Key: SA = Strongly Agreed, A = Agreed, D= Disagreed, SD = Strongly Disagreed, StD = Standard Deviation and (Decision Mean = 2.82)

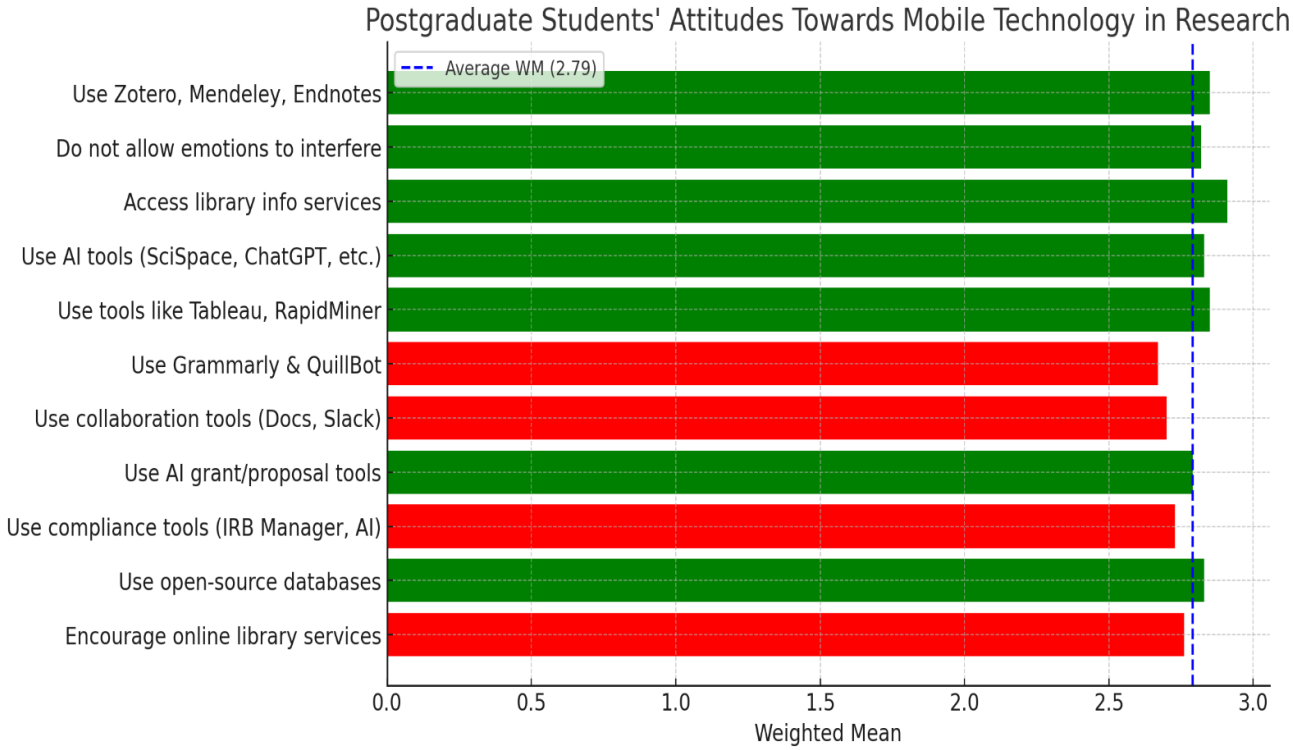
Source*:* Author's Fieldwork (2025)

Table 4.2 revealed the results of 796 respondents from the 10 universities selected for the study. The result showed the perceptions of postgraduate students on various research activities. A benchmark mean of 2.82 was used to classify activities into "Agreed" or "Disagreed." Similarly, Agreed Activities (Mean ≥ 2.82): Workshops (2.84), Seminars (2.86), Basic Research (2.86), Publishing Research Findings (2.84), Applied Research (2.90), Symposiums (2.82), and Interdisciplinary Research (2.82) are well-regarded, reflecting strong engagement and

relevance. While Disagreed Activities (Mean < 2.82): Research Publications (2.75), Translational Research (2.74), and Conferences (2.72) scored below the benchmark, suggesting challenges in these areas. With an average weighted mean of 2.82 and moderate variability (SD = 1.12), most activities are positively perceived, while a few, like research publications and conferences, require targeted improvements in universities in North-Central, Nigeria.

Research Question 2: Postgraduate students' attitude towards mobile technology devices in their research activities in universities in North-Central Nigeria

Chart 4.2: revealed the results of 796 respondents from the 10 universities selected for the study.



The result showed that respondents agreed with the positive statements of Postgraduate students' Attitude towards the use of mobile technology devices for their research activities in universities in North-Central Nigeria, with an average weighted mean score of 2.79 and an average standard deviation of 1.06. The items include Item 1. Postgraduate students have a positive attitude towards the use of mobile technology applications such as Zotero, Mendeley and Endnotes for reference citation and management. (mean = 2..85; StD = 1.09), Item 2: Postgraduate students do not allow their feelings and emotions to interfere with PG Students' research activities in terms of assisting using mobile technology devices (mean = 2.82; StD = 1.11). Item 3: Postgraduate students ensure that they have access to library information services that will aid their research activities more effectively. (mean = 2.91; StD = 0.96), Item 4: Postgraduate students use mobile technology devices and applications such as Sci Space, Chat GPT, Merlin and Semantic Scholars to ensure that they share information resources for literature reviews for the benefit of achieving their research activities. (mean = 2.83; StD = 1.15), Item 5: Postgraduate students ensure that they have mobile technology-enabled research tools such as Tableau and Rapid Miner for their data analysis (mean = 2.85; StD = 0.98). Item 6: Postgraduate students ensure that their feelings and thinking are in line with best practices in the use of mobile technology applications such as Grammarly and QuillBot in assisting PG Students in their writing. (Mean = 2.67; StD = 1.10), Item 7: Postgraduate students ensure that they use collaboration tools such as Google Docs and Slack in facilitating the research Activities of PG Students. (Mean = 2.70; StD = 1.05), Item 8: Postgraduate students also ensure that utilise Artificial Intelligence tools such as AI grant writers and Sci Note in facilitating the research activities of PG Students in the areas of writing grants and proposals (Mean = 2.79; StD = 1.14), Item 9: Postgraduate students use mobile technology device applications such as IRB Manager and Compliance AI to ensure that they comply with research ethics. (Mean = 2.73; StD = 0.98), Item 10: Postgraduate students with positive attitudes towards the use of mobile technology devices ensure that PG Students have access to open-source databases for research materials at no cost. (Mean = 2.83; StD = 1.12), and Item 11: Postgraduate students encourage the use of new technologies like mobile technology in supporting their research activities in terms of using online-based library information services. (Mean = 2.76; StD = 0.97). This implies that Postgraduate students have a highly positive attitude towards research activities in universities in North Central Nigeria.

Research Question 3: Information Provision for Research Activities of Postgraduate Students in Universities in North-Central Nigeria.

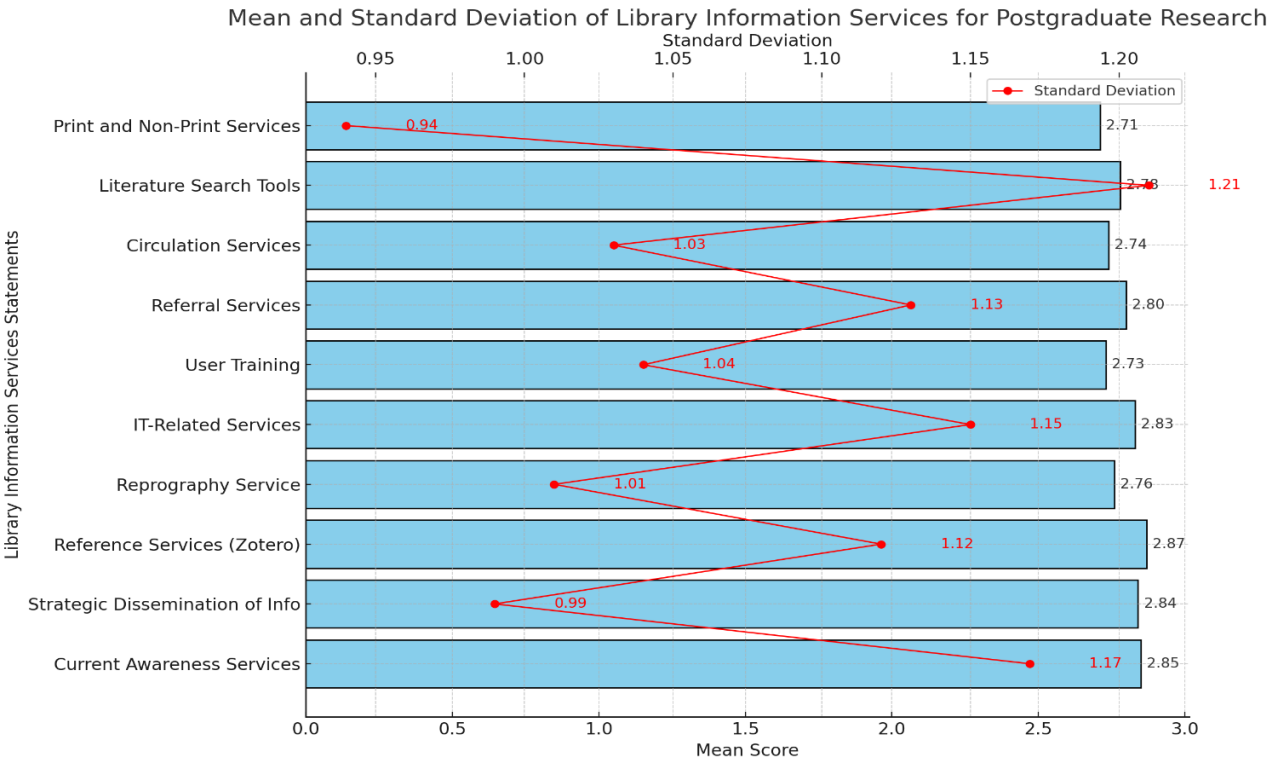


Chart 4.3: revealed the results of 796 respondents from the 10 universities selected for the study. The result showed that the provision of information services assisted the research activities of postgraduate students in universities in North-Central Nigeria with an average weighted mean score of 2.79 and an average standard deviation of 1.08. The items include Item 1: Current Awareness Services helps to provide the latest information for Postgraduate students' research (mean =2.85; StD = 1.17), Item 2: Selective dissemination of information has helped me greatly in finding the right resources for my research activities (mean = 2.84; StD = 0.99). Item: 3 Reference services have helped in making PG students' research activities easier (mean = 2.87; StD = 1.12), Item 4: Copies of relevant information resources through reprography to support their research has been made easier (mean = 2.76; StD = 1.01), Item 5: Information technology-related services have also helped in effective service provision for PG student's research activities (mean = 2.83; StD = 1.15), Item 6: User training has greatly influenced my information-searching skills positively (Mean = 2.73; StD = 1.04), Item 7: Referral services have a positive impact on my research activities (Mean = 2.80; StD = 1.13), Item 8: Circulation services played a vital role in research activities (Mean = 2.74; StD = 1.03), Item 9: Literature search has helped me in identifying gaps in knowledge (Mean = 2.78; StD = 1.21), and Item 10: Print and non-print services have made it possible for me to have access to e-books, e-journals etc. for my research writings (Mean = 2.71; StD = 0.94). This implies that the provision of information services was adequate for the research activities of postgraduate students in universities in North Central Nigeria.

Research Question 4: The extent of use of mobile technology devices for research activities of postgraduate students in universities in North-Central, Nigeria.

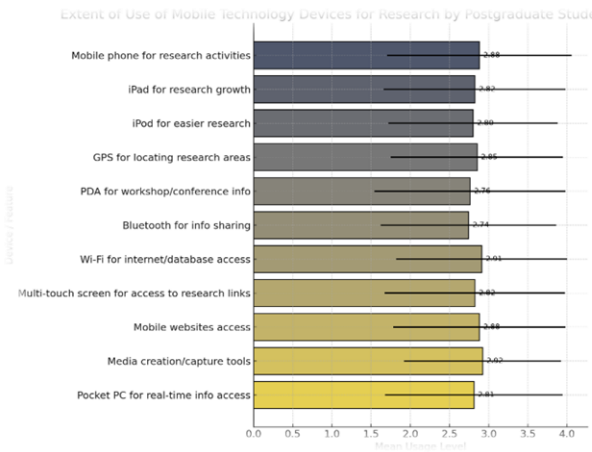


Chart 4.4. revealed the results of 796 respondents from the 10 universities selected for the study. The result showed the extent of the use of mobile technologies for research activities by postgraduate students. The extent of the use of mobile technology devices by postgraduate students' average weighted mean score is 2.83, and an average standard deviation of 1.12. The items include: Item 1: I used my mobile phone to help in my research activities (mean = 2.88; StD = 1.18), Item 2: I also use iPad to enhance my research growth (mean = 2.82; StD = 1.16), Item 3: The use of the iPod has made my research activities easier (mean = 2.80; StD = 1.08), Item 4: Global positioning systems (GPS) allow me to locate my areas of research activities using Google Maps on my phone (mean = 2.85; StD = 1.10), Item 5: The Personal Digital Assistant (PDA) allow me to have real-time information about workshops and conferences that will support (mean = 2.76; StD = 1.22), Item 6: Bluetooth makes it easier for me to retrieve both audio and video information from the mobile devices of my colleagues (Mean = 2.74; StD = 1.12), Item 7: Wireless Fidelity (Wi-Fi) helps me to connect m phone to the internet and another research database as fast as possible (Mean = 2.91; StD = 1.09), Item 8: the multi-touch screen allows me to easily access research links on my mobile phone (Mean = 2.82; StD = 1.15), Item 9: Using my mobile phone I can easily access mobile-enabled websites (Mean = 2.88; StD = 1.10), Item 10: Media creation and capture tools have been made easy when I use my mobile devices (Mean = 2.92; StD = 1.00)., and Item 11: The pocket personal computer allows me to have real-time access to essential information materials for my research (Mean = 2.81; St.D = 1.13). This implies that the extent of use of mobile technology devices is high among postgraduate students for research activities in Universities in North-Central Nigeria, with an average weighted mean of 2.86

4.5: Hypotheses

H_{03}: There is no significant composite effect of mobile technology devices, Postgraduate students' Attitudes and provision of information services on research activities of postgraduate students in universities in North-Central, Nigeria.

To test the hypothesis and analyse the data, multiple regression was used. A composite effect of mobile technology devices, Postgraduate students' Attitudes and provision of information services on research activities of postgraduate students in universities in Nigeria. The result of the analysis is presented in **Table 4.5:**

Table 4.5: Model summary of composite regression of Mobile Technology Devices, Postgraduate Student Attitudes and Information provision on Research Activities of Postgraduate Students in Universities in North-Central, Nigeria.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.802*	0.643	0.642	0.41543

a. Predictors: (Constant): Mobile technology devices, postgraduate students' attitudes, information provision

b. Dependent Variable: Research activities

Table 4.5 showed the results of a multiple regression analysis examining how mobile technology devices, postgraduate students' attitudes, and the Information provision collectively influence the research activities of postgraduate students in universities in North-Central, Nigeria.

The R value (0.802) represents the overall strength of the relationship between the combined independent variables (mobile technology devices, postgraduate students' attitudes, and provision of information services) and the dependent variable (research activities of postgraduate students). An R-value of 0.802 indicates a strong positive relationship, meaning that these three factors together significantly contribute to postgraduate research activities.

The R-Square value (0.643) indicates that 64.3% of the variation in postgraduate students' research activities is explained by the combined effect of mobile technology devices, postgraduate students' attitudes, and information provision. This means that these two independent variables are major contributors to research activities, while the remaining 35.7% of the variance is due to other factors not included in this model. The Adjusted R-Square value (0.642) is very close to the R-Square value (0.643), indicating that the model is highly reliable and has minimal bias when applied to the population. The slight reduction from R-Square to Adjusted R-Square suggests that even if additional predictors were added, the model's predictive accuracy would not significantly decrease.

The Standard Error of the Estimate (0.41543) represents the average deviation of actual research activity scores from the predicted values. A lower standard error suggests that the model provides precise predictions, reinforcing the strong explanatory power of the independent variables in predicting postgraduate students' research activities.

The model shows that mobile technology devices, postgraduate students' attitudes, and the Information provision collectively have a strong and significant impact on postgraduate students' research activities. With an R-Square of 64.3%, the model suggests that these three factors are key determinants of research engagement among postgraduate students. However, since 35.7% of the variation remains unexplained, other factors such as academic motivation, research funding, internet access, and faculty mentorship may also play significant roles in influencing postgraduate research activities.

Table 4.6: ANOVA Model Composite Regression Analysis of Mobile Technology Devices, Postgraduate Student Attitudes and Information Provision on Research Activities of Postgraduate Students in Universities in North-Central, Nigeria.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	315.310	3	105.103	869.134	.000[b]
	Residual	36.520	793	0.121		
	Total	351.830	796			

Dependent Variable: research activities

Predictors:(Constant): Mobile technology devices, postgraduate students' attitudes, provision of information services

Table 4.6. shows the composite effect of mobile technology devices, Postgraduate students' Attitudes and provision of information services on research activities of postgraduate students in universities in Nigeria. The table p-value = 0.000 infers the significant effect of the independent variables, mobile technology devices, Postgraduate students' Attitudes and provision of information services on research activities. Therefore, the null hypothesis, which stated that there is no significant composite effect of mobile technology devices, Postgraduate students' Attitudes and provision of information services on research activities of postgraduate students in universities in North-Central, Nigeria, is hereby rejected.

4.2. Discussion of the Findings

The types of research activities carried out by social science postgraduate students in universities in Nigeria are dissertation writing, attendance of workshops, seminars, symposiums for research purposes, and publications of research findings in reputable journals. The findings were supported by (Abu-helalah *et al.,* 2015; Beanland *et al.,* 2020; Borakati *et al.,* 2017; Kozlov *et al.,* 2017; Noguez & Neri, 2019; Razeghi, 2019; Roach, 2017; Swan *et al.,* 2018; Weiner & Watkinson, 2014). The authors asserted that research activities such as attending conferences, seminars, and workshops, and interacting with intellectuals in various fields of human endeavour, are key to innovation and academic publishing, especially among social science postgraduate students.

The results showed that postgraduate students' attitude towards the use of mobile technology devices for their research activities is quite encouraging and supportive. The findings further revealed that Postgraduate students ensure that postgraduate students have access to mobile technology-enabled research productivity tools such as Merlin and Semantic Scholar (Literature review), Tableau and RapidMiner (Data Analysis), Grammarly & QuillBot (Writing assistance), Google Doc and Slack (Collaboration tool), AI grant writers and EndNotes (Grant and Proposal writing), Mendeley, Zotero and EndNote (Reference Management), IRB Manager and Compliance AI (Research Ethics and Compliance) as well as Lab Archives and Any Logics (Experimentation and Simulations). This is because most Postgraduate students are tech-savvy and possess the right attitude in providing information resources geared towards aiding postgraduate students' research activities. Also, the generally positive attitude of Postgraduate students suggests a supportive environment for postgraduate students. Enhanced Postgraduate training on emerging technologies, as well as policies promoting best practices, could further bolster this support, making Postgraduate students even more effective facilitators of students' mobile-based research. The finding was supported by Larson (2019), who asserted that postgraduate students with positive attitudes are resourceful, confident, patient and humble in the way and manner they carry out their research activities using mobile technology devices. The author stated further that the benefits of Postgraduate students having a positive attitude could in the long run foster teamwork, solve problems, improve quality,

breed loyalty, reduce stress, and make for a pleasing personality, as well as make the environment congenial for the effective and efficient library information services that will aid effective, efficient and result oriented research activities through the use of mobile technology devices and its research productivity tools applications.

The study also confirmed that the following information services provisions, such as Strategic dissemination of information, reprography, reference services, circulation services, Current Awareness Services, user training, and print and non-print services, are the services provided by postgraduate students to positively influence the research activities of postgraduate students in universities in Nigeria. The result is that university libraries under study offer information services ranging from selective dissemination of information to user education programmes. This was supported by Saxena and Yadav (2013), who identified MMS and SMS notification services; library virtual/audio tours; Quick Response (QR) codes on mobiles; text reference services, mobile document supply; library guides; database browsing; e-resource with mobile interfaces; formal education, distance learning and e-learning as some of the library services that are provided to patrons via mobile technology.

The study further indicated that the extent of use of the available mobile technology devices by postgraduate students for research purposes in universities in Nigeria is high. Media creation and capture tools, Wireless Fidelity (Wi-Fi), mobile-enabled websites, mobile phones, Global positioning systems (GPS), and Bluetooth devices. This is so because most postgraduate students possess mobile technology devices with wireless fidelity, GPS, and Bluetooth enabled. Also, because of the functionality of mobile devices, postgraduate students use these devices for media creation, website and internet surfing, vis-à-vis research activities. The reason for this is that the significant use of mobile phones and tablets reflects the students' need for convenient, on-the-go research tools. This underscores the importance of maintaining reliable mobile-friendly resources and applications. Universities should focus on expanding digital resource accessibility, particularly for mobile platforms, and explore ways to incorporate other helpful mobile devices, like GPS and PDAs, into students' research routines. These findings were supported by Singh *et al.* (2020), who asserted that about two-thirds of the respondents (62.7%) owned internet-capable, handheld devices (including iPhone, Oreo, Blackberry, iPod touch, PDA, Pocket PC, etc.) and about half used the internet from their handheld devices daily. Social networking websites and text messaging were used by nine out of ten respondents (90.4% for social networking sites and 92.3% for texting), with a median frequency of daily use. The authors maintained that about three-quarters of the respondents (72.9%) used text messaging daily. This means that the extent of use of mobile technology devices is very high, which is in agreement with the present research.

There is a composite significant effect between mobile technology devices, provision of information services, and Postgraduate Students' Attitude research activities of postgraduate students in universities in North-Central, Nigeria. This can be seen by the patronage of the postgraduate to the research, and e-library sections of the university libraries for research activities, as university libraries provide wireless fidelity, technological devices and a responsive Postgraduate attitude. In the same vein, Anyim (2020) supported this assertion by examining electronic information resources for learning and research activities among undergraduate students in university libraries. The findings from Anyim (2020) revealed that online databases, search engines, World Wide Web (www), e-journals, e-books, and Online Public Access Catalogue (OPAC) were utilised. Also, the electronic information resources available in the library were used to a great extent for the research activities of the students.

5.0. Conclusion

The study highlights the Composite Effect of Attitude to Mobile Technology Devices and Information Provision as Correlates of Postgraduate Students' Research Activities in Universities in North-Central, Nigeria. Embracing mobile technology enhances accessibility, efficiency, and convenience in research activities. The study emphasises the importance of training Postgraduate students, fostering collaboration among stakeholders, addressing the digital divide, and continually adapting information services to align with postgraduate students' evolving needs. These insights aim to enrich academic experiences and research outcomes in universities in North-Central, Nigeria.

5.1. Recommendations

1. **There should be mobile-friendly resources and research tools that are optimised for devices that can facilitate seamless access to information on the go, since postgraduate students' research activities in universities in Nigeria include dissertation writing, attendance of workshops, seminars, symposiums for research purposes, and publications of research findings in a reputable journal.**
2. **Postgraduate students' Attitude towards postgraduate students' research activities through the use of mobile technology devices in the provision of information services is quite encouraging and supportive. However, there is a need for universities to advance the training and retraining of library staff to provide insights into changes over time as mobile technology devices continue to evolve.**
3. Postgraduate students are encouraged to adopt a user-centred approach in designing and delivering information services. Also, soliciting feedback from postgraduate students about their preferences and needs related to mobile technology can guide the development of more effective and relevant services.

4. The universities should create awareness campaigns to educate postgraduate students about the benefits of utilising mobile technology for their research activities.
5. Since there is a composite effect of mobile technology devices, Postgraduate students Attitudes and provision of information services on research activities of postgraduate students in universities in North-Central Nigeria, it is therefore recommended that the universities should make adequate budgetary provision annually for the purchase and upgrade of mobile technology devices as well as upskilling Postgraduate students to enable them to perform optimally in the way they provide information services for the benefit of the university and the postgraduate students.

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CURRENT STATE OF GOVERNMENT MINISTRY LIBRARIES IN IMO STATE

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ABSTRACT

Government ministry libraries play important role in supporting policy formulation and administrative decision-making in the public sector. In Imo State, however, the present situation of public and government ministry libraries show notable challenges affecting their effectiveness. Most libraries operate with inadequate funding, outdated information resources, poor infrastructure, limited application of information and communication Technology (ICT), and a shortage of professionally trained library personnel. Whereas the Public Service Rules (PSR) makes provision for libraries in government ministries to collate, organize and provide needed information resources for the smooth running of their parent bodies. Imo State has 33 functional government ministries. The study examined the state of government ministry libraries in Imo State. The objectives of the study was to assess the adequacy of library facilities and infrastructure, examine the availability and relevance of information resources, determine the extent of ICT application in library operations, evaluate the professional capacity of library staff and identify the major challenges confronting these libraries. The population of the study comprised of the librarians managing 33 government ministries libraries in Imo State. Description survey research design was used for this research. A well-structured questionnaire was used as instrument for data collection. Tables, frequencies and percentages was used to analyze the research questions. The researchers sought to evaluate the current state of the libraries with a view to ascertain what is on ground. It was found out that though the libraries had professionally qualified staff, the librarians were not exposed to trainings at workshops and seminars. They also lack knowledge of ICT applications. The libraries also suffered the challenge of inadequate funding. The authors proffered possible solutions for revitalizing the government ministry libraries in Imo State.

Keywords: Government Ministries, Information Services, ICT Application, Government Libraries, Imo State.

Introduction

Libraries are established in state government ministries to provide information resources that are required to facilitate informed policy decisions in ministries. Library is a collection of information resources either in print, non-print or both, which are organized for use by people who need them. Government ministries include ministries, departments and agencies that form executive structures responsible for delivering government services to the people. They are departments saddled with the responsibility of managing specific sectors of public administration. Examples of government ministries include but not limited to agriculture, health, education, finance, home affairs, defense, justice, industry, transportation, housing and urban planning, information, local government affairs, environment etc. Government ministries are designed to execute the policies and decisions of the government.

According to Oladapo (2011), the functions government ministries include:

1. Providing necessary input into the articulation of vision and strategy of the government
2. Provision of the appropriate mechanism for the translation of government vision into policy framework
3. Provision of appropriate machinery for the implementation of government policies and decisions;
4. Providing the appropriate structure and manpower for actualization of goals and objectives of the government.

In order for a government to function properly, ministries play specific roles in public administration. The roles will include; policy formulation and implementation involving developing sector specific policies and ensuring their implementation to improve public service delivery, preparing implementing and monitoring the annual budget for their respective sectors to facilitate development programs, monitoring and evaluation; evaluating the impact of government projects and conducting performance reviews of public institutions and advising the government on legislation within their portfolio and developing regulatory frameworks.

Libraries in government ministries are information resource centers situated in ministries, department and agencies. These libraries are also called special libraries or ministerial libraries. According to Ode and Omokaro in Nweke and Echezona (2020) Special libraries are those group of libraries essentially meant for research on a particular field of study and are patronized by specialists and researchers. Special libraries are usually attached as an aid to research in a particular subject area in establishments, organizations and government departments. Special libraries are libraries that are designed to collate, organize and disseminate specialized information resources that will serve the information needs of people with special interest. Given the reason that each ministry is focused on specific area of interest like health, education, agriculture etc., it is safe to regard libraries in the ministry as special. The resources are directed towards satisfying the need of the parent ministry and staff. These libraries are established to explore specialized information for the advantage of their parent organization which provide financial support to the libraries. Government ministry libraries can be classified as special libraries because the collection of each library is basically restricted to resources that support

the functions of the particular ministry. The library collection and access is structured to the interest of the parent ministry. Patronage is also usually staff of the ministry.

The primary essence of having libraries in situated within government offices is to serve as essential information resource centers for policy formulation, research and documentation within the federal and state agencies. The job of governance either at local government, state or federal government level is for policy decisions that affect the lives of people. These decisions are also based on defined policy framework. Decisions are guided by the law. While good decisions benefit the people, wrong or bad decisions can affect the masses negatively. Bad decisions can also influence the way the government is accepted by the people. It is therefore imperative that right decision are taken all the time. Policies of government are invariably implemented by civil servants in the various ministries, department and agencies.

According to Oyeniyi and Olaifa (2025) government policies are tools for national development in Nigeria. Good decisions can only be carried when the decision makers are well informed. The libraries in government ministries are there to provide all specialized information resources. Materials of government ministries include gazettes, laws, pronouncements, edicts, special files, etc. The materials of the ministry libraries are meant to guide decision making. Key examples include the Federal Ministry of Education Library Unit, the Office of the Secretary to the Government OSGF Library and Imo State Ministry of Justice Library. These libraries are primarily located in Abuja, the federal capital and state capitals.

These libraries are increasingly digitized, providing both physical and virtual information access to support research and public service. They are crucial for maintaining national intellectual heritage and providing timely information for government functions.

According to Igwe, Iwuagwu and Igwe (2018), government ministry libraries are established in ministries, departments and agencies to provide information resources in diverse formats for information services to support the programmes and objectives of government. These resources are expected to facilitate informed decision-making. They are crucial for maintaining national intellectual heritage and providing timely information for government functions. Types of publications available at the ministry of Justice library are gazettes, laws of the federal republic, parliamentary debates, annual reports / press releases, laws reports and Supreme Court judgments. (Okoro; 2025)

Government ministry libraries in Nigeria serve as essential information resources centers for policy formulation, research and documentation within federal and state agencies. Libraries and information centres as important agent for information dissemination have a vital role to play in the actualization and implementation of government policies. (Oyeniyi and Olaifa, (2025)

The ministry library is usually set up to act as a repository of all government publications concerning the ministry. Other resources in the library include relevant reference materials such as newspapers, magazines, research works and varied information resources in other fields of knowledge to facilitate the discharge of the duties of the ministry.

Ability of government ministry libraries in the state to provide optimal service which is basically to facilitate the work of the ministry, rests on a well-equipped library. The library must be stocked with relevant physical and electronic resources that can support research and public services.

It must have qualified personnel that are capable and competent with ICT skills to handle modern technologies. The library must also be equipped with relevant gadgets and facilities that will make the environment conducive and attractive to policy makers. Where these basic requirements are lacking or inadequate, the goal of facilitating policy decisions in the ministries becomes a mirage. Over the years, observations show that many government ministry libraries in Imo state have been operating below standard. Unfortunately, programs and activities of many government ministries in Imo State continue without input from their libraries. Libraries are not fully equipped, there is dearth of requisite information resources and their staff are not well trained with decline in funding. In fact Onuoha and Chukwueke (2025), assert that government owned libraries in Nigeria are nowhere to be ascribed to standard when compared to similar libraries in other parts of the world. The purpose of this research is to ascertain reasons for the unfavorable condition and why many government ministries in Imo state operate without functional libraries.

Objectives of the study

The specific objective of the study are;

1. To ascertain the adequacy of library facilities and infrastructure in government ministries in Imo State.
2. To examine the availability and relevance of information resources
3. To determine the extent of ICT application in library operations
4. Identify the professional capacity of library staff
5. Identify the major challenges confronting government ministry libraries

Literature Review

Availability and relevance of information resources

Information is a vital resource for problem solving and decision making. Information resources are print and non-print materials that a library provides to satisfy the research, information and decision-making needs of its clientele. According to Nweke and Echezona (2020) information resources could imply information materials acquired, processed

and organized for consultation and lending purpose. The availability and relevance of information resources in government libraries is paramount. Information resources in government ministry libraries include government publications like gazettes, white papers and policy documents, annual reports and budgets, reference materials like dictionaries, encyclopedia, directories, handbooks and manuals, current information materials like newspapers, magazines and professional journals. It also includes statistical and administrative records. These materials may be in paper form which is physical or in electronic format like e-books, online journals and databases or institutional repositories. In whatever form materials are, libraries and information centres are expected to provide them for information, education, research, current affairs, and reference services. Good information resources are characterized by relevance, currency, adequacy, accessibility and authority. The provision of relevant, and current information is an imperative for good policy formulation, and execution of policies. The information resources will support good decision-making, act as institutional repository and help staff in educational and professional development.

Ibenne, Amanze-Unagha and Udo (2018) opine that the type, quality, quantity and variety of information resources acquired in a special library depend on the nature of the users of the service, the operational environment in terms of resource availability and most importantly the adequacy of funding received by the library for its operations. Funding is a major yardstick that determines availability and relevance of information resources. Nweke and Echezona (2020) agree that lack of funds to acquire books and other information materials as well as run other library operations in ministry libraries has been identified as a barrier to successful provision of library services.

Professional Capacity of Library Staff

Professional capacity of library staff in government ministry libraries are the qualifications, skills and competences of the manpower in the libraries. The basic staff of libraries are librarians, library officers and information officers. According to Eyitayo in Daniel, Ifidon and Okegbola eds.(2012) A librarian is a skilled professional that requires a high standard of educational and professional training to be involved in book selection, reference services, readers advisory work, current awareness services, cataloguing and classification of library materials..

Aboyade, Madu and Aboyade (2016) human capacity building is the enhancement of the human factors that make efficient service delivery and user satisfaction. 21st century library and information professionals must of necessity possess a minimum of two sets of skills to function adequately in the new dispensation, namely, professional and personal competencies. Professional competencies will normally include the following;

i. the ability to use appropriate business and management approaches to communicate the modern language of information services to senior management

ii. ability to develop specialized information products for use within and outside the organization or by individual clients

iii. ability to evaluate the outcomes of information use and conduct research related to the solution of information management problems

iv. ability to continually improve information services in response to the changing needs

v. expert knowledge of the content of information resources, including the ability to critically evaluate and filter them

vi. possession of specialized subject knowledge appropriate to the business of the organization and its clientele

vii. ability to develop and manage suitable, accessible and cost effective information services aligned with the strategic directions of the parent organization

viii. ability to provide excellent instruction and support for library and information service users

ix. ability to assess information needs, designs and markets with value-added information services and products to meet identified needs of the organization

x. capability to apply appropriate information technologies to acquire, organize and disseminate information as at when required by management;

xi. having an eagle eye and in-depth ways to look at old problems and the ability to develop, adapt and implement new thinking that distinguishes him from peers and before the rest of the bunch.

Globalization, engendered by advances in ICTs has boosted library operations and services thereby making libraries to be more relevant as information professionals more than ever before. Possession of ICT skills has become an important recruitment variable foe librarians, while introduction of ICTs in education had also brought about computerization of traditional materials such as books, journals, newspapers and other information resources in the library (Madu, Aboyade and Aboyade (2016)

Extent of ICT Application in Library Operations

Access to modern information technology is currently one of the most attractive library services. ICT application to library services means the utilization of modern information technologies to acquire, process and make information available in the library. According to Blurtton in Eyitayo in Daniel, Ifidon and Okegbola (2012) ICT is defined as a diverse set of technological tools and resources used to communicate and create, disseminate, store and manage information. Information and communication Technology (ICT) in libraries act as a powerful catalyst for national; development by transforming traditional, physical repositories into digital hubs that provide efficient, fast access to

information. By accelerating knowledge sharing, education and research, these modernized services foster innovation, economic growth and social change

According to Eze and Uzuigwe (2012). Technology is driving change across the entire range of library responsibilities. Library services should be automated and provided through the use of ICTs to ensure maximum satisfaction of the information needs of the users of such services. Deployment of ICT in library operations facilitates better library service delivery.

Challenges of Government Ministry Libraries

Government ministry libraries in Nigeria have been challenged by various factors. Nweke and Echezona (2020) said that lack of finances can be seen as the most critical challenge facing special libraries in Nigeria, especially government ministry libraries. Funding continues to challenge most libraries. Government libraries are not exempted. This is also collaborated by Nkodo in Nweke and Echezona (2020) observed that special libraries have been seriously underfunded as there is no funding framework /model with clear emphasis on the funding of the libraries. In addition, Okoro (2025) asserts that factors militating against use of government publications in ministry libraries are obsolete materials, lack of proper organization, non-provision of computers and internet facilities, inadequate copies of relevant government publications, lack of reprographic services like photocopy, printing and inadequate funding of the library.

Libraries are often not seen as departments of paramount importance. Ayotunde in Nweke and Echezona (2020) also noted that special libraries around the world have experienced cuts in budget due to negligence from the parent body and government. He further asserted that parent bodies and government agencies have the belief that there are more important departments which require a larger percentage of allocation of funds than the library.

Research Methodology

The study was carried using descriptive survey. Questionnaire was employed for data collection in the existing 33 government ministries. The copies of questionnaire were analyzed using frequency counts ad percentages. Analyzed data are presented in tables.

Research Questions.

1. How adequate are library facilities and infrastructure in government ministries in Imo State.
2. How available and relevant are their information resources
3. What is the extent of ICT application in library operations
4. What is the professional capacity of library staff
5. What are the major challenges confronting these libraries

Findings and Analysis

The findings of the study are discussed under specific headings covering all the research questions.

Table 1.

Adequacy of library facilities and infrastructure in government ministries in Imo State.

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
My library has adequate space to accommodate library users	5(15%)	18(55%)	10(30%)	
The library environment is conducive for reading and research		23 (70%)	5(15%)	5(15%)
The library has adequate shelves and storage facilities		15(45.5%)	15 (45.5%)	3(9%)
The library has reliable electricity supply	7(21.5%)	16(48.5%)	10(30%)	
Reading tables and chairs are sufficient for library users		6(18.5%)	17 (51.5%)	10 (30%)
The library is well maintained		8(24%)	22(67%)	3(9%)

Table 1. Shows the perception of respondents on the facilities of their libraries. While 15% strongly accept that the space is adequate, 55% agreed that the space is adequate. 70% unanimously agreed that the library environment was conducive for reading and research. However, 22(67%) and 17(51.5%) rejected that reading tables were sufficient or that the library was well maintained.

Table 2.

Available and Relevance are Information Resources

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
The library has adequate print resources		10(30%)	14(43%)	9(27%)
Information resources are current and up-to-date		10(30%)	14(43%)	9(27%)
Government publications and policy documents are readily available		9(27%)	12 (36.5%)	12(36.5%)
Available resources are relevant to ministry's functions		20(61%)	8(24%)	5(15%)
Users are satisfied with available information resources		8(24%)	18(55%)	7 (21%)

The enquiry was to determine if information resources were available and relevant to the needs of library users.43% and 27% agreed that print resources were inadequate. 43% and 27% also agreed that information resources were neither current nor up to date. Only 24% agreed that users were satisfied with available information resources.

Table 3.

The extent of ICT application in library operation.

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
There are enough computers for library operations		3(9%)	10(30%)	20(61%)
The library uses computers for cataloguing and classification		3(9%)	10(30%)	20(61%)
Internet services are available	2(6%)	3(9%)	10(30%)	18(55%)
The library uses automated library services		3(9%)	16(48.5%)	14(42.5%)
ICT is used for information retrieval	5(15%)	10(30%)	8(25%)	10(30%)
Staff are competent in the use of ICT tools	7(21%)	12(36.5%)	14(42.5%)	

To know the extent of ICT application, only 9% of respondents said they had enough computers. 9% said they used computers for cataloguing and classification while 48.5% and 42.5% disagreed that they use automated system for library services.

Table 4.

Professional Qualifications of staff

Highest Professional Qualification	Frequency	Percentage
National Diploma ND	-	-
Higher National Diploma HND (Library Science)	10	30%
Bachelor's Degree BLS /BLIS	20	61%
Master's Degree MLS /MLIS	3	9%

Data shows that 70% of staff have the basic professional requirement of BLS degree as prescribed by Librarians Registration Council of Nigeria. It shows that ministry libraries have qualified manpower.

Table 5.

Professional Capacity of Library Staff

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
The library is staffed with qualified professional librarians	8(25%)	23(69%)	2(6%)	
Staff regularly attend workshops and training programmes		6(18%)	15(45.5%)	12(36.5%)
Staff possess adequate cataloguing and classification skills		20(61%)	10(30%)	3(9%)
There are enough staff to handle library operations effectively		24(73%)	9(27%)	
Staff are motivated to perform their duties efficiently	6(18%)	7(21%)	13(40%)	7(21%)

On the professional capacity of staff result shows that 25% and 69% of staff were professionally qualified as librarians. However, 45.5% and 36.5% did not regularly attend workshops or training. 40% and 21% said they were not sufficiently motivated to effectively perform their duties

Table 6.

Major challenges confronting government ministry libraries in Imo State

Items	Strongly Agree	Agree	Disagree	Strongly Disagree
Inadequate funding affects library operations	24(73%)	9(27%)		
Obsolete materials hinder effective service delivery	15(45.5%)	15(45.5%)	3(9%)	
There are few trained personnel in ICT	15(45.5%)	15(45.5%)		3(9%)
Inadequate ICT infrastructure limits library performance	19(57.5%)	14(42.5%)		
Poor maintenance culture affects library infrastructure	18(54.5%)	15(45.5%)		
Low awareness of library services reduces patronage	15(45.5%)	15(45.5%)		3(9%)
Lack of digital resources	9(27%)	24(73%)		
Poorly organized print resources	9(27%)	24(73%)		
Lack of collection development policy	24(73%)	9(27%)		
Lack of government support affects library development	19(57.5%)	14(42.5%)		

Result showed that almost all respondents agreed that they faced the challenges of inadequate funding, outdated materials, inadequate ICT infrastructure, lack of collection development policy and lack of government support with 57.5% and 42.5% respectively.

Discussion

Government ministry libraries are indispensable tools for the actualization of good governance. It is in agreement with this assertion that the Imo State Civil Service scheme created room for the establishment of library units in all ministries in the state. However, this libraries have not been performing effectively as result show that 70% of the information resources are neither current nor up to date. It is also not surprising that the libraries are not doing well because statistics reveal that only 9% of the respondents use computers in library operations. In the area of professionalism, the libraries have qualified staff with 70% of respondents possessing the minimum bachelors' degree in library science. However, these librarians suffer negligence in continuous professional development as only 18% accept that they are exposed to regular workshops and training.

The ministry libraries are not immune from the various challenges assailing most government owned libraries. Results show that the libraries under review, suffered a mirage of problems including, adequate funding, insufficient information resources and dearth of ICT facilities. This is in agreement with Kolajo and Olatoye (2025) stating that government libraries face the challenges of inadequate funding, inadequate and outdated stock, lack of staff motivation and inadequate ICT facilities. Regrettably, all respondents acknowledged lack of government support.

Conclusion and Recommendations

The study has revealed that libraries in government ministries though are existing, are only managing to survive. The Government can be commended for employing professional qualified librarians to run the various ministry libraries. Statistics showed that 54.5% of the workforce are between the ages of 40 and 50. The age bracket shows a young and energetic workforce. However these librarians have not been exposed to further training in workshops and seminars. The librarians also lack basic ICT skills needed to manage modern day libraries. The libraries are yet to adopt the use of ICT facilities in their library operations as revealed in Table 3. Results also show that the plague of inadequate funding that is ravaging many government owned libraries is also affecting ministry libraries. Lack of government support has deepened their problems as 100% of respondents agree that they do not experience government support in their libraries.

Library services are indispensable to the effectiveness and efficiency of government ministries. In order to make provide accurate, timely and relevant information for good policy formulation and implementation by government ministries, the following recommendations are made:

1. In order to fast-track an efficient information service delivery in government ministry libraries, funding should be adequate. It is not possible to provide special library service where financial resources are meager. Authorities are urged to make budgetary allocations to libraries and ensure release of allocated funds.
2. Though staff of the libraries have basic professional qualifications, they need trainings and retraining through workshops and seminars. They should be sponsored to attend workshops, conferences and seminars organized by Nigerian Library Association, Librarians' Registration Council of Nigeria and other profession enhancing organizations. Properly trained staff will definitely maintain and manage the libraries better.
3. Staff should be adequately trained in the use of ICT. Knowledge of ICT will enable staff to provide information in varied formats for the optimal satisfaction of their library users.
4. Automated library systems should be introduced into the operations of government ministry library. Information in print only, no longer suffices. It is therefore important to provide computers in the libraries and also automate some or all of their services.
5. Libraries in government ministries should adopt a standard library policy. Such policy will guide their operations and bring about standardization in the libraries.
6. Better government presence in the libraries is essential to boost staff morale. Long term negligence could lead to staff abandoning their duties. Government presence will encourage staff to perform optimally especially when their basic needs at work is provided.

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Current State of University Library Funding in Nigeria: Challenges, Consequences and Strategies

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Abstract

This paper explores the current situation of funding university libraries in Nigeria with their associated challenges, consequences, and strategies to over-come the situation. Mixed methods involving qualitative and quantitative research, literature survey, documentary method and citation analysis were adopted. Literature survey was adopted with the view of examining the various documentary sources and personal opinion pertinent to university library funding in Nigeria, African countries and outside world respectively. Google search was also adopted to harvest relevant sources. Results of literature survey shows that 44 literature/publications were cited to support argument raised at 63 frequencies (frequency counts) with African multidisciplinary journal as the most cited sources and results of the study contain issues surrounding the current situation of funding university libraries in Nigeria especially in the area of chronic under-funding, over-reliance on government subvention, ineffective utilization and non-implementation of research findings and panel recommendations, non-adoption of 10% budgetary allocation to university libraries, lack of autonomy, budget cut, and inadequate financial management. Funding sources include: subvention from Government, parent institutions, Tertiary Education Trust Fund (TETFund), internally - generated revenue (IGR) and fee–based services. The consequences of inadequate funding the university libraries are the over-reliance on outdated/poor and local collections, budget cut, non-implementation of policies, and low level of development and service delivery as well as low patronage on the part of clientele. In order to overcome the situation of chronic underfunding and its challenges, a number of strategies need to be put in place and they include: strict enforcement of 10% budget allocation to university libraries, adoption of acquisition method, pathway/diversification of funding sources, strategic partnership, Bring- Your-Own-Devices (BYOD) policies, fund-raising and donation, collaboration, lobbying, advocacy and efficient service delivery, among others.

Keywords: Challenges, Consequences, Funding, Nigeria, Strategies, University Libraries

Introduction

Education is the bedrock to national development in terms of social-economic, cultural, scientific and technological development and in fact an important social services and social subsection to the Growth Domestic Product (GDP). Every nation strives to provide education for its citizen. It is in line with this assertion that the 1999 Constitution of Federal Republic of Nigeria as amended in 2011 stress the importance of education to Nigerian child as it's relevant to country's economy. However, Federal Republic of Nigeria (2013) in its National Policy on Education emphasis government commitment to the Nigerian child's access to education that is relevant to the country's economy. The policy further structured Nigerian education system into four areas, thus: -

(a) Early Child Care and Development
(b) Basic Education (Pre-Primary, Primary and Junior Secondary Education)
(c) Post-Basic Secondary education (Senior Secondary and Technical Colleges)
(d) Tertiary Education (colleges of education, monotechnics polytechnics and universities).

Regardless of any system of education in operation in a country, the fundamental issue is its contribution to the entire nation especially in building human capital as this underscores the rationale behind countries making huge investments on education even through UNESCO maintain that member countries are expected to use 4 to 6% of their Gross Domestic Product (GDP) or 15 to 20% annual national budget to fund education (Chima and Yusuf 2023; leadership, 2025). Contrary to this benchmark, budgetary allocation to education by Federal, State, and Local Governments remains below the 15 – 20% of the total expenditure recommended by UNESCO. However, in 2022, 2023, 2024 and 2025, the federal budgetary allocation to education sector stood at 7.2 per cent, 7 per cent, 7.9 per cent and 7.3 per cent respectively. For the year 2026, the budget allocation to education sector stagnates at 6 – 7% (Tyohemba, 2025) even though it is far below the UNESCO standard despite the fact that Haruna and Suleiman (2020) maintain that budgetary allocation by local, state and federal government to education sector is inadequate and has affected infrastructural

development as well as non-payment of academic staff benefit as this situation usually lead to incessant strike action by trade unions within education sector. However, inadequate funding is not peculiar to universities, but also to entire higher educational institutions and research institutes which normally resulted to dispute between the trade unions and government, hence stakeholders blamed government on the acute insufficient funding to higher educational institutions including universities, thus inability to carry out research (Ayeni & Ayeni, 2023). Despite these shortcomings on funding education sector in Nigeria, some state government have made giant effort in making reasonable funding to education sector in their respective states, notably are: Kano state that allocated 30% of budget to education, and Edo state had increased monthly subvention from N100 million to N250 million to Edo State University, being a significant step toward revitalizing education sector as well as strengthen the capacity and improve learning condition respectively (Yakubu, 2026; Ochaga, 2026).

Table 1 and 2 show federal government budgetary allocation to education sector between fiscal years 2005 - 2012 and 2022 – 2026 respectively.

Table 1: Federal Government of Nigeria Budgetary Allocation to Education Sector (2005–2012)

Year	Total National Budget	Allocation to Education	% Share of Education
2005	1,846,000,000,000	92,000,000,000	4.98
2006	1,900,000,000,000	92,000,000,000	4.84
2007	2,300,000,000,000	186,000,000,000	8.09
2008	2,870,000,000,000	33,600,000,000	9.64
2009	3,101,813,750,626	216,639,437,111	6.98
2010	4,608,616,750,213	249,080,000,000	5.40
2011	4,226,191,559,255	339,481,528,685	8.03
2012	4,749,100,821,171	400,148,037,983	8.43

Sources: - Murtala, A. T. & Durosaro, D. O. (2022); Durosaro, D. O. (2012)

Table 2: Budgetary Allocation to Education Sector (2022-2026)

Year	Federal Budget ₦ (Trillion)	Allocation to Education Sector (Trillion)	Per cent (%)
2022	17.13 trillion	1.18 trillion	7.2 per cent
2023	21.83 Trillion	1.54 Trillion	7 per cent
2024	27.5 Trillion	2.18 Trillion	7.9 per cent
2025	54.99 Trillion	3.52 Trillion	7.3 per cent
2026	58.18 Trillion	3.52 Trillion	6. per cent

Source: Leadership Newspaper, Tuesday, December 30, 2025, p.4.

From Table 1 and 2 as contained in three different sources showed that Federal Government allocation to education sector is not adequate to provide education that would take Nigeria to next level hence Murtala and Durosaro (2022) reveal similar story in Table 2 as the budgetary allocation does not conform with the UNESCO standard despite Federal Government Policy Statement (2013) that it shall be committed to Nigerian child access to education that is relevant to country's economy.

The Federal Republic of Nigeria (2013) in its National Policy on Education section 5 subsection 80 maintain that tertiary education is system of education that is offered at Universities, Inter-university centres, colleges of education, monotechnics, polytechnics as well as specialized institutions like colleges of agriculture, schools of health and technology and national teachers institute (NTI). However, the concern of this paper is centered on Universities and University Library funding issues in Nigeria with respect to sources, challenges, consequences and strategies.

Even with the funding challenges to education sector in Nigeria, Government and Private organizations continue to establish universities i.e., the number of universities (federal, state and private) continue to increase on yearly basis, hence as at 5th January 2026, Nigeria has 309 universities with the breakdown of 74 Federal, 67 State and 168 Private universities respectively (NUC, 2026). The Table clearly show the breakdown even though federal universities are categorized as conventional, specialized and military respectively.

Table 3: Population of Universities in Nigeria as at January 5, 2026

Ownership	Number of Universities	Percentage (%)
Federal	74	24
State	67	22
Private	168	54
Total	309	100

Source: NUC, 2026

Universities are established to accomplish teaching, learning, research and community services even though their roles are for human capital development, research and innovation. Funds meant for the use by university library usually come through government subvention, or grant which are usually through National Universities Commission, State Ministry of Education and Proprietors respectively as case of federal, state and private universities.

Towards ending the 16-year dispute between Federal Government and Academic Staff Union of Universities (ASUU), there is hope for education sector especially the public universities in Nigeria such that the proposed funding would not only affect the welfare of academic staff but also the new "revamped university funding model with dedicated percentage allocations for research, libraries, laboratories, equipment and staff development" (Tyohemba, 2025), hence even with the available human resources and institutional facilities, without funding support, research cannot be carried out (Mohammed & Odunayo, 2023).

Based on the 1992 ASUU-Federal Government agreement, 10% of university's annual recurrent budget should be dedicated for university library services called Library Development Fund often used in the procurement of information resources, staff development, etc. This source of Library Development Fund comes from Government allocation. External agencies and private organisations can help fund university library services either in cash or in kind through donations from multinational companies, organisations and ICT from friends and philanthropists as well as complimenting the effort of government through foundation to education sector, hence federal government alone cannot finance education, (Bello & Abdulsalam 2021; Olusola, 2024).

Tertiary Education Trust Fund (TETFund) is an important supplementary source for public universities, colleges of education and polytechnics in Nigeria. This parastatal was created by Federal Government of Nigeria (Federal Ministry of Education) as part of 1992 FG and Academic Staff Union of Universities (ASUU) agreement that agency to supplement government source of funding public tertiary institutions be created/established, thus is a parastatal under Federal Ministry of Education was established and charged with the responsibility of providing funding assistance to public tertiary institutions (universities, colleges of education and polytechnics). The provision of assistance on funding public tertiary institution libraries is known as "Library Intervention" thus 2011, Act No. 7 stated that TETFund is to intervene only on public tertiary institutions which section 20 maintained "a university, a polytechnic or college of education". This act implies that companies, industries and enterprises are to pay 2% tax of their annual total earning and remitted to TETFund through Federal Inland Revenue Services (Abdullahi, Saka & Udoudoh, 2024). Although TETFund Intervention over the years have been used to construct classrooms, hostels, libraries and staff offices with emphasis placed on research capacity and digital integration in 2026 (Daily Trust, January 14, 2026).

To reduce over-dependence on government and proprietor's allocation and subvention to tertiary institutions and their libraries, there is the need for other sources of income generation as well as fee-based services to be explored, these as reported by Ishola (2014) include: binding, printing, registration, e-mail, reprographic, consultancy, rental facilities and services, among others. As for the university libraries, separate fund is usually set aside i.e running cost often called vote book or imprest. The office of the university librarian utilize this money to run the library, traveling, operating cost, maintenance of vehicles and facilities, purchase of printing book materials and stationaries. Typical university library vote book appears this format

Table 4: Imprest for XYZ Library

S/N	Title	Code	Amount₦ : K
1.	Transport and Traveling		3,000,000.00
2.	Printing and Stationery		1,000,000.00
3.	Operating Expenses		1,500,000.00
4.	Vehicle Maintenance		2,000,000.00
5.	Workshop Consumables (Bindery and Book Processing)		1,000,000,00
6.	Others (Please indicate)		Nil
7.	Maintenance of Minor Facilities		1,000,000.00
	Total		**9,500,000.00**

Source: Document search, 2026

Despite all these efforts made by both government and the authorities of tertiary institutions particularly university libraries, there are still hiccups to university library funding in Nigeria.

Statement of the Problem

University libraries are saddled with the responsibility of supporting the Universities core-mandate of teaching, learning, research and community services through the provision of information resources to support undergraduate and postgraduate teaching and researches among others. These functions can be effectively discharged if university libraries are adequately funded especially 10% that is expected to be allocated to university library services out of the entire universities' annual budget. Other sources of generating funds for university libraries are to be explored. It's unfortunately that Nigerian University libraries are facing funding challenges thus inability to deliver their services effectively. As a result of inadequate information resources couple with low users patronage which consequently lead to students attaining low academic performance resulting to inability to get better employment opportunities after graduation. (Abdullahi, Saka & Udoudoh, 2024). This study intends to examine and review relevant literature pertinent to university library funding in Nigeria thereby finding solutions to overcome challenges

Research questions

The study was designed to provide answers to the following research questions: -

1. What is the most cited sources of information as regards university library funding?
2. What are the funding challenges to university libraries in Nigeria?
3. What are the sources of funding university libraries in Nigeria?
4. What are the consequences of inadequate funding university libraries in Nigeria?
5. What are the strategies to overcome funding challenges to university libraries in Nigeria?

Literature Review

The related literatures are reviewed in line with the research questions and variables thus:

Considering the aspect of bibliometric analysis of journals of education and humanities as contain in the publication of the faculty of education and humanities, Federal University Gusau from 2016-2019, Chukwuji and Tsafe (2023) reported among others that books were the most cited/reference sources of information.

Funding Challenges

This challenge takes it source from government subvention or proprietor to universities as fund sent to universities are inadequate not to talk of the past sent to the university libraries. What is even released from the source as budget allocation to education sector doesn't align with the UNESCO recommendation not to talk of the 10% University's recurrent expenditure to university libraries. This is because this policy of 10% allocation to university libraries cannot be implemented due to the priority areas being focused by the institutional authorities as opposed to the university library development (Ishola, 2014; Awunandu, 2022) even though inadequate funding to academic libraries can affect both human and material resources (Onuoha and Chukwuemeka, 2025).

Budget cut is the reduction of the amount or percentage of budget by the institutional authorities which might be traced to lack of adequate funds, inflationary trends in the published materials, foreign exchange, priotize of items/programmes or lack of political will (Saka & Ladan, 2025).

The non-implementation of budgetary allocation to education can be attributed to lack of political will on the part of stakeholders in the education sector with little interest in reading, learning. Sometimes priority is accorded to non-education programmes as oppose to reading and library services. High cost of books, journals and ICT resources affect university library funding with high cost and inflation. With the high cost and inflation, the budgeted amount would be affected thus inability to meet-up with the realities of the 21st century librarianship. University libraries stocked the outdated collections, insufficient materials and inadequate ICT facilities. In fact, due to inadequate funding, university libraries rely mostly on the outdated resources and facilities and provison of insufficient service, google search, (Ishola 20214; Fajonyomi *et'al*, 2021; Chima & Yusuf, 2023).

Financial management is another challenge to funding Universities and possibly extend to university libraries as the case may be. According to Ibrahim (2024), the university financial management in Nigeria faces both internal and external challenges (inadequate funding couple with insufficient government allocation, poor-budgeting, limited financial autonomy as well as economic instability, regulatory framework, increased competition with limited resources were among challenges. Universities and university libraries lack full financial autonomy and hence over-reliance on government funding (Ibrahim, 2024).

Literature survey on role of libraries and information centres in Nigeria in digital age revealed that funding has being the major challenge or inhibiting factor in the effort of libraries in Nigeria to provide efficient services. Majority of

libraries in developing nations are experiencing inadequate funding resulting to stocking outdated collections: problem of adoption and sustainability of emerging technologist (Saka 2025); more so that private tertiary institutions of learning and public mono-techics in Nigeria do not benefit from any form of TETFund intervention as this situation negatively inhibit the development of libraries attached to those private institutions and public mono-technics (Saka & Ladan, 2025)

The research in Nigeria in most cases, in Art and Social Sciences are conducted for the award of certificates, diploma, and degree at the expense of implementing the research findings for national development. In most cases, the report of researches (theses and dissertations) usually ends-up on shelves in academic libraries for consultation but not for national development (Saka, Bida & Majison, 2015; Yakub, 2025). If the research outputs are fully implemented and actually put to use, they would project the image of the universities university libraries thereby attracting adequate funds for service delivery.

It's unfortunate that despite 1992 ASUU struggle and suggestion for the adoption and utilization of 10% university annual budget for university library development this has not seen the light of the day. In most public universities, the institutional management does not accord recognition to university libraries in this regard as priority is given to other projects in the university system as opposed to university library (Achebe 2012, Ishola 2014; Adetunda & Familusi, 2017).

Sources of funding

Murtala and Durosaro (2022) enumerates the sources of funding education in terms of financial provision for projects, services and business in the form of government grant, subsidy, donation, savings, tuition fees, levies and student loan to higher education even though it a clear fact that the major source of funding education is through government grant.

Abdullahi, Saka and Udoudoh (2024) to investigated the perception of undergraduate students on TETFund intervention in public university libraries in North-central, Nigeria with the adoption of survey design covering 166;026 undergraduate students in seven (7) selected universities in North-central, Nigeria used hypothetical approach of chi-square. The results showed significant association of TETFund intervention with information resource development, while there was no significant association of service provision with resource development and service provision respectively.

As rightly pointed out by Ilori and Onanuga, (2025), public library in Nigeria presently source funds through government subvention and grants as well as internally-generated revenue (IGR), such as photocopying services, rental of hall, library membership registration, printing services as well as organization of seminars and workshops couple with soliciting funds from wealthy individuals. University libraries in Nigeria are not far from generating income through the above-mentioned revenue streams even though Saka and Ladan (2025) outline various sources of funding university libraries such as government subvention, tertiary education fund (TETFund) as well as internally generated revenue including Library development levy or library registration, overdue charges, etc

However, some research institutes are university-based institutes and hence exhibit some features of university and so libraries are attached to them. Various funding sources exist to include subvention/budgetary allocation followed by donor, parent institution, research grant and internally- generated revenue (IGR) among others. Most of the funding sources are used for the acquisition of information resources; provision of services, maintenance of library materials and staff training among others (Saka, 2023). Akpena and Orahachi (2021) outline six sources of funding digital libraries thus includes international organizations, grants, government agencies, endowments, IGR and development partners.

Consequences of Inadequate Funding

The decline in funding universities has negatively affected university library development and service delivery. Since academic libraries play a central role in supporting teaching, learning, research and community services, inadequate funding has serious consequences on the overall development of the university system. Inadequate funding in the education sector, particularly in university libraries, has significantly affected infrastructural development and service effectiveness. Budget cuts often result in the delay of project execution and completion, poor maintenance of facilities, and limited expansion of library spaces. (Haruna & Suleiman, 2020; Saka & Ladan 2025).

Additionally, insufficient funding may lead to non-payment or irregular payment of staff salaries and benefits. This situation can trigger industrial actions by academic and non-academic staff unions, thereby disrupting academic activities and limiting access to library services. This situation can negatively affect student academic performance and hence serve as bottleneck in the labour market, (Abdullahi, Saka, Udoudoh, 2024 even though Onuoha and Chukwueke (2025) maintain that inadequate funding to academic libraries affect all the activities resulting to inadequate staff, resources, furniture, equipment and ICT infrastructure. In many developing countries, government funding for libraries remains inadequate, which further weakens their capacity to provide quality information services.

With persistent budget constraints, it becomes difficult to recruit and retain qualified professionals. Libraries may also struggle to acquire current academic materials and subscribe to essential electronic databases. As a result, users are forced to rely on outdated or insufficient resources, which negatively impacts research quality and academic performance (Abdullahi, Saka and Udoudoh, 2024). Due to inadequate funding, universities and university libraries may be compelled to implement budget cuts. This often involves reducing the percentage allocation to library within a fiscal year (Saka and Ladan, 2025) as such reductions can lead to non – subscription of physical and e-journals and databases respectively.

Inadequate funding significantly reduces opportunities for staff training and professional development in university libraries. Capacity building is essential for librarians to remain current with emerging trends, digital technologies, information management systems, and research support services. However, when funding is insufficient, universities are often unable to sponsor workshops, conferences, seminars, or advanced training programmes for library personnel. This lack of funded training opportunities limits skill acquisition, reduces staff efficiency, and ultimately affects the quality-of-service delivery (Awunandu, 2022).

Zero-base budgeting system is another challenge to university library funding and at the same time serve as negative effect of inadequate funding, Persistent inadequate funding may lead university libraries to operate under what can be described as "zero budgeting" or near-zero financial allocation. In such situation, once limited funds are exhausted, libraries are left with no financial resources to support ongoing operations while attitude of the management of research institutes, inadequate funding its self as well as the irregular release of funds and absence of budgetary allocation were discovered among challenges to funding research institute libraries in Nigeria. (Saka, 2023, Saka & Ladan, 2025;).

Inadequate funding to university libraries lead to stocking the outdated and irrelevant collections both (print and non-print) as subscription to electronic information resources becomes problem and consequently lead to failure in the professional and NUC accreditation and resource verification respectively, University libraries usually experience inadequate funding while accreditation is ongoing as this situation hinder acquisition of current information resources on regular basis (Fajonyomi, *et'al,* 2021: Oyetola, Adebayo and Onifade, 2025). Inadequate funding can also hinder the proper implementation of library policies and visitation panel's recommendations concerning university libraries. Even when policies exist to guide collection development, staff recruitment, ICT integration, and service delivery, financial constraints may hinder their full implementation. As reported by Musa and Saka (2025), inadequate institutional autonomy inhibits university libraries to act independently and effectively on the recommendations even though the top most challenge to the presidential visitation panel recommendations and implementation is funding to university libraries.

One of the major funding challenges to university libraries is the over-reliance on TETFund and government/university subventions. This over-dependence is often structured in such a way that university libraries are unable to explore or utilize alternative avenues to generate additional funds. As pointed out by Ibrahim (2024), "over-reliance on government funding" remains one of the internal challenges affecting university financial management in Nigeria.

Inadequate funding is not limited to universities and their libraries alone but also to entire higher institutions and research institutes in Nigeria such that the trade unions in education sector usually enter into dispute with government in the area of funding as stakeholders blamed government for under-funding higher educational institutions (Ayemi and Ayeni, 2023). Generally speaking, there is low priority to libraries in Nigeria especially with the depreciation of currency as a result of inflation which has affected library budget couple with exchange rate (Ilori and Onanuga, 2025).

Strategies to overcome funding challenges

Based on the identified challenges to funding; sources of funding which are inadequate, and consequences to inadequate funding to university libraries in Nigeria, the following strategies are suggested, enumerated and supported by literature survey:

Pathway for Nigerian Libraries.

The challenges of inadequate or poor funding from government and institutional management which sometimes are due to what Onuoha, David-West and Chuckuweke (2022) refer to as "poor economic state of nation" can be overcome through additional means of generating income by individual library, fee-based services, advocacy through sensitization and campaign as well as other means as these measures can help provide adequate funding to university libraries in Nigeria.

Pathway and Diversification of funding sources

University libraries in Nigeria should explore various sources of income generation or revenue streams especially provision of fee-based services such as registration, printing, binding, inter library loan, online, reprographic and e-mail services among others (Ishola, 2014). On the other hand, six concrete revenue diversification pathways which universities and university libraries in Nigeria can adopt according to Yahaya (2025) include: commercialization of research output, alumni endowment, philanthropy fund, public private partnership (PPP), professional and executive education (organizing short, certificate courses, online partnership with professional bodies), university holdings and investment vehicles, e.g. printing press, consultancy services etc. The sixth pathway according to Fajoyomi *et'al* (2021)

and Yahaya (2025) is the international grant and development partnership, actively pursued collaboration with global funding sources e.g Carnergie corporation.

Collection Development as Strategic option

University libraries can adopt acquisition method as strategy to overcome funding particularly in the area of building collections. The acquisition methods to be adopted by university libraries according to Issa (2023) include: purchase, gift and donations, exchange, library consortium and institutional membership.

Application of Collection Development policy through adequate funding:

This is another strategy by which adequate funding of university libraries in Nigeria can be ensured i.e provision of adequate funding so as to enhance the implementation of collection development policy of university libraries (Faga & Tsedoo, 2025). This means that with adequate funding to university libraries, there is tendency for effective implementation of collection development policies

Collaboration and Innovation

This is a strategy by which university libraries can adequately be funded and is through collaboration in general and research collaboration in particular i.e research collaboration among universities, industries' libraries and information centers (Ezekiel, 2022) thus research collaboration according to Hornby (2015) "is the act of working with another person or group of people" while collaboration can also occur among department of library and information science, industries, public private partnership, community, capacity building, research, teaching and professional networking. On the other hand, new ideas and discoveries in librarianship should be encouraged through research (Saka & Usman, 2025).

Bring -Your - Own -Devices (BYOD) Policies

This is another strategy whereby information technology (IT) policy, library staff and patrons are encouraged to use mobile phones and personal computers to access library's data, systems and databases in addition to those devices supply by the library. It has been observed that in academic libraries in Nigeria, library staff and users bring personal computers (PCs) and other IT devices to library so as to meet their information needs rather than waiting for the institution's management to supply those devices for them. Furthermore, academic libraries in Nigeria experience economic recession and inadequate budget and can be remedied through the strategy of by BYOD policy. (Onuoha and Chukwuemeka, 2025).

Lobby, advocacy and efficient service delivery;

Management of university libraries in Nigeria are expected to lobby and relate or establish relationship with the library committee members and the university governing council particularly council committee on university library services for effective efficient funding. The university librarian and other library staff should be engaged in the sensitization or exploring public awareness programs concerning the services offer by the university library as well as providing efficient services so as to win the confidence of the university management and or library committee for regular approval of library budget (Saka & Ladan, 2025; Ilori & Onanuga, 2025)

Fund raising and donation:

University libraries can organize launching i.e fund raising program this can also be related to the strategy employ by Ilori & Onanuga, (2025) concerning funding public libraries in Nigeria such that library staff can publish journal and present copies for launching and money realize could be used in providing various library services. On the other hand, the two co-authors suggested soliciting donation from private individual as well as contacting friend of library for financial assistance.

Compliance to 10% annual recurrent expenditure to university libraries

Heads of tertiary institutions particularly universities should be made to comply with the 10% of university annual budgetary allocation to university libraries and hence this should be enforced (https://www.google.com/serach?current.state.of.funding.university.libraries.in.nigeria). University libraries should be adequately funded to enable them acquire current information resources that align with standards for accreditation (Oyewole, 2019).

The uniqueness of this study lies on the fact that previous studies use singly research method and design while this study used both qualitative and quantitative research methods.

Methodology

Mixed method was used in this paper as the method involves qualitative research, literature survey, search, documentary and bibliometric analysis of cited papers, hence citation analysis was further conducted to assess the productivity of the publications being used in the write-up. The paper adopted documentary studies whereby relevant literature to university library funding are reviewed. (Akpena and Orahachi, 2021, Aina, 2024).

Literature survey was adopted for this paper as it involves harvesting, gathering sieving, sighting and reviewing relevant literatures pertinent to university library funding. The review was conducted in line with the five research questions and 44 relevant literature and sources were not only sighted at 63 frequencies but also reviewed mostly covering Nigeria

with focus on government publications, journals, conference proceedings, conference papers, a textbook, chapter in-book, reference source, newspapers, bulletin, as well as Google search. Narrations were used in the discussion of major findings thereby covering funding challenges and sources, consequences to under-funding in university libraries and strategies to overcome the identified challenges respectively. Findings from the literature survey in relation to the four research questions being identified, results and discussion follows.

Results and Discussion

From the literature survey and citations carried out, results are presented on Table 5 and the discussions made thereafter.

Table 5: Citation Analysis of Publications

Ranked Order	Cited Sources/Publications	Number of publications	Frequency	Percentage %
1	African Multidisciplinary Journal of Development	1	6	9.52
2	Academic and Research Libraries Section Conference Proceedings (2021)	2	5	7.94
4	Leadership Newspaper	4	5	7.94
2	Annual Bursary Lecture (FUT Minna)	2	5	7.94
4	Library Philosophy & Practice (e-journal)	2	4	6.35
6	NLA National Conference Proceedings (2022)	2	3	4.76
6	National Policy on Education	1	3	4.76
7	Chapter – in – book in Honour of Prof. S.O Odunkule and authored by A. Ayeni & O.J Ayeni	2	2	3.17
7	Daily Trust Newspaper	2	2	3.17
7	International Journal of Information Resource Management	2	2	3.17
7	Chapter-in- Book on Educational Financing authored by Murtala, A.T & Durosaro, D.O (2022)	1	2	3.17
7	AWAU Multidisciplinary Journal	1	2	3.17
7	Google Search	1	2	3.17
9	African Journal of Library, Archives & Information Science (AJLAIS)	1	1	1.58
9	African Journal of Library Studies	1	1	1.58
9	Bibliotheca: Journal of LIS – LAUTECH Ogbomoso	1	1	1.58
9	Constitution of Federal Republic of Nigeria	1	1	1.58
9	Education and Science Policy Review & Curriculum Development Journal	1	1	1.58
9	Gazette for TETFUND	1	1	1.58
9	Information Studies Conference Paper (University of Zululand, South Africa)	1	1	1.58
9	Inaugural Lecture (103rd) Series by Durosaro, D.O (2012)	1	1	1.58
9	International Journal of Applied Technologies in Library and Information Management	1	1	1.58
9	Journal of Information, Education, Science and Technology	1	1	1.58
9	NALISE Conference Paper (2025)	1	1	1.58
9	National Universities Commission (Bulletin)	1	1	1.58
9	Nigerian Journal of Information Science and Research	1	1	1.58
9	NLA @ 60 Compendium	1	1	1.58
9	Nigerian School Library Journal	1	1	1.58

9	Textbook Authored by N. Achebe	1	1	1.58
9	Oxford Advanced Learner Dictionary	1	1	1.58
9	Workshop Paper Presentation (AULNU)	1	1	1.58
9	Zaria Journal of Education Studies	1	1	1.58
	Total	**44**	**63**	**100**

Acronym

AWAU – Association of African Universities

AULNU – Association of University Librarians of Nigerian Universities

FUT Minna – Federal University of Technology, Minna

LAUTECH – Ladoke Akintola University of Technology

LIS – Library and Information Science

NALISE – Nigerian Association of Library and Information Science Educators

NLA – Nigerian Library Association

TETFund – Tertiary Education Trust Fund

UNESCO: United Nations Educational, Scientific and Cultural Organizations

Source(s): Literature Survey/Cited Sources/Publications, 2026

Very interesting with the Table 5 is that the frequency counts (frequency of citations) are arranged by ranked order/descending order from highest to the lowest number(s) i.e from 6 (9.52%) to 1 (1.58%) respectively. Where there are two or more cited sources with the same frequency, letter-by- letter alphabetical filing system was adopted

It was discovered from Table 5 also that 44 different but relevant sources, (publications and google search) were cited at 63 times (frequencies) out of which African multidisciplinary journal of Kampala International University, Uganda being the only North African journal among the sighted sources with much published items on university library funding and at the same time conference proceedings of academic and research libraries section of the Nigerian Library Association as well as Annual Bursary Lecture in Federal University of Technology Minna respectively were the second in the ranking list. The reason for highest frequencies in the three cited sources/publications is not unconnected to the fact that multidisciplinary journal is being published by Kampala International University Uganda, while conference proceedings of the Academic and Research Libraries (ARL) section of Nigerian Library Association (NLA) consist of libraries situated in institutions of higher learning of which universities belong and that the theme of annual Bursary lecture was not only on funding and management of finance but also centered on universities in Nigeria with reference to funding and financial resource management respectively. Analysis discovered 19 publications with (1.64%) each being cited only one most of which are from journals, government publications (gazette, Nation Policy on Education, NUC Bulletin) as well as reference source (dictionary), workshop/conference paper and textbook respectively.

Discussion of major findings

Research question one find out the most cited sources of information in the literature survey concerning funding university libraries in Nigerian and it was discovered that African Multidisciplinary Journal of Development published by Kampala International University Uganda and this finding contradicts the findings by Chikwuji and Tsafe (2023) who reported books as the most cited sources of information.

In response to research question two on funding challenges as it affects university libraries in Nigeria, the literature survey discovered non-compliance to 10% budgetary allocation to public university libraries by the institutional authorities couple with inadequate funding, inflation, lack of autonomy as they align to the right-up of Saka & Ladan (2025), Ishiola (2014), and Achebe (2012) but contradicts the write-ups by Ibrahim (2024), Yahaya (2025) and Saka (2025) as the authors lay emphasis on challenges to funding Nigerian libraries and universities in Nigeria and not specifically on University libraries in Nigeria.

Research question three sought to review literature on sources of funding university libraries and the survey show that government subvention, TETFund Intervention and IGR were the sources outline by Saka and Ladan (2025), Abdullahi, Saka and Udoudoh (2024) but contradicts the write-ups by Akpena & Orahachi (2021), Saka (2023), Ilori and Onanuga (2025) respectively as the authors focus on funding digital libraries, funding public libraries and research institute libraries in Nigeria as opposed to funding university libraries in Nigeria respectively.

In response to research question four in line with the consequences of inadequate funding university libraries in Nigeria were examined through literature survey, search and areas identified to include: stocking outdated collection, zero-base budgeting, budget cut, negative effect on the overall development of university libraries, lack of policy implementation as well as limited training opportunities and decline in academic activities. All these consequences align with the write-ups by Awunandu (2022), Abdullahi, Saka and Udoudoh (2024), Saka and Ladan (2025), Unuoha and Chikwuemeka (2025), Oyetola, Adebayo and Onifade (2025), Musa and Saka (2025) respectively. The findings contradict the literature survey with respect to write-ups by Ibrahim (2024), Ayeni and Ayeni (2025), Yahaya (2025), Ilori and Onanuga (2025)

respectively as the authors delve into consequences of inadequate funding in terms of strike action by the trade unions in higher institutions of learning, foreign exchange and low priority to libraries generally in higher institutions in Nigeria as oppose to university library funding in Nigeria.

Strategies to overcome the challenges and consequence being the response to research question five were reviewed to include: university libraries to embark on adequate funding, adoption of acquisition methods Issa (2023) diversification of funding sources, pathway, fee-based services, collaboration and BYOD policies all align with Oyewole (2019), Onuoha, David-west and Chukwueke (2022), Ezekiel (2022), Saka and Ladan (2025) write-ups and google search but literature surveyed and reviewed showed partly align with fund-raising and donation, lobby and advocacy and BYOD policies by Ilori and Onanuga (2025) and Onuoha and Chikwuemeke (2025) as the authors delve more on funding public libraries and libraries in Nigeria without specific discussion on funding university libraries in Nigeria.

Conclusion

Functionality of university libraries in supporting the attainment of the core-mandate of universities is a function of adequate funding. Strategies to overcome the challenges must also align with the university library functions to support the overall mission or core-mandate of the university (teaching, research and community service). Since there is no university library or libraries that is self-sufficient in terms of resources, there is the need for collaboration and partnership among university libraries through consortium as well as collaboration with international donor agencies and industries.

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Curriculum Relevance in Library schools in South-East Nigeria: Are graduates prepared for contemporary information work?

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Abstract

This study examined the relevance of Library and Information Science (LIS) curricula in library schools in South East Nigeria and the preparedness of graduates for contemporary information work. **Specifically, the study sought to: evaluate the relevance of current curricula to contemporary competencies; assess graduates' digital, technological, and user-centered skills; identify gaps between curriculum content and employer expectations; examine stakeholder perceptions of curriculum adequacy; and highlight challenges and strategies for aligning LIS education with modern information demands.** Anchored on Tyler's Curriculum Theory (1949), the research employed a survey design with a population of 127 respondents comprising 47 faculty members, 45 employers, and 35 LIS graduates. A total enumeration sampling technique was adopted, ensuring that all identified stakeholders participated. Data were collected using a structured Google Form questionnaire, which included closed-ended items on a four-points Likert scale and open-ended questions for qualitative insights. Quantitative data were analyzed using descriptive statistics (means, and standard deviations), with mean scores below 2.50 interpreted as disagreement and scores of 2.50 and above as agreement. Qualitative responses were analyzed using frequency counts and percentages to quantify recurring themes, thereby complementing the thematic insights. Findings revealed that although curricula reflect digital trends and balance theory with practice, they inadequately prepare graduates for modern roles, with digital and technological skill gaps most pronounced. The study recommended modernization, stronger industry collaboration, enhanced practical training, faculty development, and regular review to improve graduate employability.

Keywords: Curriculum relevance, Library and Information Science (LIS), Digital literacy, Graduate employability, South-East Nigeria

Introduction

In today's knowledge-driven economy, the relevance of Library and Information Science (LIS) curricula in preparing graduates for contemporary information work is increasingly critical. Traditionally, LIS education in Nigerian universities emphasized cataloguing, classification, reference services, serials management, and library administration (Abubakar, 2021). However, rapid advances in information technologies and changing user behaviours demand curricular reform to integrate digital literacy, knowledge management, data curation, and information architecture. The transformation of librarianship into a technology-enabled profession underscores the need to equip graduates with competencies for emerging information environments (Mubofu & Mambo, 2021).

A **curriculum** is the structured plan of learning experiences, objectives, and content designed to guide students toward acquiring knowledge, skills, and values. It provides direction for teaching and learning, establishes standards for evaluation, and ensures that learners are prepared not only for academic success but also for professional and civic responsibilities (Ochoma, 2020). **Curriculum relevance** refers to the extent to which curriculum content reflects real-world demands, technological advancements, and labour market expectations, thereby making learning meaningful and applicable to students' lives (Motsepe, Sethu, Sikhosana & Dladlama 2026).

Schools need curricula because they serve as the backbone of education, shaping instructional quality, student engagement, and employability outcomes. A relevant curriculum impacts schools by improving teaching effectiveness, impacts students by equipping them with competencies for lifelong learning and career readiness, and impacts the real world by producing graduates who can contribute effectively to national development and global competitiveness Abang (2025)

The issue of curriculum relevance and graduate employability is not peculiar to Nigeria or the South-East region; it is a global phenomenon. Studies from South Africa and Tanzania show that LIS graduates face similar challenges of limited digital readiness despite curricular reforms (Mubofu & Mambo, 2023; Sibiya & Ngulube, 2023). In advanced contexts such as the United States and Europe, curriculum reforms emphasize digital literacy, data curation, and user experience design to address evolving workplace needs (ALA, 2024; IFLA, 2023). Thus, the challenge of aligning curricula with employability is both evolving and universal.

Globally, efforts to improve curriculum relevance include regular curriculum reviews, integration of emerging technologies such as artificial intelligence and data analytics, and stronger collaboration between universities and industry (Olawunmi, 2025; Boyejo & Oke, 2025). Regionally, African scholars emphasize faculty capacity building and interdisciplinary approaches to strengthen LIS education (Awodoyin & Okiki, 2023). Locally, Nigerian reforms led by the Librarians' Registration Council of Nigeria (LRCN) have sought to modernize LIS curricula, though implementation remains slow (Okebukola, 2020; Ofor Douglas, 2024).

Despite these efforts, LIS graduates in South-East Nigeria continue to face displacement by IT specialists in digital roles, reflecting a mismatch between academic training and employer expectations. Employers consistently highlight deficiencies in software proficiency, digital resource management, and emerging areas such as information policy and knowledge management. Anchored on Tyler's Curriculum Theory (1949), this study assesses the relevance of LIS curricula in South-East Nigerian universities and examines the preparedness of graduates for contemporary information work. By situating Nigerian LIS curricula within global standards, the study aims to generate actionable recommendations for curriculum planners, educators, and policymakers to modernize LIS education, enhance graduate employability, and strengthen the contribution of information professionals to national development.

Statement of the Problem

Ideally, Library and Information Science (LIS) curricula in Nigerian universities should align with global standards such as those of IFLA and ALA, equipping graduates with both theoretical knowledge and practical competencies for contemporary information work. This would include digital literacy, data analytics, information architecture, user experience design, and knowledge management. In reality, LIS programmes in South-East Nigeria remain focused on traditional areas such as cataloguing and physical library management. Although the new Core Curriculum Minimum Academic Standards (CCMAS) introduced by the NUC aim to modernize programmes, implementation in LIS schools has been slow. Employers consistently report that graduates lack proficiency in software tools, digital resource management, and emerging areas such as information policy, leading to their displacement by IT specialists in digital roles.

The consequences are clear: outdated curricula, inadequate faculty capacity, and weak industry collaboration have widened the gap between academic training and labour market expectations. Graduates are underprepared for positions in digital libraries, archives, and corporate information centres, limiting their contribution to national development. Tyler's Curriculum Theory (1949) frames this problem by emphasizing that curricula should prepare learners for occupational roles and societal needs. The persistent misalignment between LIS curricula and employer expectations in South-East Nigeria reflects a failure to achieve these principles, underscoring the urgency of reform. Furthermore, stakeholder perceptions , including those of students, faculty, and employers, remain divided on the adequacy of LIS curricula in preparing graduates for professional practice in the digital age. Capturing these perspectives is essential to fully understand the scope of the problem and to design reforms that are both practical and inclusive.

Therefore, the central problem this study addresses is the misalignment between LIS curricula in South-East Nigerian universities and the competencies required for contemporary information work. Identifying curriculum shortcomings, evaluating the impact of CCMAS reforms, incorporating stakeholder perspectives, and aligning academic content with employer expectations are essential to improving graduate preparedness, employability, and professional performance

Research Objectives

The primary objective of this study is to assess the relevance of LIS curricula in universities in South-East Nigeria and determine the preparedness of their graduates for contemporary information work. Specifically, the study aims to:

1. Ascertain the relevance of the current curriculum of Library and Information Science schools in South-East Nigeria to the competencies required in contemporary information work.
2. To determine the extent to which LIS graduates from South-East Nigeria possess digital, technological, and user-centered skills demanded by today's information environment.
3. To identify the gaps between the curriculum content of LIS schools and the expectations of employers in libraries, archives, and other information sectors.

4. To ascertain the perception of stakeholders (students, faculty, and employers) on the adequacy of LIS curriculum in preparing graduates for professional practice in the digital age.
5. To identify the challenges that hinder the relevance of LIS curriculum in South-East Nigeria to contemporary information work.
6. To identify the strategies that LIS schools can adopt to align their curriculum more closely with the demands of the modern information environment.

Significance of the Study

This study is valuable to five stakeholder groups: curriculum planners, educators, administrators, students, and employers. For curriculum planners, it offers evidence-based insights to guide reforms that integrate technology and align outcomes with professional expectations. Educators will identify areas requiring further training to enhance graduate employability, while administrators and policymakers can use the findings to inform accreditation, resource allocation, and industry collaboration. Students will gain clearer understanding of employer expectations and the skills needed for contemporary information work. Employers, in turn, will see how collaboration with LIS schools can shape curricula that meet labour market demands. Overall, the study seeks to bridge the gap between academic preparation and professional practice, ensuring LIS graduates are better equipped for the digital information environment.

Literature Review

Curriculum Relevance in LIS Education

Curriculum relevance refers to the extent to which academic programmes reflect professional realities, technological advancements, and labour market needs (Egbosimba & Olusegun, 2025). Globally, LIS curricula have shifted from traditional emphases on cataloguing and classification to incorporate digital literacy, knowledge management, data curation, and user experience design. The American Library Association (ALA, 2024) and the International Federation of Library Associations (IFLA, 2023) highlight competencies in digital scholarship, data analytics, and information architecture as essential for modern practice.

In Africa, reforms have sought to integrate ICT and digital skills, but progress remains uneven. Studies from Tanzania and South Africa show that while curricula increasingly include digital competencies, graduates still face employability challenges due to gaps in practical readiness (Mubofu & Mambo, 2023; Sibiya & Ngulube, 2023). In Nigeria, LIS education has traditionally emphasized cataloguing, classification, and library administration, with limited integration of digital competencies (Abubakar, 2021). Despite reforms initiated by the Librarians' Registration Council of Nigeria (LRCN) and the introduction of the new **Core Curriculum Minimum Academic Standards (CCMAS)** by the National Universities Commission (NUC), curricula remain slow to adapt to technological change (Okebukola, 2020; Ofor Douglas, 2024). This raises questions about the relevance of current curricula to contemporary information work.

Graduate Skills and Preparedness

Graduate preparedness is a critical measure of curriculum effectiveness. Evidence shows that Nigerian LIS graduates often emerge with strong theoretical knowledge but limited exposure to practical digital tools. Kassim (2022) observed that graduates lack proficiency in software tools, data analytics, and information policy, making them less competitive in digital information roles. Employers increasingly replace LIS graduates with IT specialists in digital libraries, archives, and knowledge management units. Beyond technical skills, employability also requires soft skills such as adaptability, teamwork, and problem-solving. Boyejo and Oke (2025) emphasize that workplace readiness involves both technical and transferable skills, yet Nigerian LIS curricula remain weak in these areas. This deficiency undermines graduates' confidence and competence in modern information environments, highlighting the need for curricula that balance theory with practice and integrate digital competencies.

Curriculum–Employer Gaps

The gap between curriculum content and employer expectations is a recurring theme in LIS education. While curricula emphasize traditional library practices, employers demand digital literacy, information policy, and knowledge management skills. This mismatch has widened the gap between academic training and workplace realities, leaving graduates underprepared for professional practice in the digital age (Kassim, 2022; Boyejo & Oke, 2025). Employers often report dissatisfaction with graduates' ability to manage digital resources, use software tools, and adapt to emerging technologies. This disconnect reflects weak industry collaboration in curriculum design and limited consultation with employers during curriculum review processes. Addressing these gaps requires stronger partnerships between LIS schools and the information industry to ensure curricula align with workplace needs.

Stakeholder Perceptions

Stakeholder perspectives provide valuable insights into curriculum adequacy. Employers stress the need for digital literacy and soft skills such as communication and teamwork (Nwajiuba et al., 2020). Faculty members acknowledge the importance of reform but cite infrastructural limitations, shortage of digitally skilled staff, and slow policy implementation as barriers (Awodoyin & Okiki, 2023). Students express concern about employability and call for greater exposure to practical, technology-driven learning experiences (Oladapo, Olatunji, Salami & Oladapo, 2025).

These perceptions converge on the recognition that LIS curricula must evolve to meet the demands of the digital age. However, divergence also exists: while faculty may view curricula as adequate in theory, employers and students often highlight deficiencies in practice. Capturing these perspectives is essential to designing reforms that are inclusive and responsive to stakeholder needs.

Challenges Hindering Curriculum Relevance

Several challenges hinder curriculum relevance in Nigeria. These include outdated curricula that fail to integrate emerging technologies, inadequate faculty capacity to deliver modern content, weak industry collaboration, and slow implementation of CCMAS reforms (Okebukola, 2020; Ofor Douglas, 2024). Infrastructural limitations, such as poor access to ICT facilities and limited funding, further constrain effective curriculum delivery. These challenges explain why LIS graduates remain underprepared for positions in digital libraries, archives, and corporate information centres. They also highlight systemic issues in higher education governance, where policy reforms are often announced but not fully implemented.

Strategies for Curriculum Reform

Scholars propose multiple strategies to enhance curriculum relevance. These include regular review and updating of curricula, integration of emerging technologies such as artificial intelligence and the Internet of Things, stronger industry collaboration, and faculty capacity building (Olawunmi, 2025; Egbosimba & Olusegun, 2025). Interdisciplinary approaches and incorporation of transferable skills can further strengthen graduate preparedness.

Globally, LIS schools have adopted competency-based curricula that emphasize practical training, internships, and industry partnerships. Regionally, African scholars advocate for faculty development and infrastructural investment to support digital learning. Locally, Nigerian reforms led by the LRCN and NUC's CCMAS provide a framework for modernization, but success depends on effective implementation and stakeholder collaboration. Collectively, these strategies provide a roadmap for aligning LIS education in South-East Nigeria with global standards and preparing graduates for contemporary information work.

Theoretical Framework

This study is anchored on **Ralph W. Tyler's Curriculum Theory (1949)**, one of the most influential models in curriculum development. Tyler argued that curricula should not merely transmit knowledge but prepare learners for occupational roles and societal needs. His model is structured around four fundamental questions:

- **Objectives** – What educational purposes should the school seek to attain?
- **Learning Experiences** – What learning experiences can be provided to achieve these objectives?
- **Organization** – How can these experiences be effectively organized?
- **Evaluation** – How can we determine whether these objectives are being achieved?

This structure provides a systematic framework for curriculum design, implementation, and review. It emphasizes that curriculum must be dynamic, responsive to societal changes, and aligned with labour market needs.

Applied to **Library and Information Science (LIS) education in South-East Nigeria**, Tyler's framework highlights the need to balance theory with practice, integrate technological skills, and ensure curricula evolve with changing professional environments. If graduates are consistently underprepared for digital roles, it suggests failure in one or more of Tyler's four components: objectives may not reflect labour market demands, learning experiences may remain outdated, organization may not integrate practical exposure, and evaluation may not adequately measure workplace competencies. Importantly, this study does not simply benchmark South-East Nigerian curricula against Tyler's framework. Rather, Tyler's theory is used as a **diagnostic lens** to evaluate whether LIS curricula fulfill their intended purpose of preparing graduates for contemporary information work. The framework helps identify where gaps exist and guides recommendations for reform.

In Nigeria, LIS education is regulated by the **Librarians' Registration Council of Nigeria (LRCN)**, while the **National Universities Commission (NUC)** recently introduced the **Core Curriculum Minimum Academic Standards (CCMAS)** to modernize academic programmes. These developments provide a national context for curriculum reform. Tyler's framework complements CCMAS by offering a structured way to assess whether reforms are being implemented effectively and whether they address the misalignment between academic training and employer expectations. Thus, in this study, **curriculum relevance** serves as the central measure of how well LIS schools in South-East Nigeria fulfill their mandate of preparing graduates for effective participation in today's digital information environment. Tyler's theory provides both a conceptual foundation and a practical structure for evaluating curriculum adequacy, identifying shortcomings, and proposing strategies for alignment with global standards and national reforms.

Methodology

The study employed a survey research design to evaluate the relevance of Library and Information Science (LIS) curricula in South-East Nigerian universities and to assess graduate preparedness for contemporary information work. The population consisted of faculty members teaching in LIS schools, employers in libraries, archives, and corporate

information centres, and graduates of LIS programmes from the five federal universities in the region. These universities include the University of Nigeria, Nsukka; Nnamdi Azikiwe University, Awka; Michael Okpara University of Agriculture, Umudike; Federal University of Technology, Owerri; and Alex Ekwueme Federal University, Ndufu-Alike. In total, 127 respondents participated, comprising 47 faculty members, 45 employers, and 35 graduates. Each respondent was required to indicate their category in the questionnaire, which ensured accurate classification into the three groups.

A total enumeration sampling technique was adopted because the population was relatively small and accessible, allowing all identified stakeholders to be included. This ensured that the sample adequately represented the real population of interest within the defined scope of the study. To minimize social desirability bias, which is often inherent in survey studies, the questionnaire was administered electronically via Google Forms to guarantee anonymity. Respondents were assured of confidentiality and informed that their responses would be used strictly for academic purposes. Neutral wording was employed in the survey items to avoid leading questions, and the inclusion of both closed-ended and open-ended questions allowed respondents to provide candid views.

Data were collected using a structured questionnaire that combined closed-ended items on four-points Likert scale with open-ended items designed to elicit additional insights on outdated curriculum areas, skill gaps, and strategies for improvement. All responses were treated as survey data. Quantitative data were analyzed using descriptive statistics such as frequencies, percentages, means, and standard deviations, with mean scores below 2.50 interpreted as disagreement and scores of 2.50 or above as agreement. Qualitative responses (open ended questions) were analyzed using frequency counts and percentages to quantify recurring themes. This approach provided a comprehensive understanding of curriculum relevance, graduate preparedness, and stakeholder perceptions in South-East Nigeria.

Results

Table 1: Demographic Characteristics of Respondents (n = 127)

Stakeholder	Frequency	Percent
Faculty/Department	47	37.0
Employer	45	35.4
LIS Graduate	35	27.6
Total	127	100.0
Gender	Frequency	Percent
Male	65	51.2
Female	62	48.8
Total	127	100.0
Education	Frequency	Percent
Diploma	33	26.0
Bachelor's degree	32	25.2
Master's Degree	33	26.0
Doctorate	29	22.8
Total	127	100.0
Experience	Frequency	Percent
1-5 years	37	29.1
6-10 years	46	36.2
More than 10 years	44	34.6
Total	**127**	**100.0**

Respondents were fairly distributed: faculty (37.0%), employers (35.4%), and LIS graduates (27.6%). Gender was nearly balanced, with males (51.2%) and females (48.8%). Educational qualifications were evenly spread across diploma (26.0%), master's (26.0%), bachelor's (25.2%), and doctorate (22.8%). Most had 6–10 years of experience (36.2%), followed by over 10 years (34.6%) and 1–5 years (29.1%), reflecting a well-balanced and experienced sample.

Research Question 1: How relevant is the current curriculum of Library and Information Science schools in Southeast Nigeria to the competencies required in contemporary information work?

Table 2: Respondents' Perception of the Relevance of LIS Curriculum to Contemporary Information Work in Southeast Nigerian = 127(Faculty members, Employers and Graduates)

Item statement	SD	D	A	SA	Mean	SD*	Decision
The current LIS curriculum adequately prepares graduates for contemporary information work	33	37	32	25	2.39	1.08	Disagree
The curriculum reflects current trends in digital and technological skills.	32	27	37	31	2.53	1.12	Agree
The curriculum is regularly updated to meet changing industry needs.	31	28	35	33	2.55	1.13	Agree
The curriculum balances theory and practical training effectively	25	38	35	29	2.54	1.05	Agree
Overall Mean					**2.50**	**1.09**	**Agree**

In Table 2, the overall mean score of 2.50 (SD = 1.09) indicates agreement that the LIS curriculum is relevant to contemporary information work. Graduate preparedness recorded a mean of 2.39, SD = 1.08, reflecting disagreement. Other items—digital trends, curriculum updates, and balance of theory and practice—were rated agree (Means = 2.53, 2.55 and 2.54 respectively). Standard deviations (1.05–1.13) show moderate variability, suggesting mixed perceptions among respondents.

In your opinion, which areas of the curriculum are most outdated? (Open ended question as a follow up for Research question 1)

Table 3: Respondents' Opinions on the Most Outdated Areas of the LIS Curriculum

	Frequency	Percent
Digital Literacy & Skills	18	14.2
Traditional Library Practices	22	17.3
Teaching Pedagogy	9	7.1
ICT / Library Automation	35	27.6
Practical Training Component	18	14.2
Theory-Based Curriculum	9	7.1
Technological Skills Gap	8	6.3
Curriculum Structure Issues	8	6.3
Total	**127**	**100.0**

The findings show that ICT/Library Automation (27.6%) is the most outdated area, followed by Traditional Library Practices (17.3%), and both Digital Literacy & Skills (14.2%) and Practical Training (14.2%). This suggests that technological and practical components of the curriculum require significant improvement.

Research Question 2: To what extent do LIS graduates from Southeast Nigeria possess digital, technological, and user centered skills demanded by today's information environment?

Table 4: Extent to Which LIS Graduates Possess Required Digital, Technological, and User-Centered Skills n = 80 (Employers and Graduates)

Item statement	SD	D	A	SA	Mean	SD*	Decision
LIS graduates possess sufficient digital literacy skills.	30	11	19	20	2.36	1.22	Disagree
LIS graduates are well-trained in user-centered service delivery	15	13	30	21	2.72	1.05	Agree

LIS graduates demonstrate strong technological competencies	51	10	11	8	1.70	1.04	Disagree
LIS graduates are adaptable to emerging technologies and tools.	48	17	12	3	1.63	0.87	Disagree
Overall Mean					**2.10**	**1.05**	**Disagree**

The overall mean of 2.10 (SD = 1.05) in table 4 shows respondents generally disagree that LIS graduates possess required digital and technological skills. Digital literacy, technological competencies, and adaptability all scored below 2.40, reflecting notable gaps, while only user-centered service delivery (Mean = 2.72) was rated agree. Overall findings highlight critical skill deficiencies in today's information environment.

What specific skills do you think LIS graduates lack? (Open ended question as a follow up for Research question 2)

Table 5: Respondents' views on Skills Lacking Among LIS Graduates

	Frequency	**Percent**
Digital Skills	48	60
Information Literacy Skills	7	8.75
Information Retrieval Skills	5	6.25
Technology/ICT Skills	11	13.75
Data & Systems Skills	3	3.75
Software Development Skills	2	2.5
Practical Skills	2	2.5
Learning Skills	1	1.25
Computer Skills	1	1.25
Total	**80**	**100.0**

In Table 5 digital skills (60%) were the most lacking among LIS graduates, followed by technology/ICT skills (13.75%). Other areas such as information retrieval skills, software development skills, practical skills, and technical competencies recorded lower frequencies. Overall, the major deficiencies lie in digital and technological domains essential for effective performance in modern information environments.

Research Question 3: What gaps exist between the curriculum content of LIS schools and the expectations of employers in libraries, archives, and other information sectors?

Table 6: Perceived Gaps between LIS Curriculum Content and Employers' Expectations

n = 45 (Employers)

Item statement	SD	D	A	SA	Mean	SD*	Decision
The curriculum content matches the expectations of employers in libraries, archives, and other information sectors.	2	4	10	29	3.47	0.83	Agree
Employers find LIS graduates adequately prepared for professional practice.	15	8	2	20	2.60	1.34	Agree
The curriculum includes sufficient practical training and internships.	19	2	1	23	2.62	1.45	Agree
Employers are regularly consulted in curriculum development	2	1	10	32	1.49	0.85	Disagree
Overall Mean					**2.55**	**1.12**	**Agree**

The results in Table 6 suggest that employers generally perceive the LIS curriculum in South East Nigeria as aligning with their expectations, with a high mean score (3.47) indicating agreement that curriculum content broadly matches workplace needs. Employers also agreed, though less strongly, that the curriculum provides sufficient practical training and internships (Mean = 2.62) and that graduates are adequately prepared for professional practice (Mean = 2.60). The finding suggests that while curricula show some alignment, gaps persist in practice and readiness.

What gaps do you observe between curriculum content and workplace needs? (Open ended question as a follow up for Research Question 1)

Table 7: Identified Gaps between Curriculum Content and Workplace Needs

	Frequency	Percent
Lack of Practical Skills	23	51.1
ICT/Digital Skills Gap	5	11.1
Curriculum–Industry Mismatch	5	11.1
Weak Industry/Employer Link	7	15.5
Poor Curriculum Design	1	2.2
Communication Skills Gap	1	2.2
Problem-Solving Skills Gap	1	2.2
Professional/Service Skills Gap	1	2,2
UX & Community Engagement Gap	1	2.2
Total	**45**	**100.0**

The results show that lack of practical skills (51.1%) is the most significant gap, followed by weak industry/employer link (15.5%). Other gaps such as professional skills, ICT skills, and curriculum mismatch were less prominent. Overall, the major disconnect lies in insufficient practical exposure and weak collaboration with industry, limiting graduate readiness

Research Question 4: How do stakeholders - students, faculties, and employers, perceive the adequacy of LIS curricula in preparing graduates for professional practice in the digital age?

Table 8: Stakeholders' Perception of the Adequacy of LIS Curriculum for Digital-Age Professional Practice n = 127(Employers, Graduates and Faculty)

Item statement	SD	D	A	SA	Mean	SD*	Decision
Students feel confident that the curriculum prepares them for digital-age information work.	30	28	30	39	2.61	1.155	Agree
Faculty believes the curriculum is up-to-date with industry demands.	33	28	29	37	2.55	1.166	Agree
Employers are satisfied with the competencies of LIS graduates	33	31	28	35	2.51	1.154	Agree
Stakeholders believe LIS curricula foster innovation and problem-solving skills.	35	25	34	33	2.51	1.154	Agree
Overall Mean					**2.55**	**1.16**	**Agree**

In Table 8, the overall mean of 2.55 (SD = 1.16) indicates general agreement that the LIS curriculum is adequate for preparing graduates in the digital age. Student confidence (Mean = 2.61), faculty perception (2.55), employer satisfaction (2.51), and innovation/problem-solving skills (2.51) were all rated agree. Standard deviations (1.15–1.17) show moderate variation in responses. Overall, perceptions are positive, though moderate mean scores suggest room for improvement.

How would you rate the overall adequacy of LIS curricula in preparing graduates? (Open ended question as a follow up for Research question 4)

Table 9: Respondents' Rating of the Overall Adequacy of LIS Curriculum

	Frequency	Percent
Very inadequate	31	24.4
Inadequate	23	18.1

Neutral / Fairly adequate	24	18.9
Adequate	23	18.1
Very adequate	26	20.5
Total	127	100.0

The findings show mixed perceptions of curriculum adequacy. While 20.5% rated it as very adequate and 18.1% as adequate, a larger proportion (24.4% very inadequate and 18.1% inadequate) expressed negative views. This suggests that despite general agreement in earlier items, a significant number of respondents still perceive the curriculum as insufficient in preparing graduates for professional practice.

Research Question 5: What challenges hinder the relevance of LIS curricula in Southeast Nigeria to contemporary information work?

Table 10: Challenges Hindering the Relevance of LIS Curriculum to Contemporary Information Work n = 127(Employer, Graduates and Faculty)

Item statement	SD	D	A	SA	Mean	SD*	Decision
Limited resources hinder the relevance of LIS curricula	33	29	35	30	2.49	1.119	Disagree
Faculty training and exposure to new technologies are insufficient	30	32	33	32	2.53	1.111	Agree
Institutional policies restrict curriculum innovation	33	34	34	26	2.42	1.087	Disagree
Students face challenges accessing modern learning tools and facilities.	31	36	32	28	2.45	1.089	Disagree
Overall Mean					**2.47**	**1.10**	**Disagree**

The overall mean of 2.47 (SD = 1.10) in table 10 shows general disagreement that most factors hinder curriculum relevance. Only faculty training and exposure to new technologies (Mean = 2.53) was rated agree, while limited resources, policies, and access to tools were rated disagree. Overall, inadequate faculty training emerges as the most significant constraint, with other challenges less strongly perceived.

What other challenges affect LIS curriculum relevance?(Open ended question as a follow up for research question 5)

Table 11: Other Challenges Affecting LIS Curriculum Relevance

	Frequency	Percent
Inadequate ICT Infrastructure	12	9.4
Rapid Technological Change	52	40.9
Lack of Practical Training	17	13.4
Poor Policy/Institutional Support	12	9.4
Outdated Curriculum	9	7.1
Power Supply Issues	10	7.9
Information Literacy Challenges	8	6.3
Staff Training/Development Gap	7	5.5
Total	**127**	**100.0**

The results show rapid technological change (40.9%) as the most significant challenge to curriculum relevance, followed by lack of practical training (13.4%). Other issues such as ICT infrastructure, policy support, and power supply were less prominent. Overall, fast technological advancement and insufficient practical exposure are the major constraints to maintaining relevant LIS curricula.

Research Question 6: What strategies can be adopted by LIS schools to align their curricula more closely with the demands of the modern information environment?

Table 12: Strategies for Aligning LIS Curriculum with Modern Information Environment Demands n = 127 (Employer, Graduates and Faculty)

Item statement	SD	D	A	SA	Mean	SD*	Decision
LIS schools should integrate more digital and technological courses.	33	24	34	36	2.57	1.158	Agree
Stronger collaboration with employers is needed to update curricula.	28	27	36	36	2.63	1.118	Agree
Continuous professional development for faculty is essential	38	29	28	32	2.43	1.165	Disagree
Greater emphasis should be placed on practical training and internships	27	35	35	30	2.54	1.075	Agree
Overall Mean					**2.54**	**1.13**	**Agree**

The overall mean of 2.54 (SD = 1.13) indicates general agreement on strategies to align LIS curricula with modern demands. Respondents supported employer collaboration (2.63), integrating digital courses (Mean = 2.57), and practical training (2.54), while faculty development (2.43) was rated disagree. In a nutshell, findings emphasize modernization, industry collaboration, and practical exposure as key strategies.

What strategies would you recommend for improving LIS curricula? (Open ended question as a follow up for research question 6)

Table 13: Recommended Strategies for Improving LIS Curriculum

	Frequency	Percent
E-learning & Digital Learning Integration	12	9.4
Practical Training & Internships	56	44.1
Curriculum Review & Update	16	12.6
Industry Collaboration/Partnership	10	7.9
Funding & Financial Support	9	7.1
ICT Facilities Provision	9	7.1
Staff/Technology Training	8	6.3
Teaching Information Literacy	7	5.5
Total	**127**	**100.0**

In Table 13 practical training and internships (44.1%) were the most recommended strategy, followed by curriculum review and update (12.6%) and e-learning integration (9.4%). Other strategies such as industry collaboration, funding, and ICT provision were less prominent. Overall, enhancing practical exposure and regularly updating curricula are the most critical steps for improving LIS education relevance.

Discussion of findings

The findings indicate that although the LIS curriculum in South East Nigeria is generally regarded as relevant, significant concerns persist regarding the readiness of graduates for professional practice. The overall mean score of 2.50 suggests broad agreement that the curriculum incorporates digital trends, is regularly updated, and maintains a balance between theoretical knowledge and practical application. Nevertheless, the lower preparedness score (Mean = 2.39) highlights that graduates are not adequately equipped for contemporary roles in the information sector. This outcome aligns with Abubakar's (2021) argument that LIS education in Nigeria has historically placed greater emphasis on cataloguing and traditional practices, while insufficient attention has been given to developing digital competencies required in today's workplace. In line with Tyler's Curriculum Theory, the results suggest LIS schools fall short of meeting occupational outcomes.

The identification of ICT and library automation as the most outdated area, followed by traditional library practices, highlights the persistence of outdated content. This aligns with Okebukola's (2020) argument that LIS curricula in Nigeria remain slow to adapt to technological change. Similarly, Ofor-Douglas (2024) noted that the shortage of digitally skilled faculty hinders effective delivery of modern content. The respondents' emphasis on outdated technological and practical components reinforces the need for curriculum reform that integrates emerging technologies and experiential learning, as recommended by Olawunmi (2025).

Graduate skill gaps were another critical finding. Respondents disagreed that LIS graduates possess sufficient digital literacy, technological competencies or adaptability to emerging tools. Only user-centered service delivery was rated positively (Mean = 2.72). This supports Kassim's (2022) view that LIS graduates often lack proficiency in critical software tools, data analytics, and information policy, making them less competitive in digital information roles. Boyejo and Oke (2025) further emphasized that workplace readiness requires not only technical skills but also adaptability and problem-solving—areas where Nigerian LIS curricula remain weak. The survey findings confirm these scholarly concerns, showing that digital(60%) and technological skills (13.75%) are the most lacking among graduates.

Employer perspectives also revealed a disconnect between curriculum content and workplace needs. The most significant gap identified was lack of practical skills (51.1%), followed by weak industry linkages (15.5%). This finding resonates with Sibiya and Ngulube's (2023) study in South Africa, which highlighted employability challenges due to limited practical readiness, and with Awodoyin and Okiki's (2023) observation that infrastructural limitations and weak industry collaboration hinder curriculum reform in Nigeria. Tyler's framework emphasizes that learning experiences should be closely aligned with occupational roles. In light of this, the findings suggest that LIS schools in South East Nigeria need to strengthen their collaboration with employers. Such partnerships would help ensure that curricula remain responsive to workplace realities, equipping graduates with the competencies required for evolving professional demands.

Stakeholder perceptions were moderately positive, with students, faculty, and employers agreeing that the curriculum is adequate for digital-age practice. Yet, mixed ratings of overall adequacy (24.4% very inadequate, 18.1% inadequate, versus 20.5% very adequate) reveal lingering dissatisfaction. This reflects Nwajiuba et al.'s (2020) emphasis on employer demand for digital literacy and soft skills, which are not yet fully, embedded in LIS curricula. The findings also highlight rapid technological change (40.9%) and lack of practical training (13.4%) as major challenges, consistent with Mubofu and Mambo's (2023) observation that curricula across Africa struggle to keep pace with digital scholarship.

Findings reveal that rapid technological change (40.9%) is perceived as the most significant challenge to curriculum relevance in LIS schools in South East Nigeria. This reflects the reality that information environments are evolving faster than curricula can adapt, leaving graduates underprepared for emerging roles in digital libraries, archives, and corporate information centres. This aligns with broader scholarship. Okebukola (2020) emphasized that Nigerian higher education curricula often lag behind technological advancements, resulting in graduates who lack contemporary digital competencies.

Finally, respondents recommended strategies such as integrating more digital courses, strengthening collaboration with employers, and enhancing practical training and internships. Practical exposure was emphasized as the most critical reform strategy (44.1%), echoing Olawunmi's (2025) call for regular curriculum review and industry collaboration, and Egbosimba and Olusegun's (2025) emphasis on faculty capacity building. These recommendations are consistent with Tyler's Curriculum Theory, which emphasizes that curricula must remain dynamic and responsive to broader societal and technological transformations. According to this framework, the effectiveness of any curriculum is judged not only by its content but also by its capacity to prepare learners for meaningful and effective professional performance. In this context, the study's recommendations highlight the need for LIS programs to continually adapt and evaluate the curriculum content and delivery to ensure graduates are equipped with the competencies required in today's rapidly evolving information environment.

Conclusion

The study has shown that while LIS curricula in South-East Nigeria are perceived as moderately relevant to contemporary information work, they remain insufficient in adequately preparing graduates for digital-age professional practice. Outdated content, weak practical training, and gaps in digital and technological skills continue to limit graduate employability. Anchored on Tyler's Curriculum Theory, the findings underscore the principle that curricula should remain dynamic, evolving in response to societal and technological transformations. This perspective highlights the importance of continuous evaluation, ensuring that educational programs are not only theoretically sound but also aligned with occupational outcomes. In the case of LIS education, this means regularly assessing whether the curriculum equips graduates with the competencies required to meet the demands of contemporary information environments and professional practice.

Recommendations

1. LIS curricula should be updated to integrate emerging technologies such as data analytics, artificial intelligence, and digital content curation. These updates must align with international standards set by professional bodies like ALA and IFLA to ensure global relevance.
2. Greater emphasis should be placed on experiential learning. Embedding internships, hands-on projects, and practical modules within LIS programmes will help bridge the gap between theoretical knowledge and workplace realities.
3. Stronger partnerships with employers in libraries, archives, corporate information centres, and knowledge-based organisations are essential. Such collaboration will ensure that curricula remain responsive to labour market needs and evolving professional practices.

4. Continuous professional training for LIS educators is critical. Faculty must be equipped with digital scholarship skills and expertise in emerging technologies to address the shortage of digitally skilled instructors.
5. Periodic review of LIS curricula should be mandated by regulatory bodies such as the LRCN. This will ensure programmes remain dynamic, responsive to technological change, and aligned with both national and global professional standards.

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Data Literacy and Research Data Management as Predictors of Open Research Practices among Polytechnic Lecturers in Kwara State, Nigeria

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Abstract

Open research practices are gaining momentum in the emerging research world, thus demanding that researchers leverage their data and research skills for standardising research practices. Three hypotheses guided this study, leading to its investigation of data literacy and Research Data Management (RDM) as predictors of open research practices among polytechnic lecturers in Kwara State, Nigeria. A descriptive survey design of correlational type was adopted, with a population of 1,165 lecturers in Kwara State Polytechnic and the Federal Polytechnic, Offa, in Kwara State, Nigeria. Using simple random sampling, 291 lecturers were selected, and data were collected through a validated questionnaire. Pearson Product-Moment Correlation (PPMC) was employed to test the null hypotheses 1 and 2, while regression analysis was used for hypothesis 3. Findings revealed a moderate negative correlation between data literacy and open research practices ($r = -0.440$, $p = .000$), indicating that higher data literacy was unexpectedly associated with lower engagement in open research. Conversely, RDM showed a very strong positive correlation with open research practices ($r = 0.881$, $p = .000$), suggesting that effective data management strongly enhances openness. The joint analysis demonstrated a robust predictive relationship, with $R = 0.897$ and $R^2 = 0.804$, meaning that data literacy and RDM together explained 80.4% of the variance in open research practices. The results highlight that while data literacy alone may not directly foster openness, possibly due to institutional or cultural barriers, RDM plays a decisive role in enabling transparency, reproducibility, and collaboration. The study concludes that strengthening RDM systems, alongside targeted data literacy training, is critical for advancing open research practices among Nigerian polytechnic lecturers.

Keywords: Data skills, Data literacy, Lecturers, Open research, Open science, Research data management

Introduction

The discourse on open research practices has gained significant momentum in recent years, reshaping the landscape of knowledge creation and dissemination. Open research, often equated with open science, emphasizes transparency, accessibility, reproducibility, and collaboration across the entire research cycle, from conceptualisation to dissemination. Scholars argue that this paradigm shift is not merely a technical adjustment but a transformative movement aimed at democratising knowledge and fostering equity in scholarly communication (Borghi & Van Gulick, 2021; Bertram et al., 2023). Yet, the debate persists: can open research truly thrive in academic environments where data literacy and research data management (RDM) remain unevenly developed?

On one side of the argument, proponents contend that open research practices are unattainable without robust data literacy skills. Data literacy, defined as the ability to acquire, handle, evaluate, and ethically utilise data (Downes, 2023), has become a fundamental competency in the 21st century. Lecturers, as custodians of knowledge, are expected not only to teach but also to model effective data practices. Evidence from African universities suggests that deficiencies in data literacy hinder lecturers' productivity, collaboration, and ability to engage meaningfully in open science (Kanaabi et al., 2020; Adika & Kwanya, 2020). In this view, data literacy is not optional; it is the bedrock upon which open research rests.

Conversely, others argue that while data literacy is essential, it is insufficient without effective RDM. Research data, often described as the "fuel" of scientific advancement (Arthur et al., 2024), requires systematic organisation, preservation, and sharing to ensure reproducibility and transparency. The RDM policies, such as those instituted by the NIH and Canada's Tri-Agency, highlight the global recognition of data management as a prerequisite for open science (Government of Canada, 2021; NIH, 2020). Without RDM, data risks becoming fragmented, inaccessible, or unusable, thereby undermining the very principles of openness. Critics, therefore, posit that RDM, more than data literacy, is the decisive predictor of whether lecturers can effectively adopt open research practices.

This tension between data literacy and RDM raises critical questions for Nigerian polytechnics, particularly in Kwara State, Nigeria, where lecturers face increasing demands from funders, institutions, and the global academic community to embrace open science. While some scholars, such as Zhang et al. (2022) and Ologbosere (2023) have emphasised the urgency of equipping lecturers with data literacy skills to navigate complex datasets, others stress that without institutionalised RDM systems, such skills may not translate into sustainable open research practices (Suharsiwi et al., 2023; Odigwe et al., 2020). The debate thus centers on whether data literacy or RDM serves as the stronger predictor of open research adoption, or whether their interplay is indispensable.

Against this backdrop, this study investigates data literacy and research data management as predictors of open research practices among polytechnic lecturers in Kwara State, Nigeria. Through situating the inquiry within the broader debates on openness, transparency, and reproducibility, the study seeks to clarify the relative and combined influence of these competencies. The findings are expected to contribute to ongoing scholarly discussions on how African institutions can bridge gaps in research capacity, enhance collaboration, and align with global standards of open science.

Statement of the Problem

The need to make research processes known and freely accessible to the general public have made open research practices gained significant attention in the evolving scientific, academic and research landscapes. Consequently, this heightened the need for lecturers and academics to develop skills and competencies in data handling and research data management (Abel & Rod, 2025; Andrikopoulou et al., 2022). Rantasaari (2022) stressed the evident impact of research data management on open research practices as a catalyst for fostering a collaborative research environment that facilitated the seamless research endeavours, ultimately contributing to the overall advancement and quality of scholarly output.

Despite the potential benefits of open research practices, the literature has reported a discouraging state of open research practices among academics, who ought to be its champions and advocates. Some of the notable reasons for the poor, ~~sickening~~ status of open research practices among academics include poor data literacy and research data management skills, inadequate research data management infrastructure, poor research efficacy, inadequate institutional commitment and support and poor participation among academics, inadequate competence among library staff and lack of institutional support (Ashiq et al., 2022; Tenopir et al., 2020).

The highlighted issues clearly showed that the practice of open research can be mitigated by many factors and significant progress could be recorded if future research could be tailored towards investigating these issues, as they are peculiar to specific disciplines or locations. The need to determine whether lecturers' abilities to efficiently and effectively manage research data to promote their research endeavours underscores why this study investigated data literacy and research data management as predictors of open research practices among polytechnic lecturers in Kwara State, Nigeria.

Objectives of the Study

The main objective of this study was to investigate data literacy and research data management as predictors of open research practices among polytechnic lecturers in Kwara State, Nigeria. The specific objectives are to:

1. establish the relationship between data literacy and open research practices among polytechnic lecturers in Kwara State, Nigeria;
2. establish the relationship between research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria; and,
3. establish the joint relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria.
4.

Research Hypotheses

The following null hypotheses were raised for this study and tested at 0.05 level of significance:

i. There is no significant relationship between data literacy and open research practices among polytechnic lecturers in Kwara State, Nigeria.

ii. There is no significant relationship between research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria.

iii. There is no significant joint relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria.

Review of Related Literature

Theoretical Model: Diffusion of Innovations Theory

The Diffusion Innovations Theory was proposed in 1962 at the University of New Mexico by E.M. Rogers, a communication theorist. The theory describes how various individuals who engage with or start utilising a new idea go through phases of adoption. According to the theory, invention, communication channels, time, and social systems are the four primary factors that affect how quickly a new idea spreads. In other words, diffusion is the process by which an innovation spreads over time among members of a social system via certain routes (Halton, 2023).

From introduction to broad adoption, new technical and other innovations spread throughout communities and cultures, according to a theory known as the DoI Theory. The DoI aims to explain how and why new concepts and methods are embraced, including the reasons why acceptance of new concepts may take a long time. According to DoI, people go through five stages as they develop: awareness, persuasion, decision-making, implementation, and adoption. The innovation spreads through a variety of communication channels if it is embraced. Diffusion is influenced by subjective views of the invention rather than a scientific evaluation of the idea during communication. The procedure takes place. Lastly, diffusion, diffusion norms, the roles of change agents and opinion leaders, the kinds of innovation decisions, and the outcomes of innovation are all determined by social systems (Estabrooks et al., 2006).

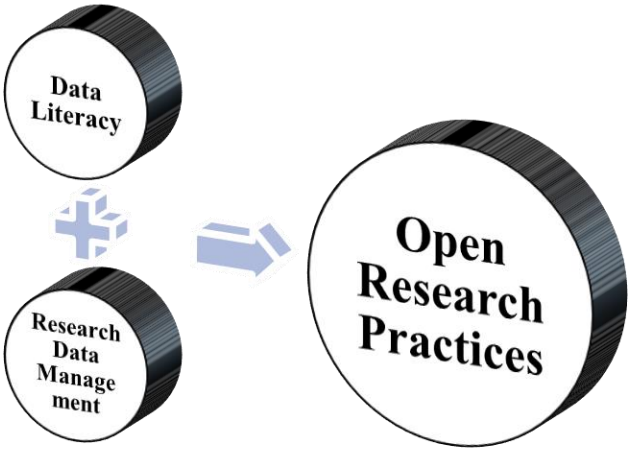
Innovators, early adopters, early majority, late majority, and laggards make up the majority of DoI. Early adopters are those who want to test new technologies and determine their usefulness in society; innovators are those who are willing to take chances and are the first to attempt novel concepts. Additionally, the early majority are members of the general public who made it possible for an innovation to be used in mainstream culture. The laggards are those who adopted new ideas and creative products later than the general population, whereas the late majority followed the early majority in incorporating the innovation into their daily lives (Halton, 2023).

Because its five components, which are innovators, early adopters, early majority, late adopters, and laggards, can be used to characterise the lecturers who have been using open research procedures based on their data literacy and RDM practices, DoI is thought to be relevant to this study. Lecturers who are willing to learn about RDM and data literacy and who are the first to experiment with open research methods are the innovators. Lecturers who are interested in data literacy and RDM and who use them for open research methods are also early adopters. Additionally, the lecturers who pioneered the use of RDM and data literacy to support open research practices make up the early majority. Additionally, the laggards are the lecturers who lagged behind the general population in utilising their data literacy and RDM skills to engage in open research practices, whereas the late majority are lecturers who adopted data literacy and RDM as part of their daily lives after the early majority.

Conceptual Model

This study adopted an intuitive conceptual model to presents the variables – Data literacy (IV 1), Research data management (RDM) (IV 2) and Open research practices (DV) as separate entity before establishing the nexus between them. Data literacy focuses on the lecturers' understanding of data, collecting data, analysing data, visualising data, storing and preserving data. communicating and sharing data and data ethics and governance. RDM encompasses data management planning, collection, organisation, storage, security and back-up, documentation and metadata and sharing and reuse. Finally, open research practices address open access to publications, open data, open peer reviews, open educational resources, open software tools and open methods and protocols.

The model is illustrated in Fig. 1



Relationships between Data Literacy, Research Data Management and Open Research

Studies in many settings and places have been conducted as a result of the requirement to determine the relationship between data literacy, RDM, and open research. This is because people's ability to use and comprehend data is essential since researchers are becoming more aware of the significance and worth of data (Vermeire et al., 2025). Open research

methods and data literacy are becoming more widely acknowledged as crucial elements of contemporary academic and societal data engagement. While open research methods encourage transparency and accessibility in research data sharing, data literacy includes the abilities required to read, comprehend, create, and transmit data successfully (Vermeire et al., 2025).

Barang (2022) highlighted the need for better involvement with data practices to support open scientific initiatives after finding that academics' data literacy about open research data was disappointing. In contrast, Casali et al. (2022) noted that researchers in education have a favourable attitude towards the benefits of open research practices, but they bemoaned the fact that over half of them are ignorant about open data repositories. With the encouragement of transparency, reproducibility, and ethical use of data, data literacy is crucial for critically analysing and using data, which is consistent with open research methods and eventually improves collaboration and knowledge sharing in research communities (Downes, 2023).

Furthermore, Koltay (2021) stressed that data literacy is crucial for open research practices since it makes it possible for researchers to successfully comprehend, analyse, and use data. It encourages a culture of transparency and cooperation in academia, which is essential for solid and repeatable research, by supporting data exchange and quality evaluation. Effective management of big datasets is becoming more and more important as data quantities increase exponentially across fields. Robust RDM techniques have become increasingly important in recent years due to the push for open science and reproducibility. Appropriate RDM maximises the return on research spending, improves data discoverability, and guarantees adherence to publisher and funder requirements (Downes, 2023).

To improve scientific research's accessibility, reproducibility, and openness, RDM and open research procedures are essential. In order to ensure that data is useful for both original researchers and the larger community, effective RDM takes into account every stage of the data lifecycle, from planning and collecting to long-term preservation (Borghi & Gulick, 2021). Because it makes it easier to share research data, which can boost the validation and impact of research findings, this management is essential for advancing open science (Casali et al., 2022; Áholz & Jaekel, 2021). Effective research data organisation, storage, and sharing are all part of RDM. By encouraging transparency and cooperation, open research practices, especially open data, improve empirical research in sports science. For successful adoption, the sports science community must adopt a cohesive strategy (Krüger et al., 2023). RDM is essential for putting open research techniques into practice and enabling efficient data utilisation across industries. Research data makes significant contributions to open science, fostering interdisciplinary cooperation and facilitating practical applications of scientific discoveries (Boiko et al., 2022).

Empirical Reviews

The increasing emphasis on open science and open research practices has brought research data management (RDM) and data literacy to the forefront of scholarly discourse. The RDM encompasses a range of activities including data creation, storage, security, retrieval, sharing, and reuse, all of which are essential for ensuring the integrity, accessibility, and sustainability of research outputs. Data literacy, defined as the ability to locate, interpret, manage, and ethically use data, provides the foundational skills necessary for effective RDM. Together, these competencies are critical predictors of open research practices, which emphasize transparency, collaboration, and accessibility through mechanisms such as open peer review, open access publishing, and data sharing in repositories.

Empirical evidence from Nigeria and other African contexts underscores the significance of RDM in enhancing research effectiveness. Odigwe et al. (2020) demonstrated that data storage, security, retrieval, sharing, and reuse significantly contributed to educational research effectiveness among lecturers in South-south, Nigeria. Their regression analysis revealed that RDM practices accounted for substantial variance in outcomes such as proper citation, problem-solving, knowledge creation, and the generation of testable data. Similarly, Tunmibi and Ajokotola (2024) reported high levels of RDM services in Lagos State university libraries, including data creation, preservation, sharing, and reuse, suggesting that institutional support can enhance RDM adoption. However, Abiodun-Asanre (2024) found that health librarians in Nigeria possessed inadequate RDM skills despite strong personal and library competencies, highlighting the persistent gap in data literacy that limits the provision of RDM services.

The literature also reveals challenges in the adoption of open research practices. Ajani et al. (2023), in their study of librarians in Kwara State, Nigeria, observed engagement in open peer review, open access publishing, and institutional repositories. Nevertheless, barriers such as lack of training, fear of plagiarism, and limited awareness hindered deeper involvement. These findings are particularly relevant to polytechnic lecturers in Kwara State, who may face similar obstacles in adopting open research practices. Adekoya et al. (2025) further emphasized the need for developing “data-savvy librarians” through mentoring, workshops, and industry exposure, while Mosha and Ngulube (2025) identified ICT infrastructure and organizational support as critical enablers of RDM in Tanzanian higher education institutions.

Comparative insights from global contexts reinforce these observations. Ferguson et al. (2023) reported that nearly 90% of scholars in North America had used at least one open science practice by 2020, with strong support for data and code sharing. However, scholars underestimated the prevalence of such practices in their fields, suggesting a gap between perception and reality. Shelly and Jackson (2020) found inconsistencies in RDM support across Australian universities, with strong encouragement for secure data storage but limited practical guidance. Similarly, Kinde et al. (2021) revealed

low awareness of RDM among Ethiopian faculty, with most relying on personal devices for data storage, while Buhomoli and Buneja (2023) observed that Tanzanian researchers practiced data sharing primarily within research groups, reflecting cultural and institutional barriers to broader open research engagement.

Synthesizing these findings, three themes emerge. First, RDM practices are strong predictors of research effectiveness, as evidenced by their contribution to citation accuracy, knowledge creation, and problem-solving. Second, data literacy remains underdeveloped among lecturers and librarians, limiting their ability to fully utilize RDM services and engage in open research. Third, institutional and cultural barriers including fear of plagiarism, lack of awareness, inadequate infrastructure, and weak policy frameworks continue to restrict the adoption of open research practices. For polytechnic lecturers in Kwara State, these insights suggest that data literacy and RDM skills are critical determinants of their ability to engage in open research.

Methodology

This study adopted a descriptive survey design of a correlational type. The design helped the researchers in establishing the relationships or otherwise of how data literacy and research data management help in predicting open research practices among polytechnic lecturers in Kwara State, Nigeria. The population of this study is 1,165 lecturers in government-owned polytechnics in Kwara State, Nigeria. The studied polytechnics included Federal Polytechnic, Offa, and Kwara State Polytechnic, Ilorin. A simple random sampling technique was employed to select 291 lecturers as advised by the Krejcie and Morgan (1970) sampling table. A self-designed questionnaire with good and acceptable gradings for the variables - Open research practices (.77); Data literacy (.83) and Research data management (.90). Data collected through the questionnaire was presented in Pearson Product Moment Correlation (PPMC) to analyse the results of hypotheses 1 and 2, while regression analysis was used to analyse the hypothesis 3 implying that inferential statistics was used in this study.

Demographic Characteristics of the Respondents

Table 1: Respondents' Demographic Information

Options		F	%
Respondent's institution	Kwara State Polytechnic, Ilorin	117	51.6
	Federal Polytechnic, Offa	109	48.4
	Total	**226**	**100**
Gender	Male	138	61.1
	Female	88	38.9
	Total	**226**	**100**
Age range	21 – 30 years	28	12.4
	31 – 40 years	67	29.6
	41 – 50 years	90	39.8
	51 – 60 years	29	12.8
	61 years and above	12	5.3
	Total	**226**	**100**
Highest Academic qualification	HND	22	9.7
	BSc/BA/BLIS/BL	82	36.3
	MSc/MA/MLIS/ML	106	46.9
	PhD	16	7.1
	Total	**226**	**100**
Work experience	1 – 5 years	27	11.9
	6 – 10 years	40	17.7
	11 – 15 years	105	46.5
	16 – 20 years	48	21.2
	20 years and above	6	2.7
	Total	**226**	**100**
Marital status	Single	72	31.9
	Married	143	63.3
	Divorced	8	3.5
	Widow	3	1.3
	Total	**226**	**100**

Source: Researchers' Field Survey, 2025

Table 1 reveals that Kwara State Polytechnic, Ilorin, has the majority of respondents (117 or 51.6%), while Federal Polytechnic, Offa, has the second largest (109 or 48.4%). On gender, 131 (68.8%) are males, while only 88 (38.9%) are females. In the age range, 41 – 50 years has the highest representation with 90 (39.8%), followed by 31 – 40 years (67, 29.6%), 51 – 60 years (29, 12.8%), 21–30 years (28, 12.4%) and 61 years and above (12, 5.3%). Moreso, on highest academic qualifications, 106 (46.9%) are MSc/MA/MLIS/ML holders, followed by BSc/BA/BLIS/BL (82 36.3%), HND (22 9.7%) and Ph.D. (16 9.1%). Moreso, 105 (46.5%) have 11 – 15 years, followed by 16 – 20 years (48 21.2%), 6 – 10 years (40 17.7%), 1 – 5 years (27 11.9%) and 21 years and above (6 2.7%). Finally, 143 (63.3%) of the respondents are married, followed by single (72, 31.9%), divorced (8 3.5%) and widowed (3, 1.3%).

Hypotheses Testing

Hypothesis 1: There is no significant relationship between data literacy and open research practices among polytechnic lecturers in Kwara State, Nigeria.

Table 2: PPMC results showing the relationship between data literacy and open research practices of polytechnic lecturers in Kwara State, Nigeria

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Data literacy	18.97	3.70	226	-.440**	.000	Significant
2.	Open research practices	15.31	4.25	226			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_1 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

From the descriptive statistics, the mean score for data literacy is 18.97 with a standard deviation of 3.70, indicating a relatively high and consistent level of data literacy among the respondents. In contrast, the mean score for open research practices is 15.31 with a slightly higher standard deviation of 4.25, suggesting more variability and a generally lower level of engagement in open research practices.

The findings reveal a moderate negative correlation between data literacy and open research practices, with a correlation coefficient of $r = -0.440$. This suggests that as polytechnic lecturers' data literacy increases, their engagement in open research practices tends to decrease. The correlation is statistically significant at the 0.05 level, as indicated by the p-value of .000, which is well below the threshold for significance. Therefore, the null hypothesis is rejected.

This inverse relationship is somewhat unexpected, as one might assume that higher data literacy would naturally support and encourage open research practices. However, the negative correlation may point to underlying institutional, cultural or policy-related barriers. For instance, polytechnic lecturers who are more data literate may also be more aware of the risks and challenges associated with open research, such as data privacy concerns, lack of incentives or inadequate infrastructure for sharing research openly.

Hypothesis 2: There is no significant relationship between research data management and open research practices of polytechnic lecturers in Kwara State, Nigeria.

Table 3: PPMC results showing the relationship between research data management and open research practices of polytechnic lecturers in Kwara State, Nigeria

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Research data management	25.71	3.00	226	.881**	.000	Significant
2.	Open research practices	15.31	4.25	226			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_1 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

The findings reveal a strong and statistically significant relationship between research data management (RDM) and open research practices (ORP) of polytechnic lecturers in Kwara State, Nigeria. The mean score for RDM is 25.71 with a standard deviation of 3.00, indicating a relatively high and consistent level of engagement in managing research data among the librarians. In contrast, the mean score for ORP is 15.31 with a higher standard deviation of 4.25, suggesting more variability in how librarians engage in open research practices.

The Pearson correlation coefficient ($r = 0.881$) shows a very strong positive correlation between the two variables. This means that librarians who are more involved in research data management are also more likely to participate in open research practices. The significance value ($p = 0.000$) is well below the threshold of 0.05, leading to the rejection of the null hypothesis. Therefore, the relationship is not due to chance and is statistically significant.

In essence, the data suggests that improving research data management among academic librarians could positively influence their adoption of open research practices. This has practical implications for university policy makers and library administrators, who may consider investing in training and resources that support both RDM and ORP to foster a more open and collaborative research environment.

Ho_3: There is no joint significant relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria.

Table 4: Model Summary results showing the joint significant relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.897[a]	.804	.803	1.88711

a**. Predictors:** (Constant), Research data management, Data literacy

The findings from the Model Summary indicate a strong and meaningful relationship between the independent variables, data literacy and research data management, and the dependent variable, open research practices. The correlation coefficient (R) of 0.897 suggests that the model has a high predictive strength, meaning that the combination of data literacy and research data management is closely associated with the level of open research practices among the lecturers.

The R-squared value of 0.804 implies that 80.4% of the variation in open research practices can be explained by the two predictors. This is a substantial proportion, indicating that these factors play a major role in shaping how lecturers engage with open research. The Adjusted R Square, which accounts for the number of predictors and sample size, is 0.803, showing that the model remains robust and reliable even after adjusting for potential bias.

Additionally, the standard error of the estimate, which is 1.88711, reflects the average distance between the actual values and the values predicted by the model. While this figure suggests some level of prediction error, it is relatively low, further supporting the model's accuracy. The statistical evidence supports the conclusion that data literacy and research data management are significant and effective predictors of open research practices. This suggests that efforts to improve these areas among lecturers could lead to greater adoption and implementation of open research principles in polytechnic institutions.

Table 5: ANOVA results showing the joint significant relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3266.175	2	1633.087	458.580	.000[b]
	Residual	794.144	223	3.561		
	Total	4060.319	225			

a. **Dependent Variable:** Open research practices

b. **Predictors:** (Constant), Research data management, Data literacy skills

The regression sum of squares is 3266.175, which represents the portion of the total variation in open research practices that is explained by the predictors, data literacy and research data management. In contrast, the residual sum of squares is 794.144, indicating the variation that remains unexplained by the model.

The degrees of freedom for the regression are 2, corresponding to the two predictor variables, while the residual degrees of freedom are 223, based on the sample size. The mean square values are 1633.087 for regression and 3.561 for residual, and are used to compute the F-value, which is 458.580. This very high F-value suggests that the model is highly effective in explaining the variation in open research practices. Most importantly, the significance level (p-value) is .000, which is well below the conventional threshold of 0.05. This means that the relationship observed is not due to chance, and there is a statistically significant joint effect of data literacy and research data management on open research practices of polytechnic lecturers in Kwara State, Nigeria.

The ANOVA results strongly support the conclusion that data literacy and research data management significantly influence open research practices among polytechnic lecturers. This implies that enhancing these competencies could lead to greater adoption and implementation of open research principles in the academic environment.

Table 6: Coefficients[a] results showing the joint significant relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria

		Unstandardised Coefficients		Standardised Coefficients		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	8.862	.894		9.911	.000

Data literacy skills	-.206	.036	-.180	-5.752	.000
Research data management	.552	.021	.824	26.389	.000

a. **Dependent Variable:** Open research practices

The findings reveal a statistically significant model, indicating that both data literacy and research data management jointly influence open research practices of polytechnic lecturers in Kwara State, Nigeria. However, the nature and strength of their influence differ markedly. Firstly, research data management emerges as a strong positive predictor of open research practices. With a standardised coefficient (Beta) of 0.824 and a highly significant p-value ($p < .001$), it suggests that lecturers who are proficient in managing research data such as organising, storing and preserving data are much more likely to engage in open research practices. This aligns with the idea that effective data management facilitates transparency, reproducibility and sharing, which are core to open research.

In contrast, data literacy skills show a negative and significant relationship with open research practices (Beta = -0.180, $p < .001$). This is somewhat counterintuitive, as one might expect that higher data literacy would support open research. The negative coefficient implies that as data literacy increases, engagement in open research practices decreases. This could be due to several contextual factors. For instance, lecturers with higher data literacy might be more aware of the risks associated with data sharing, such as data misuse, intellectual property concerns or lack of institutional support, leading to more cautious behaviour. The constant term in the model is also significant, indicating that even in the absence of the two predictors, there is a baseline level of open research practice among lecturers.

Overall, the model underscores the importance of research data management as a key enabler of open research practices. However, the unexpected negative relationship with data literacy suggests a need for further qualitative investigation to understand the underlying reasons. Institutions may need to address barriers and provide clearer guidelines or incentives to ensure that data literacy translates into more open and collaborative research behaviours.

Discussion of Findings

Relationship between data literacy and open research practices among polytechnic lecturers in Kwara State, Nigeria

The findings reveal a statistically significant moderate negative correlation between data literacy and open research practices among academic librarians, with a correlation coefficient of $r = -0.440$ and a p-value of .000. This result suggests that as librarians' data literacy increases, their engagement in open research practices tends to decrease. At first glance, this outcome appears counterintuitive, especially when compared with existing literature that generally portrays data literacy as a catalyst for open research. For instance, Downes (2023) describes data literacy as the ability to critically acquire, manage, evaluate, and use data, arguing that such competencies are essential for participating in open science. Similarly, Koltay (2021) emphasises that data-literate individuals are better equipped to interpret and share data transparently, which aligns with the principles of open research. These perspectives suggest a positive relationship between data literacy and openness in research, which contrasts with the negative correlation observed in this study.

One possible explanation for this discrepancy lies in the clear understanding that increased data literacy may also heighten awareness of the risks and responsibilities associated with data sharing. Donaldson et al. (2023) note that individuals with higher data literacy are often more cautious about data privacy, ethical considerations and legal compliance. This heightened awareness may lead to reluctance in sharing data openly, especially in environments where institutional support for open research is limited or unclear. The context of the study also provides important insights. Ajani et al. (2023) found that librarians in this region face several barriers to open research, including fear of plagiarism, lack of awareness and inadequate infrastructure. These challenges may discourage even data-literate librarians from engaging in open research practices. Moreover, Masenya (2021) highlights that many African institutions lack comprehensive policies and systems for research data management, which further complicates efforts to promote openness.

Another factor to consider is the cultural and psychological resistance to technological change. Timms (2023) discusses how some researchers, particularly those more familiar with data systems, may resist open research due to concerns about job security and the implications of artificial intelligence and automation. This resistance may be more pronounced among those with higher data literacy, who are more aware of the broader consequences of data openness. The theoretical framework adopted in the study, the Diffusion of Innovations Theory, offers a useful lens for interpreting these findings. According to Rogers (1962), individuals adopt innovations through a process that includes awareness, persuasion, decision, implementation, and confirmation. Data-literate librarians may still be in the persuasion or decision stages, hesitant to fully embrace open research due to perceived risks or lack of institutional incentives.

Relationship between research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria

The finding that RDM significantly influences ORP among polytechnic lecturers in Kwara State, Nigeria, is consistent with global trends and theoretical expectations. This relationship is not only statistically significant but also conceptually

grounded in the broader movement toward open science, which emphasises transparency, accessibility and collaboration in research. Open research practices, as defined by Borghi and Van Gulick (2021), involve the sharing of research materials, methodologies and data in a manner that promotes reproducibility and innovation. These practices are deeply intertwined with RDM, which encompasses the planning, organization, storage, documentation and sharing of research data.

In the context of polytechnic lecturers in Kwara State, Nigeria, the role of RDM is particularly pronounced. Librarians are often at the forefront of data curation, repository management and the implementation of institutional data policies. Studies such as those by Subaveerapandiyan and Ugwulebo (2024) and Ajani et al. (2023) demonstrate that librarians actively engage in open research through practices like open peer review, depositing research in institutional repositories and publishing in open access platforms. These activities are underpinned by robust RDM systems that facilitate the discoverability and reuse of research data.

The theoretical underpinning of this relationship can be framed within the Diffusion of Innovations (DoI) theory, which explains how new ideas and practices spread within a social system. Polytechnic lecturers in Kwara State, Nigeria, may be viewed as early adopters of RDM and ORP, given their proactive engagement and institutional roles. Their adoption of these practices sets a precedent for other academic stakeholders, including lecturers to follow suit. Empirical evidence further supports the significance of RDM in promoting ORP. Odigwe et al. (2020) found that data management practices such as storage, sharing and reuse significantly contribute to research effectiveness among university lecturers. Similarly, Adika and Kwanya (2020) identified gaps in RDM literacy among Kenyan lecturers, which hindered their participation in open research.

Joint relationship among data literacy, research data management and open research practices among polytechnic lecturers in Kwara State, Nigeria

The regression analysis reveals a statistically significant model, indicating that both data literacy and research data management (RDM) are influential predictors of open research practices among polytechnic lecturers in Kwara State, Nigeria. However, the nature and strength of their influence differ, a finding that aligns with and is enriched by existing literature. Data literacy is conceptualized in the study as the ability to collect, analyse, interpret and effectively use data to inform decision-making and problem-solving. It encompasses a range of competencies, including data collection, analysis, visualisation, storage, sharing and ethical governance (Downes, 2023; Casali et al., 2022). These skills are increasingly recognised as essential in the 21st-century academic landscape, where data-driven research is the norm (Vermeire et al., 2025). The study's findings support the assertion by Suharsiwi et al. (2023) that data literacy significantly affects lecturers' research performance, particularly in enhancing transparency, reproducibility and collaboration in open research.

In contrast, research data management refers to the systematic processes involved in planning, organising, storing, sharing, and preserving research data throughout its lifecycle (Borghi & Van Gulick, 2021; Abiodun-Asanre et al., 2024). The RDM is more structural and institutional in nature, often requiring policy frameworks, infrastructure and collaborative support systems. The study's findings resonate with the work of Kinde et al. (2021), who emphasised the growing pressure on researchers to improve their RDM practices due to funder and institutional mandates. Furthermore, RDM is crucial for ensuring data integrity, facilitating reuse and enhancing the visibility and impact of research outputs (Fürholz & Jaekel, 2021).

While both data literacy and RDM contribute to open research practices, their roles are distinct. Data literacy is more individual-centric, focusing on the personal capabilities of lecturers to engage with data meaningfully. RDM, however, is system-centric, emphasising the institutional and procedural mechanisms that support sustainable data handling. This distinction is critical, as it suggests that improving open research practices requires both personal skill development and institutional support. The joint influence of data literacy and RDM on open research practices is further contextualised by empirical studies. For instance, Odigwe et al. (2020) found that effective data management practices, including storage and sharing, significantly enhance educational research effectiveness. Similarly, Adika and Kwanya (2020) identified gaps in RDM literacy among lecturers, which hinder their ability to engage in open research. These findings underscore the importance of integrating both data literacy and RDM training into academic development programs.

Moreover, the study's findings align with the theoretical framework of the Diffusion of Innovations Theory (Rogers, 1962), which explains how new ideas and practices spread within a social system. Lecturers who are innovators or early adopters of data literacy and RDM are more likely to engage in open research practices, thereby influencing their peers and contributing to a broader cultural shift within academic institutions.

Conclusion

The findings of this study underscore the pivotal role of research data management (RDM) in driving open research practices among polytechnic lecturers in Kwara State, Nigeria. While data literacy was found to have a significant but negative correlation with open research practices, RDM demonstrated a strong and positive relationship, suggesting that lecturers who actively engage in systematic data organization, preservation, and sharing are more likely to adopt open research practices. This highlights that while data literacy equips lecturers with the skills to handle data, it is the

structured application of these skills through RDM that truly enables transparency, reproducibility, and collaboration in research.

Furthermore, the joint analysis revealed that data literacy and RDM together account for over 80% of the variation in open research practices, emphasizing their combined importance as predictors. The unexpected inverse relationship between data literacy and open research practices may reflect contextual challenges such as inadequate infrastructure, fear of plagiarism, or institutional barriers that discourage lecturers from openly sharing data despite their competence. Conversely, the strong positive influence of RDM suggests that institutionalized systems and practices for managing data provide the necessary framework for lecturers to confidently engage in openness.

Above all, this study affirms that strengthening RDM capacities, alongside fostering data literacy, is essential for advancing open research practices in Nigerian polytechnics. Institutional support, policy frameworks, and training programs must prioritize RDM infrastructure while addressing cultural and systemic barriers to openness. By doing so, lecturers can be empowered not only to manage data effectively but also to embrace open science as a sustainable and collaborative model of knowledge creation and dissemination.

Recommendations

Based on the findings, this study recommends that:

1. Polytechnic management should strengthen RDM infrastructure. This could be achieved by establishing secure institutional repositories for data storage and sharing, developing clear policies and guidelines for data preservation and reuse and providing long-term preservation systems to ensure sustainability of lecturers' research outputs.
2. Polytechnic management should partner with relevant associations and agencies to invest in capacity-building initiatives such as organizing workshops, seminars, and mentoring programs to improve lecturers' data literacy skills. The data literacy training should align with practical applications of RDM to ensure lecturers can translate knowledge into practice.
3. Polytechnic management and regulating bodies should address cultural and systemic barriers by implementing awareness campaigns to reduce fear of plagiarism and increase confidence in open research. This can be achieved by creating reward and incentive systems for lecturers who adopt open research practices.
4. Polytechnic management should embed openness into institutional research policies and ensuring that policy frameworks support compliance with funder and publisher requirements for openness. This will encourage collaboration across departments and institutions to foster a culture of transparency.

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Democratic Governance and National Development in Nigeria: an appraisal on the roles of libraries during democratic dispensations

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Abstract

The library is an agent of social and political transformation in every given society. Democratic dispensations are usually preferred by nations because it is assumed to have the magic wand to improve socio-economic welfare of the people while achieving national development. Libraries play a pivotal role in enhancing good democratic governance by participating actively as the information "dispenser", this they do through the provision of good information which drives innovation and has a major impact on National development. Sensitization during election seasons curbs electoral malpractice and apathy thereby strengthening our democracy, rural mass literacy programs plays a major role in educating the population and fostering literacy culture, symposiums, conferences and seminars help create awareness. The idea that to develop a nation is to educate them and give them access to necessary information is the ultimate role being played by the library. This paper concludes that the library must be treated as the information hub of a nation and it is through the instrument of provision of vital information that it can impact on National Development and strengthen Democracy.

Key Words (Democracy, Governance, National Development, Libraries, Information Centre)

Introduction

The movement of information is the basic pillar upon which every meaningful national development is anchored on, and democratic settings have been adjudged to speed up development for nations that adopt them. Article 19 of the Universal Declaration of Human Rights declared that the right to information is a fundamental right. Libraries being a knowledge institution are at the forefront of facilitating this right.

According to Okoye and Ibeh (2013) Libraries are important institutions through which democracy could be strengthened and it affects every part of man's social, economic and political life. According to Ifijeh & Iwu-James (2020) Democracy thrives on transparency, accountability, and informed citizenry. Libraries play a crucial role in sustaining democratic principles by providing access to unbiased information that enables citizens to make informed decisions. The availability of credible news sources, historical records, and policy analyses in university libraries helps prevent misinformation and promotes fact-based political engagement.

Nigerian libraries are well placed to contribute meaningfully and effectively in political and developmental stability of the nation for a positive change, most especially to enlighten the populace on the political status of the nation. More so, there were emphasizing on the key areas of information provision and dissemination by libraries, such as provision of adequate political information, supporting educational development, Re-orientation of Nigerian political culture, provision of information materials, provision of open access to information, creation political awareness etc. to the development of a nation politically stable (Ofondu & Okwoli, 2023).

Ikenga and Chima (2021) stated that democracy especially in the third world countries has become a mighty beacon where it is plagued with extreme level of corruption, insecurity, political instability, abuse of law and has assumed the front burner as an indispensable requirement for social, economic and political development and stability restructuring factor, to most countries including Nigeria. Nigeria operates a democratic system of government and thus is not immune to the challenges that come with democratic dispensations, it is necessary therefore that both the elected and the electorates have access to accurate information that will broaden their horizon and make for better decision making and to acquire these information and knowledge, one must achieve it through reading of books and consulting other information materials which are normally stored in the library (Ofondu & Okwoli, 2023). Also, Idogbe and Philip (2020) emphasizes that libraries as knowledge entities have been concerned with human development; mostly it takes into consideration its community in gaining knowledge through the provision and making available such inspiring resources

that will offer the community a wide range of information and knowledge. The library is an ultimate organisation when it comes to attainment of knowledge, information, education and ultimately societal development. Presently, libraries have been and remained the forefront in fostering a stable and functional education which is fundamental to the development of any democratic society. (Abata-Ebire, Adebowale and Ojokuku, 2018).

This study, therefore, seeks to investigate the roles of libraries as information institutions in enhancing political participation and cultural creativity to enhance national development in Nigeria. In achieving this, the focus of this presentation would be on creation and distribution of information and participation, federalism, democratic governance, individual's response to political campaign messages etc.

Statement of Problem

The development of any nation is influenced by the level of the information it has access to and the integration of such information into critical areas that will further develop those areas. It is thus pertinent for scholarly efforts to improve the level of development for a nation, to work on the level of information available to the people and their access as a means towards national development. While some literatures especially in Information Science have treated information creation, very few have considered factors that can improve access to such information by the populace in Nigeria, also there seem to be none that considers the concept of information integration especially during election periods to strengthen democratic participation in the field of Librarianship.

The purpose of this work therefore is explore the usefulness of libraries and give an in-depth study on how libraries act as a catalyst to national development with particular reference to Nigeria as a growing nation.

Definitions of Key Concepts

Democracy

According to Betham (1989) democracy is a form of government based on popular rule or popular control over collective decision-making where citizens are entitled to their opinion on public affairs both through the association of civil society and through participation in government. Shehu (2019) asserts that democracy depends upon a literate and knowledgeable citizenry whose access to information enables it to participate as fully as possible in the public life of society and criticize unwise or oppressive government officials and policies. In a democratic state, citizens and their elected representatives recognize that democracy depends upon the widest possible access to uncensored data, ideas and opinions. For democratic governance to succeed, citizens must be free to express themselves openly, publicly and repeatedly both in speech and writing (Augie, 2004)

Governance

Governance means the Process of decision making and the process by which decisions are implemented or not implemented, governance is thus about execution, or what has traditionally fallen within the domain of public administration, governance chiefly focuses on the process of governing involving interactions between various formal and informal institutions as well as influencing the policies and decisions that concern public lives. The success of governance depends on the reinvention of the government, reinvigoration of non-government sectors and their willingness to positively impact the people (Mehraj, 2020).

According to the UN Development Programme (2011), governance refers to the exercise of political and administrative authority at all levels to manage a country's affairs. It comprises the mechanisms, processes and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences. Specific reference is made to democratic governance as "a process of creating and sustaining an environment for inclusive and responsive political processes and settlements."

National Development

National development is includes all aspects of the life of an individual and the nation. It is very comprehensive in nature. It is a method of reformation and development of various scope of a nation and the development of individuals. It consists of full-growth and expansion of our industries, agriculture, and education, social, religious, and cultural institutions. Moreover, national development implies the development of a nation as a whole. It can be best defined as the all-round and balanced development of different aspects and facets of the nation viz. political, economic, social, cultural, scientific, and material (Bhawna, 2016).

According to Lawal and Oluwatoyin (2011) national development can be described as the overall development or a collective socio-economic, political as well as religious advancement of a country or nation. This is best achieved through development planning, which can be described as the country's collection of strategies mapped out by the government.

Libraries and Information Centres

According to Taye (2011) Library is defined as an organized collection of published books and audio-visual materials with the aid of the services of staff that are able to provide and interpret such materials as required, to meet the informative research, educational and recreational needs of its users. It is an agency through which sources of information of accumulated knowledge and experience are selected, acquired, organized, preserved and disseminated. Libraries and information centers provide a much wider range of information services from

local, state and federal governments; organizations/institutions within and outside the country among others for the people. With the provision of variety of information sources, users of libraries and information centers are exposed to different information with their respective values. A very important word, which is functionally synonymous with library, is "information dissemination". These are centers that are charged with the collection, organization, preservation, retrieval, dissemination, access, and use of information in any format.

Libraries and National Development: an overview

Country development are not adjudged same, some nations are miles above others in terms of development and technological advancements and this is the direct consequence why some nations are referred as developed, while others are referred as developing. Nigeria as a nation unfortunately is a third world nation whose development is still on the feeders stage. Idogbe and Philip (2020) asserts that Nigeria as a nation that exists with stable community of people is expected to change/develop to a modernized state. Such a nation expected to develop gradually from her traditional or created level to a modern state. It is worth noting that the difference between a developed nation and its developing counterparts has always been felt in the areas of information access. The Impact of the lack of access to information can seriously impact economic opportunities for disconnected individuals and nations. Nations and individuals who do not have access to information may be unable to properly educate its populace and thereby not be able to create proper jobs. Additionally, countries without stable access to critical information to power important sectors of the economy can face challenges to economic development. However, the library can help mitigate this divide and economic opportunities may increase. Aguolu (1997) stresses that access to most of the world's wealth of information will remain a myth for the developing countries until they overcome the prevailing obstacles, which include high rate of illiteracy, unawareness of the relevance of information, poverty and lack of infrastructural facilities

Muzahidul et al. (2012) asserts that information is playing one of the key roles in advancement of a nation. In this modern era, without the development of information and its dissemination, the dream of development and national advancement of a country would be a distant dream. However information cannot be useful on itself if there is no functional library serving as the conduit and as a driving force in establishing an idea in to society and state. It is of great importance to note that information cannot be separated from education and that the library is an information provider. This is to say that provision of accurate information by libraries, is the key to knowledge, which is a pre-requisite for holistic development in the contemporary age (Idogbe & Philip, 2020). The role of education in nation-building (Nigeria) is collaborated with the functions of libraries especially public libraries, which include primarily the collection, organisation and provision of information relevant to build the society's knowledge base. For this reason, the value of any institution is by all standards, immeasurable for any nation in search of national development and modernisation. Schoenbrum (2017) added that libraries have the mandate to drive education for national development by implementing their core function, which is to provide a conducive place for citizens to access a broad range of information.

The main pillars of rapid economic growth and development include adequate well-trained and skilled manpower, a predominantly literate populace, appropriate technology to explore and exploit the various natural resources of the country, and also a conducive political and social atmosphere guarantees national development. Igwela and Nsirim (2017) observes that for a nation to develop, it needs to have and provide relevant, updated and adequate information on food security, health, democracy, population, education, family planning, youth empowerment, gender equality, environment etc. Libraries are established for proper management, provision and communication of such information. Information is a vital ingredient of a successful nation and the most effective agency for collecting, documenting and disseminating such information is a good library. To be successful, an industrialist requires the most current product information, company information and market information. All these forms of information are usually made available by the special librarian in the form of summaries, abstracts and bulletins. The library will also aid research on raw materials and other items that directly affect the operations of the parent organization. It is, therefore, a matter of great importance for the industrial and commercial sectors of our economy to devote substantial amounts of money to the establishment and maintenance of libraries where relevant information will be readily available at all times (Ibrahim & Ahmad, 2025).

The Roles of libraries during democratic dispensations

Provision of Information to all Citizens

Kranich (2020) asserts that democracies need libraries. An informed public constitutes the very foundation of a democracy; after all, democracies are about discourse—discourse among the people. If a free society is to survive, it must ensure the preservation of its records and provide free and open access to this information to all its citizens. It must ensure that citizens have the resources to develop the information literacy skills necessary to participate in the democratic process. It must allow unfettered dialogue and guarantee freedom of expression. All of this is done in our libraries, the cornerstone of democracy in our communities. Libraries are for everyone, everywhere. They provide safe spaces for public dialogue. They disseminate information so the public can participate in the processes of governance. They provide access to government information so that the public can monitor the work of its elected officials and benefit from the data collected and distributed by public policy makers. They serve as gathering places for the community to share

interests and concerns. They provide opportunities for citizens to develop the skills needed to gain access to information of all kinds and to put information to effective use.

Roach (2012) writes that vital democratic systems require a well-informed citizenry. To be able to form a political will and to participate in democratic decision-making citizens must have unrestricted access to all the information needed and related to subjects of public and individual interest. This implies the absence of censorship in any form. Libraries have to adopt a non-biased attitude and to provide the broad range of opinions. A second obligation consists in their role as transparency institutions. As such they "should collect information materials issued by official bodies, particularly those that deal with citizens' rights and entitlements" (IFLA Manifesto on Transparency, 2008). If citizens don't have the chance to access official sources, material of anti-corruption NGOs and other relevant sources at the same time an informational dissymmetry will come into being which hinders or even prohibits political participation and democratic control of the authorities. An improvement of political participation via library services requires libraries which are free of commercialization and ideological biases. Libraries have to serve as a kind of informational shelter for all their users. The relation between the library and their users has to be one of strict confidentiality, secrecy and respect of privacy. It must be guaranteed to users that their personal data remain secret and will be protected in principle. Thus, the library will be a place where citizens are able to access information of their choice without any restrictions

Political Education

Political education in a democracy involves conscious efforts for and by citizens to acquire cognitive, procedural and habitual democratic skills. According to Jaeger and Burnett (2005) every democratic society relies on deliberation and dialogue between social groups with varying perspectives to provide for the representation of the diverse members of the society. The library in its own case is ready to maintain certain basic skills through organizing talks on elections using the information resources housed in it, that would empower the citizens and the leaders to become self-reliant, and foster interactions in order to move away from social vices like stealing, embezzlement, hijacking of voting materials, election violence, etc., that could jeopardize the democracy. Skills like digital literacy, information literacy, are better delivered to the citizens through the library to enable them use the computers effectively during elections/voting exercises to get information, to vote for their candidates and source for election better practices (Alex-Nmecha, Horsfall & Igbinovia, 2017).

Preservation of Knowledge

According to Kaur (2025) libraries have historically been seen as quiet repositories of books, offering spaces for study, reflection, and access to knowledge. However, the 21st century has ushered in dramatic shifts in information technology, digital media, and social dynamics. As a result, libraries are evolving beyond their traditional roles. They are becoming essential digital literacy hubs and vital community centres, responding to the needs of increasingly diverse, digitally-driven populations. This transformation is not merely aesthetic or superficial; it reflects a deep structural shift in how libraries operate, serve, and engage with the public. Today's libraries are no longer just warehouses of printed knowledge but proactive agents of digital inclusion, education, and political education hubs which facilitates political awareness, democracy, and social integration. Technological advances should have ushered in some changes in society, which as a whole has become more complex and digitally integrated; therefore, libraries are increasingly becoming essential in facilitating civic literacy, information integrity and digital citizenship. Library roles in Democratic republics provide a comfortable, welcoming, and unbiased place where people can access political thought, civic responsibility, and civic policies. Kohli and Rana (2025) states that the library act as: (Information centres that make government documents, electoral rolls, databases of public policies and the local governance information available (Civic learning centres that provided lectures, workshops and voter registration drives (Communal forums where a citizen can meet with other citizens and discuss the current events or engage in debates or town halls style, get together Citizens frequently go to libraries, when they want to clear their confusion about civic rights, social schemes or about which legal procedure to go through. Their non-commercial community-based character makes them such special trusted institutions at an age of institutional mistrust.

Active Citizens Engagement During Elections

According to Brooks (2024) Library leaders play an essential role in ensuring free access to information for all. The library has a responsibility to cultivate a democracy grounded in respectful, yet robust, public engagement." libraries are taking active steps to advocacy of media and information literacy (MIL) which involves training users on the evaluation of sources, ascertaining of facts and propaganda detection, browsing and verifying sources of facts and work with civic technology sites to present reliable sources. Libraries also conduct professional training of the librarians to play the role of information intermediary in aiding users to differentiate between real and manipulative information. There is also no denying that the availability of the internet and digital skills is critical to political engagement as more services become digitalized, libraries bridge this gap by: providing the underprivileged access to free internet and digital online gadgets, keeping e-governance kiosks where users are led through the mode of accessing welfare schemes, raise grievances or submit an RTI (Right to Information) petition, training in digital literacy especially to senior citizens, in the rural areas and to women.

Daniela et al. (2021) asserts that libraries stimulate deliberation, inclusion, and equality, which are the cornerstones of participatory democracy, as they serve as the place of social interaction between people that work as the public spheres. These services, collections, and programs will promote the knowledge, skills, and confidence of the citizens to have access to and participate in the governance process and combat misinformation, as well as demand their rights. Libraries are central places of political awareness and active citizenship, based both on their historical role in equalizing civil liberties and access to knowledge, and their contemporary role in digital literacy, civic engagement, and freedom of expression.

In conclusion, libraries as information service delivery outlets play an important role in ensuring effective democratic governance and national development in Nigeria. They provide and equip the citizenry with relevant information that will enable them participate actively in the democratization process. Libraries garner information to do with voting rights, election procedures, civic education, national core values, citizens' moral obligations to society and enhance democratic governance and national development in Nigeria.

Challenges facing the Library in the Discharge of these Roles

Poor Funding

Kolajo and Olatoye (2025) observes that a major challenge faced by most libraries in Nigeria is that of poor funding. Both governments owned libraries and business libraries face this problem. The majority of public libraries do not currently have enough infrastructures. They use out-dated reference materials. There are no dedicated spaces for the music library or audio-visual resources, nor are there any spaces for serious readers, particularly those conducting study. Ebiwolate (2010) asserts that lack of proper funding of public libraries, budget non-approval, and the failure to release or implement approved budgets has culminated in substandard service conditions, a scarcity of professional staff, inadequate human resource management, severely deteriorated structures and facilities, out-dated resources, challenges in extending services to rural areas, and insufficient ICT facilities, among other issues.

It is of the opinion of the authors that finance/ lack of funding is the chief instigator of every other challenge that might be faced by the library. The negative impact poor funding has in the work of Libraries expresses itself in different areas and manifest in different dimensions, thus creating additional burden that the library must bear. It is noteworthy that finance is the life wire of every organisation and for a fundamental institution like the library, underfunding it will definitely make it to not live to its full potential. Agreeing to this thought line; Elisha (2006) asserts that without increased funding, all advances such as in human resource development are surely doomed.

Limited Resources to serve the needs of clients

For a library to be functional, it has to meet its user's needs and ensuring that users make functional use of the information resources and services available at their disposal. All activities, resources, and services of the library are geared towards helping the general public to achieve its information needs. However, as important as this library was it has been observed that information resources are not readily available. Opurum and Okwu (2021) assert that most libraries in Nigeria are plagued with out-dated materials and lack the required facilities and resources to satisfy users' needs, which result in inadequate library services, poor academic performance, and poor reading culture which negatively affects national development. They further argue that information resources are not always available in the quality desired. Africa particularly is faced with a problem that researchers have identified as "Book Famine". This means that information resources are scarce. This inadequacy of information resources poses a grave challenge to effective rendering of library services by Nigerian libraries.

Staff Shortages and Low Motivation

Library staffs have a major role to play in the day to day running of the library; they ensure that the library's objectives are met. Every valuable resource that the library offer requires properly trained staff and sufficient funding to maintain it, libraries need staff to shelve books, catalogue e-resources, oversee room reservations, create programs, and even to simply open the front doors on time. Without enough staff, important tasks can't be done on schedule, and some services have to be cancelled. Not having enough staff to handle the volume of use can also lead to burnout, which in turn can increase turnover and reduce efficiency. As demand for services continues to rise while staffing and budgets fall behind, the gap between what patrons want and what libraries can provide will only widen (Triola, 2026).

Lack of Infrastructure

Nigerian libraries lack infrastructures like steady power supply, internet facilities and even adequate number of computers to support automation. Many libraries have installed Internet facility in the past but none of them is functional presently. This has been due to lack of finance to sustain and maintain these facilities. Lack of adequate power supply is one of the problems facing the utilisation ICT in libraries in Nigeria which hampers effective library services. Facilities in the electronic library, reprographic and other units of the library need power supply to function effectively. The absence of power leads to delay in information retrieval and loss of time on the side of the user (Opuru & Okwu, 2021).

Conclusion

The broadsheet has attempted to show the relevance of libraries in enhancing democratic governance and national development in Nigeria. It revealed that there is a linkage between democratic governance and national development;

and that for national development to be more realistic in Nigeria all stake-holders must be allowed to play their role effectively in the democratization process.

The paper also disclosed the indispensable role of libraries in providing the necessary information that would empower citizens to participate in the democratization process which will ensure good governance development in Nigeria. It however, revealed some daunting challenges libraries face in providing effective and efficient information service delivery that would engender democratic governance and national development. Prominent among these are, inadequate funding to procure the relevant information resources, inadequate skilled manpower, lack of effective library cooperation and networking, high rate of illiteracy among library users (citizens), week policy formulation/implementation etc.

Recommendations

Based on the discussion in the paper the following recommendations are proffered

1. Libraries of all kinds should be adequately funded by their parent bodies for improved service delivery, by ensuring that 10% of the library's budget is devoted to improving the services. Alternatively, they could seek for assistance from agencies

(Such as TETFund, foundations and the like) to support their services.

2. Librarians should formulate strong and robust policies that would ensure effective and efficient service delivery to the users/citizens and should strictly effect the implementation of these policies.

3. Interlibrary cooperation/networking should be encouraged among libraries in order to enhance access to information by library users. These would be facilitated through automation of the library functions and services.

4. Skilled manpower with ICT literacy should be employed in libraries of all kinds as this would ensure adequate service delivery to users (citizens). In addition, they should be exposed to regular capacity building programmes to update their knowledge and skills.

5. Libraries should support literacy programmes by not only providing the premises for adult literacy classes but also relevant information resources that enhance literacy.

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Demographic Characteristics and Knowledge of Open Data Practices among Academic Librarians in selected Federal Universities in Nigeria.

By

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Abstract

The growing global emphasis on open science has continued to place open data as a critical component of transparent, collaborative, and impactful research. Academic librarians are increasingly expected to support open data practices through research data management, data curation, and scholarly communication services. This study examined the demographic characteristics and knowledge of open data practices among academic librarians in Nigeria, and further determined the relationship between selected demographic variables and their knowledge levels. A correlational survey research design was adopted for the study. The population comprised 125 academic librarians drawn from selected federal universities across Nigeria's six geopolitical zones, using a total enumeration sampling technique. Data were collected through a structured questionnaire and analyzed using descriptive statistics and non-parametric tests, including the Mann–Whitney U test and Kruskal–Wallis H test, at a 0.05 level of significance. The findings revealed that academic librarians possess a moderate to high level of knowledge of open data practices, particularly in relation to general concepts and professional roles. However, gaps were identified in technical areas such as data management planning and licensing. The study further found that gender had no significant relationship with knowledge of open data practices, while academic qualification and years of professional experience showed significant relationships, with higher qualifications and longer experience associated with higher knowledge levels. The study concludes that although academic librarians in Nigeria are conceptually prepared for open data practices, their readiness remains partial due to limitations in technical competencies. It recommends targeted capacity building, strengthened curriculum content, and institutional support to enhance practical engagement with open data.

Keywords: Demographic characteristics, gender, qualification, experience, open data, academic librarians, knowledge, Nigeria

Introduction

The global movement toward open science has increased attention to open data as an essential component of transparent, collaborative, and impactful scholarly communication. Open data refers to the practice of making research data freely accessible for use, reuse, and redistribution with minimal restrictions, thereby promoting verification, innovation, and broader knowledge dissemination (Baro & Eze, 2017; Okechukwu et al., 2024). Within academic institutions, open data practices involve the organized creation, documentation, preservation, sharing, and ethical reuse of research data in ways that enhance research credibility, improve institutional visibility, and maximize the public value of scholarly outputs. As universities increasingly emphasize data driven scholarship and accountability, open data has become a significant area of professional engagement for academic librarians.

Academic librarians occupy a strategic position in higher education because they support teaching, learning, and research through information organization, scholarly communication services, and digital resource management. Their responsibilities now extend beyond traditional library services to include research data management, metadata creation, repository administration, digital preservation, and advocacy for open science initiatives (Nitecki & Davis, 2019; Sugihartati et al., 2025). In this evolving context, academic librarians are expected to guide researchers in data documentation, licensing, ethical compliance, preservation, and dissemination. Their ability to fulfill these responsibilities effectively depends largely on their level of knowledge of open data practices and their capacity to apply such knowledge within institutional systems.

Knowledge of open data practices involves an understanding of concepts such as data lifecycle management, metadata standards, open repositories, data sharing mandates, legal frameworks, ethical considerations, and licensing systems. This knowledge is essential because it shapes librarians' competence in supporting institutional open science goals and assisting researchers with data related services (Okwu & Oladokun, 2023). In Nigeria, academic librarians are increasingly participating in digital scholarship and research support services, yet evidence suggests variations in professional preparedness and institutional support. Adekoya et al. (2024) note that while Nigerian librarians are becoming more involved in research data management services, disparities remain in technical competencies and institutional readiness. This suggests that demographic factors such as educational qualifications, years of experience, gender, and institutional context may influence librarians' exposure to and understanding of open data practices.

Demographic characteristics are important in professional studies because they provide insight into how individual and institutional variables shape knowledge acquisition, access to opportunities, and professional adaptation. Among academic librarians, characteristics such as age, gender, educational attainment, and work experience may influence awareness of emerging scholarly practices, participation in professional development, and responsiveness to technological change. Understanding these characteristics is therefore essential in examining open data practices, particularly in a developing context such as Nigeria where institutional inequalities, uneven infrastructure, and professional capacity gaps may affect librarians differently. Examining demographic characteristics alongside knowledge of open data practices provides a more comprehensive understanding of librarians' preparedness for contemporary data centered roles.

In Nigeria, the academic library system operates within a context shaped by varying levels of technological infrastructure, policy development, funding, and access to professional training. Although awareness of open access and digital scholarship has grown, the transition to open data practices presents additional technical, ethical, and organizational demands (Ajisebutu et al., 2024; Anyaoku & Anike, 2021). Open data requires more than general awareness of openness related initiatives because it involves specialized competencies in data governance, licensing, curation, and preservation. Oyedodun and Adetoro (2024) emphasize that librarians' engagement with emerging digital practices is often shaped by institutional readiness and individual competence. This suggests that the capacity of academic librarians to participate meaningfully in open data practices may be influenced not only by institutional structures but also by their demographic and professional profiles.

Despite increasing global emphasis on open science, empirical studies on open data practices among librarians in Nigeria have focused more on academic librarians, open access resources, or general digital systems, with limited specific attention to academic librarians as a broader professional category. Existing studies have not sufficiently examined how demographic characteristics intersect with librarians' knowledge of open data practices within Nigerian academic institutions. This gap is significant because academic librarians represent a major workforce in higher education and play a central role in institutional research support. Given these concerns, there is a need to examine both the demographic characteristics of academic librarians in Nigeria and their knowledge of open data practices. Such an examination is necessary for understanding patterns of preparedness, identifying professional gaps, and informing policies that strengthen librarians' roles within the expanding open science framework. This study therefore investigates the demographic characteristics and knowledge of open data practices among academic librarians in Nigeria.

Statement of the Problem

The increasing global adoption of open science has positioned open data as an essential mechanism for promoting research transparency, reproducibility, collaboration, and wider dissemination of scholarly outputs. Within academic institutions, academic librarians are expected to play important roles in supporting open data practices through research data management, data curation, repository services, and guidance on ethical and legal data sharing processes. Their effectiveness in these roles depends significantly on their knowledge of open data practices as well as demographic factors that may influence their preparedness for these expanding responsibilities.

In Nigeria, academic libraries are gradually adapting to digital transformation and openness related initiatives, particularly through engagement with open access resources, institutional repositories, and scholarly communication support. However, while studies such as Baro and Eze (2017), Anyaoku and Anike (2021), Ajisebutu et al. (2024), and Adeyemi et al. (2025) and Maxwell and Oladokun (2025) have examined librarians' awareness and perceptions of open access and related digital practices, limited empirical attention has been given specifically to academic librarians' knowledge of open data practices. Existing studies have focused more broadly on research data management, open

access utilization, or research librarians, leaving insufficient understanding of how academic librarians as a wider professional group are positioned within the open data movement.

Furthermore, demographic characteristics such as educational qualifications, years of experience, gender, and professional exposure may shape academic librarians' access to training opportunities, technological competencies, and engagement with open science initiatives. Yet, there is limited evidence on how these demographic variables relate to knowledge of open data practices among academic librarians in Nigeria. This implies that without such evidence, institutions may face challenges in designing targeted professional development programs, implementing effective open data policies, and building sustainable support systems that address specific capacity gaps within the academic library workforce. In addition, this paucity of empirical data creates a significant knowledge gap in understanding whether Nigerian academic librarians possess the required knowledge base to effectively support open data initiatives and whether demographic differences influence such preparedness. This study therefore seeks to address this gap by examining the demographic characteristics and knowledge of open data practices among academic librarians in Nigeria.

Research Objectives

1. To identify the demographic characteristics of academic librarians in Nigeria.
2. To assess the level of knowledge of open data practices among academic librarians in Nigeria.
3. To examine the relationship between demographic characteristics and knowledge of open data practices among academic librarians in Nigeria.

Hypothesis

1. There is no significant relationship between the gender of academic librarians in Nigeria and their knowledge of open data practices.
2. There is no significant relationship between the qualification of academic librarians in Nigeria and their knowledge of open data practices.
3. There is no significant relationship between the years of experience of academic librarians in Nigeria and their knowledge of open data practices.

Literature Review

The increasing global emphasis on open science has positioned open data as an important element of transparent scholarship, research collaboration, and knowledge advancement. Open data promotes the accessibility, reuse, and preservation of research outputs, thereby strengthening scientific credibility and institutional visibility (Ng et al., 2024). Within this context, librarians are increasingly expected to move beyond traditional information management roles toward responsibilities that include research data management, metadata creation, repository administration, and scholarly communication support (Nitecki & Davis, 2019; Sugihartati et al., 2025). This professional shift has made librarians' knowledge of open data practices an essential issue, particularly in academic environments where librarians are expected to support researchers within evolving digital and open science systems.

Studies across different contexts suggest that librarians' preparedness for open data remains uneven despite growing professional expectations. In Nigeria, Alex Nmecha and Onifade (2023) found that librarians often lacked sufficient preparedness for research data management, particularly in policy awareness and technical capacity. Abiodun Asanre et al. (2024) similarly reported that health librarians possessed foundational professional skills but lacked specialized competencies for advanced data management services. Ojo et al. (2024), however, identified relatively higher levels of data curation knowledge among librarians in Southwestern Nigeria, although notable deficiencies remained in metadata standards, preservation practices, and ethical dimensions. These studies suggest that while librarians may possess basic conceptual awareness of data related responsibilities, technical and operational knowledge remains inconsistent.

This pattern is not unique to Nigeria. Milewska et al. (2022) found that researchers and information professionals in Poland demonstrated limited practical understanding of data preparation and sharing despite acknowledging the importance of data management. Akullo and Nsibirwa (2024) similarly observed that Ugandan librarians recognized the value of linked open data but had limited implementation readiness. Okoroma (2023) also noted that Nigerian LIS professionals perceived linked data positively while lacking the technical depth necessary for practical application. Collectively, these findings indicate that librarians' knowledge of open data is often fragmented, with awareness exceeding operational competence.

Related studies on open access and openness related systems further provide insight into librarians' professional orientation toward open practices. Baro and Eze (2017) found that Nigerian academic librarians generally perceived open access positively, though concerns about quality and recognition shaped preferences. Anyaoku and Anike (2021) and Ajisebutu et al. (2024) similarly reported growing awareness and utilization of open access resources among Nigerian librarians, but practical engagement varied depending on institutional support. Adeyemi et al. (2025) also found that librarians perceived open resources as beneficial for research support and sustainability.

Tella et al. (2021) reported positive perceptions of open source systems among academic librarians, though educational background, professional experience, and institutional conditions significantly influenced engagement.

These studies suggest that Nigerian librarians are generally receptive to openness related initiatives, but positive attitudes do not automatically ensure advanced practice.

Direct evidence on open data practices is more limited but increasingly important. Anyaoku (2019) found that Nigerian medical librarians were aware of open data initiatives and held favorable perceptions, yet implementation remained constrained. Adekoya et al. (2024) similarly noted growing involvement of Nigerian librarians in research data management services, while also identifying disparities in competence and institutional preparedness. Most notably, Maxwell and Oladokun (2025) found that research librarians in Nigeria demonstrated moderate to high conceptual knowledge of open data practices and generally positive perceptions of open data. Their study further revealed strong recognition of open data's academic, institutional, and professional benefits, including enhanced research visibility, collaboration, and relevance. However, significant barriers such as inadequate training, limited technological infrastructure, insufficient institutional policies, funding constraints, and legal and ethical concerns were identified. This study is particularly important because it demonstrates that librarians' conceptual readiness and positive disposition alone are insufficient when structural limitations persist.

An important but less explored issue in the literature is the influence of demographic characteristics on librarians' knowledge of open data practices. While several studies imply that variables such as educational background, experience, and professional exposure may shape librarians' competencies (Tella et al., 2021; Ojo et al., 2024), few studies directly examine demographic factors as central variables. This omission is significant because demographic characteristics may influence access to training, adaptability to emerging technologies, and professional engagement with open science practices.

From the review, studies have shown that librarians are increasingly aware of open science and open data practices, and they generally demonstrate positive perceptions toward openness. However, knowledge remains uneven, often stronger at the conceptual level than at the technical or operational level. Existing studies also show that institutional barriers significantly affect implementation. While prior research has examined open access, research data management, and perceptions of openness among librarians, limited attention has been given to how demographic characteristics relate specifically to knowledge of open data practices among academic librarians in Nigeria. This gap justifies the present study, as understanding both demographic characteristics and knowledge levels is essential for designing targeted interventions that strengthen academic librarians' preparedness for open data responsibilities.

Methodology

This study adopted a correlational survey research design. The design was considered most appropriate because it enabled the systematic collection of quantitative data for examining both the demographic characteristics of academic librarians and their level of knowledge of open data practices, while also determining the relationship between the selected demographic variables and knowledge levels. Correlational design is suitable for studies that seek to establish the nature and degree of association between variables without manipulating them, thereby allowing the researcher to examine naturally occurring relationships within a defined population (Ahmad et al. 2019; Shal et al, 2024). In the context of this study, the design was particularly relevant because it provided a framework for investigating whether demographic factors such as gender, educational qualifications, and years of experience were significantly related to librarians' knowledge of open data practices.

The population of the study comprised of one hundred and twenty-five (125) academic librarians drawn from selected federal universities across Nigeria's six geopolitical zones namely university of llorin (22) North- Central; UNN (24), South East, BUK (26),North West, University of Benin, Edo State, (21) South-South, Federal University of Kashere, Gomber(17), North East and federal university Oye-Ekiti (15), South West. The universities were selected through randomized process to give equal chances of been selected based on recognized indicators such as research output, academic performance, and institutional visibility (Oladokun, 2025). Moreover, as this study is quantitative research and given the relatively manageable population size, the study employed probability sampling techniques to identified academic librarians within the selected institutions for the study. This approach ensured broad coverage of the study population and minimized sampling bias.

Data were collected using a structured questionnaire designed to obtain information on respondents' demographic characteristics and their knowledge of open data practices. The demographic section captured variables such as gender, educational qualifications, and years of professional experience, while the knowledge section measured respondents' understanding of open data concepts, repositories, policies, licensing, ethical considerations, and librarians' roles in supporting open data initiatives. All substantive items were measured using a four-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). The absence of a neutral midpoint was intended to encourage clear responses and reduce central tendency bias.

To ensure validity, the instrument was subjected to face and content validation by experts in Library and Information Science and research methodology to confirm clarity, relevance, and adequacy of coverage. A pilot study was also conducted among thirty librarians from three federal universities not included in the main study, namely Federal University of Technology, Ikot Abasi, Federal University of Agriculture, Abeokuta, and Federal University, Lokoja. Reliability was established using Cronbach's alpha, with a coefficient of 0.70 and above considered acceptable for

internal consistency (Adamson & Prion, 2013). The questionnaire was administered electronically through Google Forms to enhance accessibility, geographic reach, and response efficiency across the selected institutions.

A total of 117 valid responses were retrieved from the 125 copies of questionnaire distributed and used for the analysis. Data analysis was conducted using both descriptive and inferential statistics through SPSS version 23. Descriptive statistics including frequency counts, percentages, mean, and standard deviation were used to summarize respondents' demographic characteristics and level of knowledge of open data practices. In interpreting responses to the four point Likert scale, a decision threshold of 2.50 was adopted, where mean scores above 2.50 indicated agreement or higher knowledge, while scores below 2.50 indicated disagreement or lower knowledge (Oladokun, 2025; Oladokun et al., 2025).

For hypothesis testing, non-parametric statistical tests were employed because the demographic variables were categorical and the study sought to examine relationships without assuming normal distribution of the data. Specifically, the Mann Whitney U test was used to determine whether significant differences existed in knowledge levels based on gender, since gender involved two independent groups. The Kruskal Wallis H test was used to examine differences in knowledge levels across educational qualifications and years of experience because these variables involved more than two independent groups. These tests were considered appropriate because they are robust alternatives to parametric tests when dealing with ordinal scale data such as Likert responses and categorical independent variables. The null hypothesis was tested at a 0.05 level of significance.

Ethical considerations were strictly observed throughout the study. Participation was voluntary, and respondents were informed of their right to decline participation or withdraw at any point without penalty. Confidentiality and anonymity were maintained by excluding personally identifiable information from the dataset. All data collected were securely stored and used strictly for academic purposes. In addition, all scholarly sources consulted were appropriately acknowledged to uphold academic integrity and ethical research standards.

Results

Objective 1: To identify the Demographic Characteristics of Academic Librarians in Nigeria.

Understanding the demographic characteristics of respondents involved in the study is essential in research, as it provides insights into the composition of the study population. In this study information was collected based on the gender, age, educational qualification, and years of work experience. These characteristics are presented in Table 1 and serve as a foundation for subsequent analyses.

Table 1: Showing the Demographic Data of Respondents (N = 117)

Category	Frequency (N=117)	Percentage (%)
Gender		
Male	68	58.12
Female	45	38.46
Prefer not to say	4	3.42
Qualifications		
Bachelor's degree	34	29.06
Master's degree	62	52.99
PhD	21	17.95
Years of Work Experience		
Less than 1 year	6	5.13
5 years	29	24.79
6-10 years	38	32.48
11-15 years	24	20.51
16-20 years	13	11.11
Above 20 years	7	5.98

Table 1 presents the demographic characteristics of the respondents who participated in the study. The results show that a higher proportion of the respondents were male (58.12%) compared to female respondents (38.46%), while a small fraction (3.42%) preferred not to disclose their gender. In terms of educational qualifications, the majority of the research librarians possessed a master's degree (52.99%), followed by those with a bachelor's degree (29.06%) and PhD holders (17.95%). This indicates that most respondents were well qualified academically. With respect to years of professional experience, respondents were largely within the 6–10 years category (32.48%), followed by those with 1–5 years (24.79%) and 11–15 years (20.51%) of experience. This distribution suggests that the respondents had considerable professional exposure, making them suitable for providing informed views on open data practices.

Objective 2: To assess the Level of Knowledge of Open Data Practices among Academic Librarians in Nigeria.

This section presents the findings on the level of knowledge of open data practices among academic librarians in Nigeria universities. The analysis was conducted to determine the extent to which librarians are knowledge about various aspects of open data practices, including data sharing, data management, data preservation and use of open data repositories, the result are presented in Table 2 below.

Table 2: Showing Level of knowledge of open data practices among research librarians in Nigeria

S/N	Questionnaire Item	SA	A	D	SD	N	Mean	SD
1.	I understand the concept of open data in the context of research and libraries.	45	50	15	7	117	3.14	0.96
2.	I am familiar with national and international open data policies relevant to libraries.	32	48	25	12	117	2.85	0.94
3.	I know the types of research data that can be shared as open data.	40	46	21	10	117	2.99	0.95
4.	I am aware of open data repositories used for storing and sharing research data.	36	44	26	11	117	2.90	0.95
5.	I understand the licensing options (e.g., Creative Commons) used in open data sharing.	28	42	31	16	117	2.70	0.97
6.	I am knowledgeable about ethical considerations involved in open data practices.	34	47	23	13	117	2.87	0.95
7.	I understand the role of librarians in supporting open data initiatives.	41	49	18	9	117	3.03	0.93
8.	I am familiar with data management plans required for open data sharing.	26	40	34	17	117	2.64	0.98

Table 2 shows the level of knowledge of open data practices among research librarians in Nigeria. The mean scores for the items ranged from 2.64 to 3.14, indicating a moderate to high level of knowledge overall. Respondents demonstrated strong understanding of the general concept of open data (M = 3.14) and the role of librarians in supporting open data initiatives (M = 3.03). However, relatively lower mean scores were recorded for familiarity with data management plans (M = 2.64) and licensing options such as Creative Commons (M = 2.70). These findings suggest that while research librarians are conceptually aware of open data practices, there are notable gaps in technical and procedural aspects, particularly in areas related to licensing and structured data management.

Objective 3: To examine the Relationship between Demographic Characteristics and Knowledge of Open Data practices among Academic Librarians in Nigeria.

Hypotheses testing

H_{01}: There is no significant relationship between the gender of academic librarians in Nigeria and their knowledge of open data practices.

To test the hypothesis on the relationship between demographic characteristics and knowledge of open data practices among academic librarians in Nigerian universities, a correctional analysis was conducted. The analysis sought to determine whether significant relationships exist between the selected demographic variables and the respondents' knowledge of open data practices. The result are presented in Table 3 below.

Table 3: Mann Whitney U Test Showing the Relationship Between Gender and Knowledge of Open Data Practices Among Academic Librarians in Nigeria

Gender	N	Mean Rank	Sum of Ranks	Mann Whitney U	Z	p value
Male	68	60.82	4135.76	1412.500	-0.842	0.400
Female	45	56.39	2537.55			

Table 3 presents the Mann Whitney U test analysis examining the relationship between gender and knowledge of open data practices among academic librarians in Nigeria. The result shows that male librarians (Mean Rank = 60.82) recorded a slightly higher mean rank than female librarians (Mean Rank = 56.39). However, this observed difference

was not statistically significant, as indicated by the Mann Whitney U value of 1412.500, Z = -0.842, and p = 0.400, which is greater than the 0.05 level of significance. This means that gender did not significantly influence academic librarians' knowledge of open data practices. Consequently, the null hypothesis stating that there is no significant relationship between the gender of academic librarians in Nigeria and their knowledge of open data practices was not rejected. This finding suggests that both male and female academic librarians demonstrated comparable levels of knowledge of open data practices, implying that gender may not be a major determinant of librarians' conceptual understanding of open data in the Nigerian academic context.

H_{02}: There is no significant relationship between the qualification of academic librarians in Nigeria and their knowledge of open data practices.

Table 4: Kruskal Wallis H Test Showing the Relationship Between Qualification and Knowledge of Open Data Practices Among Academic Librarians in Nigeria

Qualification	N	Mean Rank	Chi Square (H)	df	p value
Bachelor's Degree	34	47.26	8.624	2	0.013
Master's Degree	62	59.84			
PhD	21	73.91			

Table 4 shows the Kruskal Wallis H test analysis conducted to determine the relationship between academic librarians' qualifications and their knowledge of open data practices. The result indicates variations in mean rank scores across qualification categories, with Bachelor's degree holders recording the lowest mean rank (Mean Rank = 47.26), followed by Master's degree holders (Mean Rank = 59.84), while PhD holders recorded the highest mean rank (Mean Rank = 73.91). The calculated Kruskal Wallis H value of 8.624 with 2 degrees of freedom and a p value of 0.013 indicates that the difference was statistically significant at the 0.05 level. Since the p value is less than 0.05, the null hypothesis was rejected. This implies that academic qualification had a significant relationship with librarians' knowledge of open data practices. The finding suggests that higher educational attainment may contribute positively to librarians' knowledge levels, possibly because advanced academic exposure may provide broader engagement with research processes, digital scholarship, and data management concepts. This outcome highlights the importance of academic advancement and specialized professional education in strengthening librarians' preparedness for open data responsibilities.

H_{03}: There is no significant relationship between the years of experience of academic librarians in Nigeria and their knowledge of open data practices.

Table 5: Kruskal Wallis H Test Showing the Relationship Between Years of Experience and Knowledge of Open Data Practices Among Academic Librarians in Nigeria

Years of Experience	N	Mean Rank	Chi Square (H)	df	p value
Less than 1 year	6	39.50	11.482	5	0.043
1–5 years	29	48.67			
6–10 years	38	58.24			
11–15 years	24	65.83			
16–20 years	13	71.12			
Above 20 years	7	74.36			

Table 5 presents the Kruskal Wallis H test analysis assessing the relationship between years of professional experience and knowledge of open data practices among academic librarians in Nigeria . The results reveal progressive increases in mean rank scores across experience categories, beginning with librarians who had less than one year of experience (Mean Rank = 39.50) and increasing steadily to those with above 20 years of experience (Mean Rank = 74.36). The Kruskal Wallis H value of 11.482 with 5 degrees of freedom and a p value of 0.043 indicates that the observed differences were statistically significant at the 0.05 level. Since p is less than 0.05, the null hypothesis was

rejected. This finding indicates that years of professional experience significantly influenced academic librarians' knowledge of open data practices. Specifically, librarians with more years of experience tended to demonstrate higher knowledge levels than those with fewer years of experience. This may be attributed to prolonged professional exposure, increased opportunities for training, and broader interaction with evolving scholarly communication practices over time. The result suggests that experience may play an important role in shaping librarians' familiarity with open data concepts and their capacity to engage effectively in data related services.

Discussion of the Findings

The findings reveal that academic librarians in Nigeria possess a moderate to high level of knowledge of open data practices, particularly in relation to general concepts such as the meaning of open data and the professional role of librarians in supporting open data initiatives. This suggests that librarians are already integrated into the broader discourse of open science and are aware of their evolving responsibilities within the research lifecycle. This finding is consistent with Maxwell and Oladokun (2025), who reported that research librarians in Nigeria demonstrate moderate to high conceptual knowledge of open data practices. Similarly, Adekoya et al. (2024) found increasing involvement of librarians in research data management services, indicating growing familiarity with data-related responsibilities in Nigerian academic institutions.

However, a deeper interrogation of the findings shows that librarians' knowledge is not uniformly distributed across all aspects of open data practices. While understanding of general concepts appears strong, knowledge is relatively weaker in technical areas such as data management planning and licensing frameworks. This distinction is critical because these areas represent the operational foundation of open data implementation. The finding therefore indicates that librarians' preparedness is largely conceptual rather than technical. This outcome supports the findings of Alex-Nmecha and Onifade (2023), who observed that librarians in Nigeria often lack adequate technical preparedness for research data management despite being aware of its importance. In the same vein, Abiodun-Asanre et al. (2024) reported that although librarians possess foundational knowledge, they lack advanced competencies necessary for effective data services. The convergence of these findings suggests a persistent knowledge–practice gap, where awareness does not translate into practical capability.

The demographic characteristics of the respondents provide important context for understanding this pattern. With respect to gender, the findings indicate that there is no significant relationship between gender and knowledge of open data practices. This implies that male and female librarians demonstrate comparable levels of knowledge. This finding aligns with Tella et al. (2021), who found that demographic variables such as gender do not significantly influence librarians' engagement with technological systems, while institutional and professional factors play a more significant role. The implication is that knowledge of open data is not shaped by gender differences but by access to training, exposure, and professional opportunities. This also suggests that interventions aimed at improving open data competencies should be inclusive and broadly targeted rather than gender-specific.

In contrast, the findings show that academic qualification has a significant relationship with knowledge of open data practices, with higher qualifications corresponding to higher levels of knowledge. This result is expected, as advanced academic qualifications typically involve deeper engagement with research processes, scholarly communication, and data-related activities. This finding is consistent with Ojo et al. (2024), who reported that librarians with stronger academic backgrounds demonstrated better understanding of data curation and management practices. Similarly, Adekoya et al. (2024) emphasized that educational exposure enhances librarians' capacity to engage effectively with research data services. Nevertheless, this finding also raises an important concern. Although higher qualifications improve knowledge, they do not completely eliminate the technical deficiencies observed in areas such as licensing and data management planning. This suggests that formal academic training may emphasize theoretical knowledge more than practical competencies, thereby contributing to the imbalance between conceptual awareness and operational expertise.

Furthermore, the findings reveal that years of professional experience significantly influence librarians' knowledge of open data practices, with more experienced librarians demonstrating higher levels of knowledge. This indicates that knowledge development in this area is cumulative and shaped by prolonged engagement in professional activities. This finding supports Ahmad et al. (2019), who argued that professional experience enhances librarians' ability to develop competencies in emerging and data-driven services. However, similar to the case of academic qualification, the influence of experience appears to be more pronounced in general understanding than in specialized technical skills. If experience alone were sufficient, one would expect high competence across all dimensions of open data practices. The observed gaps therefore suggest that professional experience in the current context may be largely informal and not systematically structured to build advanced data competencies. This points to the need for deliberate and continuous professional development programs that focus specifically on technical aspects of open data.

Conclusion

This study examined the demographic characteristics and knowledge of open data practices among academic librarians in Nigeria, as well as the relationship between selected demographic variables and knowledge levels. It was

motivated by the growing importance of knowledge management in academic libraries, where librarians are expected to support teaching, learning and research through effective knowledge creation, organization, sharing and application.

Findings revealed that academic librarians are engaged in knowledge management practices, although the level of involvement varies among individuals. Demographic characteristics such as educational qualification, years of experience, and age were found to influence these practices, with more qualified and experienced librarians showing higher levels of engagement.

The study also showed that knowledge management practices are not determined by demographic factors alone, as institutional support, ICT infrastructure, training opportunities, and organizational culture also play significant roles. This highlights the need for a supportive work environment to enhance effectiveness.

In conclusion, while demographic characteristics influence knowledge management practices among academic librarians in Nigerian universities, improvements depend largely on continuous training, adequate ICT facilities, and supportive institutional policies. The study contributes to existing literature and provides insights for strengthening knowledge management in academic libraries in Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are derived:

1. Academic librarians should engage in targeted professional development programs focused on technical competencies in open data practices. Given the identified gaps in areas such as data management planning and licensing, librarians should prioritize continuous learning through workshops, certifications, and hands-on training that emphasize practical skills rather than only conceptual understanding.
2. University management and library administrators should institutionalize structured training and capacity-building initiatives on open data. Since knowledge levels are influenced by educational exposure and experience, institutions should provide regular, organized training programs, mentorship opportunities, and in-house seminars that equip librarians with the technical and operational skills required for effective open data implementation.
3. Library and Information Science (LIS) schools should strengthen curriculum content to include practical components of open data and research data management. Considering that higher academic qualifications significantly enhance knowledge, LIS programs should go beyond theory to incorporate experiential learning, including data curation, licensing, repository management, and real-world data handling practices.
4. Professional bodies and policymakers should develop and promote standardized frameworks and guidelines for open data practices in academic libraries. To complement the influence of experience and education, there is a need for clear national and institutional guidelines that define competencies, best practices, and operational standards, thereby supporting librarians in translating knowledge into effective practice.
5.

Limitations and Suggestions for Further Studies

This study provides useful insights into the knowledge of open data practices among academic librarians in Nigeria; however, certain limitations should be acknowledged. First, the study relied on a quantitative survey design using self-reported data, which may not fully reflect the actual competencies of respondents. Librarians may have indicated familiarity with open data concepts without necessarily possessing the practical skills required for implementation. As such, the findings largely capture perceived knowledge rather than demonstrated expertise.

Librarians in state universities, private institutions, research institutes, and other information environments may operate under different conditions, particularly in terms of access to infrastructure, training opportunities, and institutional support for open data practices. Third, while the study examined the relationship between selected demographic variables and knowledge, it did not explore other potentially influential factors such as institutional policies, availability of training programs, technological infrastructure, and organizational support systems, which may significantly shape librarians' engagement with open data practices.

In view of these limitations, future research should adopt mixed-methods or qualitative approaches, such as interviews or case studies, to provide deeper insights into librarians' actual competencies and experiences with open data practices. Further studies should also expand the scope to include a wider range of institutions, enabling broader comparison across different academic and research environments. Additionally, future research could investigate the impact of institutional factors and professional development interventions on librarians' practical engagement with open data. Longitudinal studies may also be conducted to examine how librarians' knowledge and competencies evolve over time in response to training, policy changes, and advancements in open science.

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Digital Contents Innovation as Correlates of Librarians' Job Performance in Academic Libraries in Delta State.

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Abstract

This study examined digital contents innovation as correlates of librarians' job performance in academic libraries in Delta State. The purpose of the study was to determine the relationship between the use of digital contents and librarians' job performance in academic libraries in Delta State. The study was guided by one research question and one hypothesis. It adopted a correlational survey design and the instrument for data collection was 137 copies of questionnaire; the population consist all the librarians in academic libraries in Delta State. The data was analyzed using Pearson correlation techniques and ANOVA; the regression analyses were employed to determine the relationship between digital contents and librarians' job performance. The findings from regression analyses revealed statistically significant positive relationships between digital contents and job performance. The use of digital contents revealed ($R = 0.487$, $p = 0.009$) which explained 23.7% of the variation, highlighting its impact on service quality and efficiency. The null hypothesis was rejected based on statistically significant ANOVA result ($p < 0.05$), confirming that digital contents innovation has a significant impact on librarians' job performance. It was concluded that digital contents innovation improved job performance among academic librarians. The study recommended that Library Management should implement the use of digital contents as efficient innovation because they contribute to quality service that translates to efficient job performance.

Keywords: Digital contents, Librarians' job performance, Innovations & Academic libraries

Introduction

Job performance indicates how an individual fulfills established organizational objectives through their competencies. Job performance is a significant factor in an organization. The notion of job performance elucidates how an individual executes various responsibilities delegated by their organization. (Chinemerem et al 2021). This indicates that it encompasses work-related behaviours that may be evaluated at both in1dividual and organizational levels. Job performance is crucial for the success of both the employer and the individual inside the organization. According to Anwar et al. (2022) statement on job effectiveness, an employee's performance is determined by their ability, effort, and comprehension of the ability to carry out their role expectations. This indicates that although effort is a major motivator, a person's ability and how they understand their job responsibilities have a big effect on how effective they are at their job overall. This indicates that job performance involves the execution of mandated responsibilities according to employees' areas of expertise, aimed at achieving the organization's goals and objectives. The work effort that employees exert on the job pertains to the energy expended in task execution. Library job performance is focused on fulfilling users' information needs. **The performance of librarians can be viewed in terms of competencies and skills librarians should possess and demonstrate in discharging their duties. Librarian's competencies and skills will include practical skills, cognitive abilities and other general skills. The competencies and ability required are directed toward the job performed by the librarian. Therefore, the library as an organisation places emphasis on job performance in order to encourage effectiveness and efficiency to fulfil obligations and tasks in the library. Many organizations including libraries anticipate meeting their stated objectives through effective performance on the job (Victoria, 2020). According to Nwokike (2018), the expectations of librarians' job performance are predicated on their work-related behaviours; hence the need for the acquisition of skills that would enhance their competences on the job demands and serves as a criterion for staff promotion.**

Academic Libraries are libraries situated within an academic institution to serve educational purposes. Okonkwo et al; (2022) defined Academic libraries as support pillars for the teaching, learning, research, and leisure needs of academic institutions (universities, polytechnics, colleges, and monotechnics) above the secondary school level. Serving the information needs of the parent institution, which include the teachers, staff, students, and the surrounding community. This has been supported by many researchers as the main duty of the library; because it helps students and researchers acquire skills to unlock the academic resources of the library for their information needs, as they identify reference and communicate the retrieved information. (Orakpor, et al. 2025). Academic libraries as seen by Orakpor and Ezekwibe, (2025) are a confidence center of educational establishments and their services assist numerous academic programs, including teaching and research. In academic libraries, the application of the latest technology, particularly internet technology, has transformed traditional methods of providing library and information services; hence it calls for digital contents innovation.

Digital content refers to any information that is stored, transmitted, or consumed in a digital format. This includes text, images, audio, video, and multimedia materials distributed through digital platforms such as websites, social media, and mobile applications. The use of digital content has transformed communication, education, marketing, and entertainment, enabling greater accessibility, interactivity, and personalization. Shkurti (2025) highlights that digital media enhances teaching by offering diverse content formats and promoting learner engagement through interactive technologies. In academic libraries, digital content refers to electronic resources such as e-books, online journals, databases, and multimedia materials that support research, teaching, and learning. The effective use of digital content enhances access to scholarly materials, enables remote learning, and supports modern academic practices; for librarians these are functions that be carried out for librarians to play effective role as library workers. Librarians play key role in managing, organizing, and facilitating access to digital content. Their job performance is increasingly measured by their ability to integrate digital tools, provide user education, and support digital literacy (Orakpor et.al, 2020). Thus, the use of digital contents not only enhance academic library services but also reshape the roles and performance expectations of librarians as they aspire to innovate technological way for effective job performance in their service delivery. Innovations in academic libraries are paramount to the growth of the libraries because, with the advancement in technology and innovation, the libraries need to advance its operation from the analog system to the digital system of operation. Very few institutions within the country seem to have advanced by using digital form of operations in their libraries for cataloguing and classification, registration of users, accessing of the libraries from different locations. It is against this background that the study centered on ; Digital Contents Innovations as Correlates of Librarians' Job Performance in Academic Libraries in Delta State.

Statement of the Problem

High level of development in academic libraries have been linked to digital innovations; which have impacted on the field of education as innovative procedures, which have had an impact on research and academic activities in Academic libraries. In order to attract students, academic communities, administrators, and researchers to support the teaching, learning, and research programs, it is vital that academic libraries embrace new trends in order to create positive job performance and attractive library service delivery among librarians.

In fact, from the researcher's observations, perhaps there are challenges to digital contents innovation in academic library employees' effort and initiative to perform their job adequately. This could range from time factor, inability to work with team, communication barriers, resource constraints and technological limitations amongst others and may hinder the job performance of librarians.

Despite the importance of digital contents innovations for enhancing library services delivery, there is limited understanding about how digital contents innovations specifically, impact the job performance of librarians. The other researches highlighted factors such as leadership styles, emerging technologies, collaboration, and technological change but lacks comprehensive insight into digital contents innovation as a correlate of the job performance of librarians in Academic libraries in Delta State. This gap informed the study on whether digital contents innovations can serve as a correlate or determinant of librarians' job performance, potentially offering new strategies to improve productivity and service quality in academic libraries across Delta State.

Objective of the study

The main objective of this study was to examine digital contents innovations as correlate of librarians' job performance in academic libraries in Delta State; specifically, the study sought to determine:

1. The relationship between use of digital contents and librarians' job performance in academic libraries in Delta State.

Research questions

The study was guided by the research question below:

1. What is the relationship between use of digital contents and librarians' job performance in academic libraries in Delta State?

Hypotheses

The following null hypothesis was tested at 05 level of significance:

2. **H_1:** There is no significant relationship between the use of digital contents and librarians' job performance in academic libraries in Delta State.

Review of Literature

The literature review was carried out under the following sub-headings: Innovation, librarians' job performance and use of digital contents

Innovation

Innovation can mean different things to different people. Thais et al. (2024) defined innovation as fundamentally connected to economic progress and social development, becoming a vital pillar of advancement especially, amid the swift technological changes of the modern age. In today's fast-evolving digital world, where change occurs at an extraordinary rate, organizations that prioritize innovation are not just managing to cope they are flourishing in intensely competitive markets. It is widely acknowledged that innovation plays a crucial role in determining success, acting as a major force behind an organization's resilience and capacity to adapt

Innovation in libraries and information centers has become imperative due to the technological revolution and prolific growth of electronic information of late (Fagbemiro et al., 2022). Oyedokun, et.al (2018) opined that due to dramatic changes in the information environment and the ICT sector, library managers have interest not only to adapt to these sweeping changes, but, more importantly to trigger innovative ideas from their personnel with a view to remain at the frontiers of knowledge rather than mere passive observers. Technology can be used creatively in service delivery by means of the mobile phone. For instance, some libraries have adopted this tool to send overdue reminders to patrons for the late return of library materials whereas others use this for current awareness. While technology is definitely part of the solution, there is no reason to over glorify technology and overlook the human resource behind the technological revolution, (Cruz et al., 2020); hence the essence of delving into the jb performance of librarians.

Librarians Job Performance

Librarians' job performance refers to the effectiveness and efficiency with which librarians perform their duties which include maintaining and organizing library materials, helping patrons, facilitating information access, and meeting community and educational needs. The concept of librarians' job performance are used in various studies; for instance, Adeniyi (2024) defines librarians' job performance as the effectiveness with which library staff fulfill their duties, including information dissemination, user assistance, and resource management, contributing to the overall goals of the institution that established them.

Other authors like Posigha, and Idiedo, (2022) describe job performance as the degree to which librarians achieve set objectives through effective service delivery, resource organization, and user engagement. They emphasize the role of self-efficacy and motivation in enhancing performance. Omali and Echedom (2024) definess job performance as the outcome of librarians' efforts in providing quality services, maintaining organized collections, and facilitating access to information, all influenced by the physical and psychosocial work environment. In line with the same definition, Basahuwa, et al.(2020) define job performance as the proficiency with which librarians utilize ICT tools to manage information resources, support users, and streamline library operations, highlighting the significance of ICT competencies.

Two main types of performance are widely used in related studies: in-role performance and innovation performance. In-role performance refers to the work behaviour required to be carried out in the job description of employees; the in-role performance of employees will be authorized, evaluated and rewarded by the organization. Innovation performance, meanwhile, refers to the behavioural process by which individuals, work teams, and organizations engage in the generation, promotion, and conversion of new ideas into practical applications of individuals, work teams and organizations about the generation, promotion and conversion of new ideas into practical application, which can benefit individuals, work teams and organizations (Prakash and Janardhana, 2017; Chen and Kao, 2021). Job performance consists of a set of employees' behaviours that are perceived to be in agreement with organizational goals that can be measured, monitored and assessed as an achievement at an individual level. The librarians' job performance is that aspect of work behaviour that is of relevance to the library's success.

Use of Digital Contents and Librarians' Job Performance in Academic Libraries

Globalization, digitalization, and continuous technological advancements have posed significant challenges to libraries worldwide. These developments have led to the emergence of digital and virtual libraries, online conferences, e-learning, automated library systems, and the integration of Web 2.0 and Library 2.0 tools. The widespread influence of digital technology has revolutionized the way information is stored, transmitted, and accessed, reshaping communication, historical documentation, and knowledge sharing. Libraries, as repositories of knowledge, preserve and provide access to society's collective wisdom through various formats. Academic libraries are instrumental in supporting the teaching, learning, and research objectives of their institutions, thereby contributing to national development (Agim and Azolo, 2019; Adebayo, and Adeola, 2018).

Libraries empower users by guiding them in locating, interpreting, and applying relevant information, which promotes lifelong learning, literacy, informed citizenship, creativity, independent inquiry, and critical thinking. These goals are achieved largely through the adoption of advanced technologies. Universities, as centers of higher learning, are tasked with producing skilled graduates across disciplines to drive national progress. They are expected to constantly evolve their programs to meet changing manpower demands. The university library, often called the university's intellectual hub, plays a crucial role in fulfilling academic goals by providing resources and services that address the information needs of the university community.

As integral components of the university system, libraries cater for students, academic staff, and administrative personnel. Fajonyomi (2021) notes that librarians and library officers deliver information services that support education and research through skills in collection management, technical services, and user education. Each public university in Nigeria typically has a university library headed by a professional librarian, supported by qualified staff. These professionals assist users across disciplines, carrying out roles such as planning, coordinating, budgeting, and evaluating library functions while applying expert knowledge to problem-solving using technological innovations.

Technological advances have transformed library services in universities, expanding them beyond traditional print formats. These technologies enhance processes like information discovery, access, circulation, and organization, while also improving the acquisition and cataloguing of materials (Agim and Azolo, 2019). Libraries now serve as strategic providers of information in various formats, supporting academic functions through the timely provision of relevant materials; which demands their being digitally literate to be able to apply the use of digital contents. (Edewor et al., 2016; Adewoyin et al., 2017).

Shannon (2017) defines digital literacy as the ability to locate, evaluate, share, and create content using digital technologies and the internet. A digitally literate person critically assesses and effectively uses credible online sources. The shift in educational practices due to ICT advancements has made digital literacy an essential skill in today's learning environments and librarians are expected to embrace the advances in the discharge of their duties.

The ability of academic librarians to harness digital tools in the 21st century depends heavily on their digital competencies. Unfortunately, studies reveal that many Nigerian librarians lack these vital digital skills (Atkinson., 2019; Agim and Azolo, 2019). Many are unable to perform basic computer operations, manage emails, navigate the internet, or deliver services using technological tools, which affects their job performance. This gap in skills can be attributed to the lack of digital infrastructure in university libraries. Aina (2019) highlighted key issues facing Nigerian academic libraries, such as the absence of functional e-libraries and adequately trained personnel. The failure to automate many university libraries negatively affects service quality and librarian productivity. observations and past studies (Basahuwa et al., 2020).All these point to declining performance among librarians, often resulting in user dissatisfaction and the tendency of users to seek alternative information sources.

Methodology

The research design for this study was correlational research design. Correlational research is a non-experimental design that seeks to explore the relationship between two or more variables by using survey methods to collect data, with the primary objective of determining the extent to which variables are related (Pallant, 2020). The choice for this design is relevant and appropriate because it establishes the relationship between digital contents innovations and librarians' job performance in academic libraries in Delta State Nigeria. The area of study was in Delta State. Delta State is located in the southern region of Nigeria, is a diverse and vibrant state known for its rich cultural heritage, natural resources, and educational institutions.

The population of this study consists of 137 librarians in all academic libraries in Delta State, Nigeria. The sample size for this study was 137 academic librarians, which is the entire population of librarians from the academic libraries in Delta State, Nigeria. This decision was made based on the manageable size of the population. The data was analyzed using Pearson correlation techniques and ANOVA; the regression analyses were employed to determine the relationship between digital contents and librarians' job performance.

Results and Analysis of Data

Research Question 1: What is the relationship between use of digital contents and librarians' job performance in academic libraries in Delta State?

Table 1

Regression Analysis on Relationship Between Digital Content Use and Librarians' Job Performance

Model	R	R^2	Adjusted R^2	Unstandardized Coefficients (b)	Std. Error	Decision
Constant	.487[a]	.237	.229	52.314	11.876	positive relationship
Digital Content Use				.319		

a. Predictors: (Constant), Digital Contents Innovation Use

The results in Table 1 show a moderate positive relationship between the use of digital content and librarians' job performance. The correlation coefficient (R = 0.487) indicates that increased access to and integration of digital resources enhances job performance. The R^2 value of 0.237 reveals that 23.7% of the variation in performance is attributable to digital content use; with a coefficient of b = 52.314, this shows that for each unit there is increase in the use of digital content, job performance increases by approximately 52.31 units. These results reinforce the contribution of digital content to improved service delivery and productivity in academic libraries.

Hypotheses

Hypothesis 1: There is no significant relationship between use of digital contents and librarians' job performance in academic libraries in Delta State.

Table 2

ANOVA on Significance of Relationship Between Digital Contents Innovation Use and Librarians' Job Performance

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	1034.281	1	1034.281	7.048	.009[b]
Residual	14523.764	99	146.697		
Total	15558.045	100			

a. Dependent Variable: Job Performance

b. Predictors: (Constant), Digital Contents Innovation Use

The results in Table 2 reveals a significant relationship between the use of digital contents innovation and librarians' job performance (F = 7.048, p = .009). As the p-value is less than 0.05, the null hypothesis is rejected. This shows that digital content plays a critical role in enhancing librarians' service delivery, confidence, and efficiency. Therefore, there is a significant relationship between use of digital contents innovation and librarians' job performance in academic libraries in Delta State.

Discussion of the Findings

The findings of the study are discussed as follow:

Digital Content and Librarians' Job Performance

This study revealed a significant relationship between the use of digital content and librarians' job performance. Librarians who made extensive use of e-resources, such as electronic books, online journals, and multimedia learning tools, were more efficient and effective in their daily responsibilities. A probable reason for this relationship is that digital content enables faster and more comprehensive access to information, thereby improving the quality of reference services, research support, and information literacy instruction. Additionally, digital content supports creativity and innovation in service delivery, helping librarians better meet the needs of their institutions and users.

This finding is consistent with Aliyu and Mohammed (2018), who found that digital content availability significantly improved information service delivery among academic librarians in Northern Nigeria. Similarly, Etim and Udoh (2021) reported that librarians who regularly used digital resources demonstrated higher levels of competence and responsiveness to academic community needs. Akporhonor and Onoriode (2022) also showed that the availability of digital resources improved librarians' creativity and facilitated innovative methods in delivering library services. Balogun and Ogunmodede (2024) further emphasized that digital repository integration positively influenced collection development and research support roles among academic librarians in Nigerian federal universities.

Conclusion

Based on the findings, the study concludes that digital contents innovation play pivotal role in enhancing librarians' job performance in academic libraries in Delta State. The study showed a significant and positive relationship with performance outcomes. Digital contents innovations were found to support continuous professional development and boost librarians' ability to deliver user-centered services. The use of digital contents improved research support, reference services, and general responsiveness to user needs. It enhanced the organization, classification, and retrieval of library resources, thereby strengthening cataloging efficiency and digital access. In essence, the study concludes that librarians' job performance is significantly influenced by their engagement with digital content.

Recommendations

Based on the findings and conclusion reached, the study recommended the following:

1. Library Management should implement the use of digital contents as efficient innovation because they contribute to quality service that translates to efficient job performance.

2. Library Management should implement the use of digital contents because they enable innovative collaboration, adaptability, and efficiency.

3. They should expand access to digital contents in order to help librarians to improve their library service delivery.

4. Universities and library boards should invest in broadening access to high-quality digital resources. Subscription to e-journals, e-books, and multimedia learning tools should be prioritized to support effective research and information service delivery. Moreover, workshops and certification programs should be organized regularly to improve librarians' competencies in digital contents and database navigation.

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DIGITAL LITERACY AND INFORMATION AND COMMUNICATION TECHNOLOGY PROFICIENCY FOR ELECTRONIC INFORMATION RESOURCE UTILIZATION AMONG LECTURERS AT KWARA STATE POLYTECHNIC, ILORIN

By

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Abstract

The growing adoption of electronic information resources in higher education has increased the need for lecturers to possess adequate digital literacy and Information and Communication Technology (ICT) proficiency to effectively access and utilize these resources. This study examined digital literacy and ICT proficiency on the utilization of electronic information resources among lecturers at Kwara State Polytechnic, Ilorin. A descriptive survey research design was employed for the study. The study population comprised lecturers of the Polytechnic, while a purposive sampling technique was used to select the Institute of Information and Communication Technology from the six institutes in the polytechnic because of its relevance to the study objectives. The institute had a total of 53 lecturers, all of whom constituted the study sample. Data were collected using a structured questionnaire. Of the 53 questionnaires administered, 41 were duly completed and returned, yielding a response rate of 77.4%. The collected data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores. The findings revealed that the lecturers possessed a moderate level of digital literacy and ICT proficiency. They demonstrated greater competence in basic digital skills and routine ICT operations than in advanced competencies such as searching academic databases, creating digital content, utilizing cloud computing technologies, and applying specialized digital research tools. The study also found that the overall utilization of electronic information resources was moderate. E-journals, e-books, and digital repositories were the most frequently used resources, whereas subscription-based academic databases recorded comparatively lower levels of utilization. Furthermore, the study identified several challenges affecting effective utilization of electronic resources, including inadequate awareness of available electronic resources, limited access to subscription databases, insufficient ICT training, and difficulties in navigating electronic resource interfaces. The study concluded that digital literacy and ICT proficiency are pivotal to lecturers' effective utilization of electronic information resources. It recommended regular digital literacy and ICT capacity-building programmes for lecturers, increased awareness and user education on available electronic resources, improved institutional access to subscription-based databases, and enhanced technical support to facilitate effective utilization of electronic resources. Implementing these measures will strengthen teaching, research, and academic productivity within Kwara State Polytechnic and similar higher education institutions.

Keywords: Digital literacy, ICT proficiency, electronic information resources, electronic resource utilization, lecturers, Kwara State.

Introduction

The rapid advancement of Information and Communication Technology (ICT) and digital technology has fundamentally transformed the way information is created, accessed, stored, and disseminated across educational institutions worldwide. According to UNESCO (2021), digital technologies serve as essential enablers of knowledge creation, scholarly communication, and institutional efficiency in modern education systems. Similarly, Adebayo and Ibrahim (2016) argue that the integration of ICT tools into academic environments has expanded the range of electronic information resources available to lecturers, thereby enriching teaching and research activities. In contemporary academic environments, electronic resources such as e-journals, online databases, e-books, digital repositories, open educational resources, and academic search platforms have become indispensable tools for scholarly communication and knowledge creation. Ilori, Okoro and Abayomi (2022) affirm that the shift from print to digital information systems has improved the speed, flexibility, and depth with which academic staff retrieve and utilize scholarly materials. Mawere and Sai (2018) stated that electronic resources play a crucial role in enhancing academic productivity by providing access to current information, improving teaching methodologies, and supporting high-quality research. Furthermore, Ukwoma and Echezona (2017) emphasize that the availability of digital databases, institutional repositories, and online scholarly platforms has redefined how lecturers' source, retrieve, and utilize academic information. These resources offer lecturers rapid access to current information, support evidence-based teaching, and enhance research productivity. However, as institutions increasingly shift toward digital and hybrid modes of knowledge delivery, the ability of lecturers to effectively utilize electronic resources has become a key indicator of academic quality and institutional competitiveness.

Central to this digital transformation is the role of digital literacy and ICT proficiency, which is important to how effectively lecturers navigate, evaluate, and utilize digital information systems. Digital literacy extends beyond basic computer skills to include information searching, online communication, critical evaluation, and ethical use of digital content. According to Musa (2025), digital literacy entails not only basic computer operation but also the ability to locate, evaluate, and critically use digital information. Also, Eshet-Alkalai (2018) explains that digital literacy extends beyond basic technical skills to include higher-order cognitive abilities such as information evaluation, ethical use of digital content, and problem-solving in technology-rich environments. ICT proficiency on the hand, refers to the technical skills required to operate digital devices, manage digital files, use productivity software, and interact with online academic platforms. Anyim (2018) stated that ICT competences encompass the knowledge and skills required to navigate and utilize digital tools for academic and professional purposes. Similarly, Agyekum and Brempong (2020) stated that ICT proficiency involves mastery of computer operations, software applications, online platforms, and digital communication tools that support academic work. According to Aina and Akpojotor (2019), lecturers who possess advanced digital literacy and ICT skills are more capable of effectively engaging with electronic databases, digital libraries, and online research platforms to support both teaching and scholarly work. This evidence highlights the critical need to investigate the extent to which digital literacy and ICT competencies shape the utilization of electronic resources in polytechnic settings.

In Nigeria, polytechnics have increasingly adopted electronic information systems as part of national efforts to upgrade the quality of technical and vocational education. Kwara State Polytechnic, Ilorin, provides access to electronic databases and digital library services to support lecturers' instructional and research needs. Despite these investments, observational evidence suggests that the utilization of electronic resources among Kwara State Polytechnic lecturers may be below expected levels, potentially due to gaps in digital literacy, ICT proficiency, awareness, and access conditions such as internet reliability. Previous studies in Nigeria have largely focused on universities, librarians, or students, with limited attention given specifically to lecturers in polytechnics even though they constitute a critical group responsible for knowledge transmission, curriculum development, and research innovation. Considering the pivotal role of lecturers in advancing institutional academic objectives, it is crucial to understand the factors that influence their utilization of electronic resources. This study therefore investigates digital literacy and ICT proficiency as determinants of electronic resources utilization among lecturers in Kwara State Polytechnic, Ilorin. However, by examining the predictive influence of these competencies, the study seeks to provide evidence that can inform digital capacity-building initiatives, institutional ICT policies, and strategies for optimizing electronic resources usage within polytechnic environments.

Research Questions

The following research questions were set out to guide the course of this study:

1. What is the level of digital literacy among lecturers in Kwara State Polytechnic, Ilorin, Nigeria?
2. What is the level of ICT proficiency possessed by lecturers in Kwara State Polytechnic, Ilorin, Nigeria?
3. What is the extent to which lecturers utilize electronic resources in Kwara State Polytechnic, Ilorin, Nigeria? and
4. What are the challenges affecting the utilization of electronic resources by lecturers in Kwara State Polytechnic, Ilorin, Nigeria?

Literature Review

The advancement of information and communication technologies (ICTs) has transformed how information is created, accessed, and utilized in higher institutions of learning. Lecturers are increasingly required to possess digital literacy and ICT proficiency to effectively engage with electronic resources for teaching, research, and professional development. Electronic resources refer to digital information materials that can be accessed electronically, usually via the internet or institutional intranet. These include e-books, online journals, databases, multimedia learning materials, and institutional repositories. Adeniran (2020) defines e-resources as digital sources that provide users with convenient and efficient access to scholarly information without physical boundaries and further stated that utilization of e-resources enhances access to current information and promotes academic productivity. Electronic resources such as e-books, online journals, databases, and institutional repositories have become vital tools for academic productivity and knowledge dissemination. Ogbemudia and Okoduwa (2023) stated that the utilization of electronic resources by lecturers is influenced by several factors, including digital literacy, ICT proficiency, access to reliable internet, awareness of available e-resources, and institutional support. When effectively used, electronic resources enhance lecturers' research productivity, improve instructional delivery, and foster global academic engagement.

Digital literacy is a multifaceted concept that refers to an individual's ability to locate, evaluate, utilize, and create information using digital technologies. According to International Federation of Library Associations and Institutions (IFLA, 2017), digital literacy is the capacity to confidently and critically engage with digital tools and resources for learning, work, and participation in society. Similarly, Gilster (2017) describes digital literacy as the ability to understand and use information in multiple formats from a wide range of digital sources. Digital literacy refers to the ability to effectively find, evaluate, use, and communicate information through digital platforms. However, for lecturers in higher institutions, digital literacy extends beyond the mere ability to operate computers; it includes the capacity to critically assess digital content, manage data effectively, use online platforms for teaching and research, and engage in scholarly communication through digital means. Rahman and Ameen (2023) stated that digital literacy is essential for academic staff to effectively access and utilize electronic resources, enhance pedagogical delivery, and contribute to research productivity. Digital literacy involves competencies such as online searching, data management, and ethical use of digital content. Studies (e.g., Gilster, 2017; Rahman & Ameen, 2023) highlight digital literacy as a prerequisite for efficient use of electronic academic resources. Iyanda, Ajayi and Lawal (2016) emphasized that digital literacy significantly influences the ability of educators to access and use electronic academic materials effectively.

ICT proficiency on the other hand, refers to the ability to effectively apply ICT tools, applications, and systems in performing professional tasks. It includes computer operation, use of productivity software (e.g., MS Office, data analysis tools), internet navigation, and digital communication. According to the International Society for Technology in Education (ISTE, 2016), ICT competence encompasses the skills required to use digital tools purposefully to enhance productivity, communication, collaboration, and problem-solving. Similarly, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018) describes ICT proficiency as the capacity to utilize a range of technological tools such as computers, software applications, online platforms, and digital communication systems to support teaching, learning, and administrative activities. ICT proficiency represents the skill level and confidence in using ICT tools, including computers, databases, and communication platforms, for academic and administrative functions. Oye, Salleh, and Iahad (2021) observed that lecturers with higher ICT proficiency tend to integrate technology more effectively into their teaching and research processes. Further stated that ICT proficiency plays a critical role in shaping lecturers' engagement with digital technologies for teaching, research, and collaboration. Also, Adeleke and Olorunsola (2022) stated that lecturers with high ICT proficiency are more capable of integrating technology into their instructional activities, accessing digital academic content, and managing electronic communication effectively.

However, the extent to which lecturers can utilize these resources depends largely on their digital literacy and ICT competence. In many Nigerian polytechnics, including Kwara State Polytechnic, challenges such as limited ICT infrastructure, inadequate training, and low awareness of available electronic resources continue to impede effective utilization. Aina and Olabode (2022) revealed that limited ICT skills and digital illiteracy often constrain effective utilization in developing countries and disparities in digital competence persisting among lecturers, often resulting in limited engagement with institutional digital resources. Obuh and Bozimo (2021) stated that usage levels among lecturers vary due to factors such as awareness, accessibility, ICT skills, and institutional support and ICT proficiency levels vary widely due to unequal access to training opportunities and infrastructural deficiencies. Furthermore, inadequate ICT proficiency remains a major barrier to the adoption of e-resources in Nigerian tertiary institutions (Adeleke & Olorunsola, 2022). However, despite efforts to digitalize higher education in Nigeria, poor internet connectivity, irregular power supply, and limited access to digital devices continue to impede the effective utilization of electronic resources (Ojedokun & Owolabi, 2016). In the context of Nigerian polytechnics, digital literacy and ICT proficiency has become increasingly crucial due to the growing adoption of e-learning systems and electronic databases. Therefore, this study bridged this gap by empirically investigating the extent to which digital literacy and ICT proficiency influence the utilization of electronic resources among lecturers in Kwara State Polytechnic, Ilorin. The outcome of this study provided insight into how digital competencies shape lecturers' access to, and effective use of electronic resources, and guided institutional policies on capacity building and ICT integration in teaching and research.

Empirical Review

Several empirical studies have examined the relationship between digital literacy, ICT competence, and electronic resource information utilization in tertiary institutions: Aina and Olabode (2022) investigated digital literacy and e-resource utilization among lecturers in colleges of education in South-west, Nigeria. Their findings revealed a significant relationship between digital literacy and the frequency of e-resource use. Lecturers with higher digital literacy demonstrated better access to online databases and journals. Similarly, Ogbemudia and Okoduwa (2023) conducted a study among academic staff in Nigerian polytechnics and found that ICT proficiency had a strong positive correlation with e-resource utilization. They concluded that ICT training significantly enhances lecturers' ability to navigate electronic databases and institutional repositories. In another study, Rahman and Ameen (2023) examined digital literacy and access to scholarly e-resources among lecturers in higher education institutions in Pakistan. Their results showed that digital literacy directly influences both the quality and frequency of electronic resource use. Similarly, Ehioghae and Okojie (2024) reported that lecturers' use of e-resources in Nigerian universities is positively associated with both ICT skills and access to stable internet facilities. Their regression analysis revealed that ICT proficiency explained 52% of the variance in e-resource utilization. A comparative study by Mushtaq and Shahzan (2025) across selected African universities found that digital literacy training and ICT support services significantly improved lecturers' engagement with digital repositories and research databases. On the other hand, Obuh and Bozimo (2021) reported that inadequate ICT facilities, poor internet access, and lack of awareness of available e-resources remain major obstacles to optimal utilization in Nigerian universities. These findings collectively underscore the importance of digital competence in maximizing e-resource use. However, there is a paucity of studies focusing specifically on polytechnic lecturers in Kwara State, despite the increasing emphasis on digital integration in technical and vocational education. This gap justifies the need for the present study, which explored how digital literacy and ICT proficiency influence the use of electronic resources among lecturers in Kwara State Polytechnic, Ilorin.

Methodology

The study adopted a descriptive survey design to collect quantitative data from a representative sample on the identified variables without manipulating them. A purposive sampling technique was employed to select just only Institute of Communication and Information Technology (IICT) from Kwara State Polytechnic. The sample size is all the 53 lecturers in the Institute. Questionnaire was employed as data collection instrument titled *"Digital Literacy, ICT Proficiency, and Electronic Resources Utilization Questionnaire (DLIPERUQ)"* and the validity was ensured through expert review to confirm content and face. Their feedback led to minor revisions for clarity and relevance. The reliability coefficient of the instrument was determined using Cronbach's Alpha, which yielded an overall coefficient of 0.87, indicating high internal consistency and reliability of the scale. Data were collected using a well-structured open-ended questionnaire. The instruments were administered to the respondents during the working hours of working days. Respondents were assured of the confidentiality of their responses and that the data collected would be used solely for academic purposes. The researchers followed up with reminders to ensure a satisfactory response rate. Data collected were analyzed using descriptive statistics such as frequency, percentage and mean scores with the aid of SPSS software. The results were presented in tables for easy interpretation and understanding. The researchers upheld ethical standards by ensuring voluntary participation, and confidentiality of respondents' information.

Data Analyses and Results

Response Rate

Table 1: Response Rate

Administered Questionnaire	Retrieved Questionnaire	Valid	Percentage (%)
53	44	41	77.3

A total of 53 questionnaires were administered to the respondents. Out of these, 44 questionnaires were retrieved, representing a retrieval rate of 83.0%. However, only 41 questionnaires were found usable for analysis after data cleaning and validation, resulting in a valid response rate of 77.3%. This valid response rate is considered adequate for social science research, as rates above 70% are generally regarded as acceptable for generating reliable and representative findings. The high retrieval and validity rates suggest good cooperation from the respondents and support the robustness of the subsequent data analysis.

Level of digital literacy among lecturers in Kwara State Polytechnic, Ilorin.

This section presents the analysis of data relating to the level of digital literacy possessed by lecturers of Kwara State Polytechnic. The purpose is to determine the extent to which lecturers possess the competencies required to effectively access, evaluate, manage, and utilize digital technologies and electronic information resources. Responses obtained from the respondents are summarized in Table 2.

Table 2: Level of digital literacy among lecturers in Kwara State Polytechnic

Digital Literacy	VH		H		L		VL		
	F	%	F	%	F	%	F	%	$\bar{X}$
My ability to search for academic information online is…	18	43.9	9	22.0	10	24.4	4	9.8	3.00
My ability to use search engines effectively (e.g., Google Scholar) is…	16	39.0	11	26.8	10	24.4	4	9.8	2.95
My skill in evaluating the credibility of online information sources is…	16	39.0	9	22.0	9	22.0	7	17.1	2.83
My competence in downloading, saving, and organizing digital documents is…	5	12.2	17	41.5	0	0.0	19	46.3	2.20
My skill in using academic databases and digital libraries is…	3	7.3	19	46.3	0	0.0	19	46.3	2.15
My ability to create digital content (e.g., slides, multimedia materials) is…	2	4.9	17	41.5	3	7.3	19	46.3	2.05

Decision Rule: *If $\bar{X}$ is 1.0 to 1.74 = Very Low (VL); 1.75 to 2.49 = Low (L); 2.50 to 3.24 = Higher (H); 3.25 to 4.0 = Very High (VH).*

The results in table 2 indicate that the respondents possess moderate digital literacy in basic online searching skills, such as searching for academic information and using search engines. However, advanced digital literacy skills, including the use of academic databases, digital document management, and digital content creation, were generally low, as reflected by lower mean scores. The results suggest that while lecturers are familiar with basic digital tasks, there are significant gaps in advanced digital competencies that may hinder effective utilization of electronic resources.

Level of ICT proficiency possessed by lecturers in Kwara State Polytechnic, Ilorin

This section presents the analysis of data on the level of Information and Communication Technology (ICT) proficiency possessed by lecturers in Kwara State Polytechnic, Ilorin. The purpose is to determine the extent to which lecturers possess the knowledge, skills, and competencies required to effectively use ICT tools and applications for teaching, research, communication, and access to electronic information resources. The findings provide an understanding of the lecturers' capability to utilize various ICT facilities in carrying out their academic responsibilities. The responses of the respondents are presented in Table 3.

Table 3: Level of ICT proficiency possessed by lecturers in Kwara State Polytechnic

ICT Proficiency	HP		MP		LP		NP		
	F	%	F	%	F	%	F	%	$\bar{X}$
I can operate a computer efficiently for academic tasks.	8	19.5	20	48.8	7	17.1	6	14.6	2.73
I am proficient in using Microsoft Office applications (Word, Excel, PowerPoint).	4	9.8	23	56.1	8	19.5	6	14.6	2.61
I can use institutional ICT facilities (e.g., digital library systems).	5	12.2	19	46.3	11	26.8	6	14.6	2.56
I am skilled in using internet-based communication tools (e.g., Email, Zoom).	16	39.0	5	12.2	15	36.6	5	12.2	2.51
I can manage electronic files and folders effectively.	6	14.6	14	34.1	15	36.6	6	14.6	2.49
I am able to use cloud storage platforms (e.g., Google Drive, OneDrive).	3	7.3	16	39.0	15	36.6	7	17.1	2.37

Decision Rule: *If $\bar{X}$ is 1.0 to 1.74 = Not Proficiency (NP); 1.75 to 2.49 = Less Proficiency (LP); 2.50 to 3.24 = Moderately Proficiency (MP); 3.25 to 4.0 = Highly Proficiency (HP).*

The results in table 3 show that the respondents demonstrate a moderate level of ICT proficiency, with mean scores ranging from 2.37 to 2.73. Higher proficiency was observed in basic computer operation and the use of Microsoft Office applications, while lower proficiency was evident in cloud storage usage and electronic file management. The findings suggest that although respondents possess foundational ICT skills, their competence in more advanced and emerging ICT tools remains limited.

Extent to which lecturers utilize electronic resources in Kwara State Polytechnic, Ilorin

This section presents the extent to which lecturers in Kwara State Polytechnic, Ilorin utilize electronic information resources for teaching, research, publication, professional development, and other academic activities. The analysis is intended to establish the frequency and level of use of various electronic resources available through the Polytechnic Library and other digital information platforms. The findings will indicate whether the available electronic resources are being effectively utilized by lecturers in support of their academic responsibilities. The responses are summarized in Table 4.

Table 4: Extent to which lecturers utilize electronic resources in Kwara State Polytechnic

Extent of Utilization	A		O		R		N		
	F	%	F	%	F	%	F	%	$\bar{X}$
I use e-journals for teaching and research.	19	46.3	9	22.0	10	24.4	3	7.3	3.07
I consult digital repositories for scholarly information.	17	41.5	8	19.5	14	34.1	2	4.9	2.98
I use e-books for course preparation and research.	17	41.5	8	19.5	14	34.1	2	4.9	2.98
I use electronic resources to update my lecture notes.	18	43.9	7	17.1	12	29.3	4	9.8	2.95
I access online databases provided by the Polytechnic.	3	7.3	11	26.8	23	56.1	4	9.8	2.32
I download and store digital materials for academic use.	2	4.9	12	29.3	23	56.1	4	9.8	2.29

Decision Rule: *If $\bar{X}$ is 1.0 to 1.74 = Never (N); 1.75 to 2.49 = Rarely (R); 2.50 to 3.24 = Often (O); 3.25 to 4.0 = Always (A).*

The results in table 4 indicate a moderate extent of utilization of electronic resources among the respondents. Higher usage was recorded for e-journals, e-books, digital repositories, and the use of e-resources for updating lecture notes. However, low utilization was observed in accessing institutional online databases and in downloading and storing digital materials. The results suggest that while the respondents make use of readily accessible electronic resources, the utilization of subscription-based and institution-provided digital resources remains limited.

Challenges affecting the utilization of electronic resources by lecturers in Kwara State Polytechnic, Ilorin

This section presents the analysis of the challenges affecting the utilization of electronic resources by lecturers in Kwara State Polytechnic, Ilorin. The objective is to identify the major factors that hinder lecturers from effectively accessing and utilizing electronic information resources for teaching, research, and other scholarly activities. Understanding these constraints will provide insights into areas requiring institutional intervention to improve the accessibility and effective use of electronic resources. The responses obtained from the respondents are presented in Table 5.

Table 5: Challenges affecting the utilization of electronic resources by lecturers in Kwara State Polytechnic

Challenges	SA		A		D		SD		
	F	%	F	%	F	%	F	%	M
Lack of awareness of available electronic resources affects my usage.	8	19.5	20	48.8	7	17.1	6	14.6	2.73
Limited access to subscription databases is a major challenge.	7	17.1	21	51.2	8	19.5	5	12.2	2.73
The user interface of some e-resources is difficult to navigate.	5	12.2	22	53.7	7	17.1	7	17.1	2.61
I experience difficulty in retrieving relevant information from databases.	5	12.2	18	43.9	10	24.4	8	19.5	2.49
Inadequate ICT facilities hinder my use of e-resources.	6	14.6	7	17.1	15	36.6	13	31.7	2.15
I lack adequate training on how to use electronic resources effectively.	5	12.2	7	17.1	14	34.1	15	36.6	2.05

Decision Rule: *If $\bar{X}$ is 1.0 to 1.74 = Strongly Disagree (SD); 1.75 to 2.49 = Disagree (D); 2.50 to 3.24 = Agree (A); 3.25 to 4.0 = Strongly Agree (SA).*

The results in table 5 indicate that lack of awareness of available electronic resources and limited access to subscription databases are the most prominent challenges affecting respondents' utilization of electronic resources, as reflected by the highest mean scores (M = 2.73). Difficulties related to navigating e-resource interfaces and retrieving relevant information were also reported at a moderate level. In contrast, inadequate ICT facilities and lack of adequate training recorded lower mean scores, suggesting that although they pose challenges, they are perceived as less severe by the respondents. The findings show that awareness and access-related issues constitute the major barriers to effective electronic resource utilization among the respondents.

Discussion of Findings

The findings of this study reveal important insights into the digital literacy skills, ICT proficiency, extent of electronic resource utilization, and challenges affecting lecturers in Kwara State Polytechnic, Ilorin in utilization of electronic resources. The results indicate that lecturers possess a moderate level of digital literacy, particularly in basic skills such

as searching for academic information online and using search engines like Google Scholar. This suggests that most lecturers are familiar with general online information retrieval practices. This finding is consistent with the studies of Aina and Akpojotor (2019) and Ilori, Okoro and Abayomi (2022), they reported that academic staff in Nigerian tertiary institutions generally demonstrate adequate competence in basic digital and online searching skills. However, the study also revealed low proficiency in advanced digital literacy skills, including the use of academic databases, digital document management, and digital content creation. Ukwoma and Echezona (2017) found that lecturers were more comfortable with the use of general search engines and open-access platforms than with specialized academic databases. The implication is that limited advanced digital skills may restrict lecturers' ability to maximize the scholarly benefits of electronic resources.

In terms of ICT proficiency, the findings show that lecturers demonstrate a moderate level of competence in basic ICT operations such as computer usage and Microsoft Office applications. However, lower mean scores were recorded for cloud storage usage and electronic file management, indicating gaps in emerging ICT skills. This is in line with the findings of Agyekum and Brempong (2020) and Olayemi and Ojo (2023), who reported that lecturers in Nigerian tertiary institutions are generally proficient in traditional ICT applications but exhibit limited competence in advanced and cloud-based technologies. Similarly, Umar, Shuaibu, and Aliyu (2024) observed that while academic staff possess foundational ICT skills, deficiencies in emerging digital tools continue to constrain effective engagement with electronic information resources. Such gaps may affect lecturers' efficiency in managing digital academic materials and collaborating effectively in digital environments.

The study further reveals a moderate extent of electronic resource utilization among lecturers. While respondents reported relatively high usage of e-journals, e-books, and digital repositories, utilization of institution-provided online databases and systematic downloading and storage of digital materials was low. This aligns with the findings of Okiki and Asiru (2011) and Ukwoma and Echezona (2017), who observed that academic staff in Nigerian tertiary institutions tend to rely more on freely accessible electronic resources than on subscription-based databases provided by their institutions. Similarly, Tella, Orim, Ibrahim and Memudu (2018) reported that limited awareness, inadequate search skills, and interface complexity often discourage lecturers from fully utilizing licensed electronic databases, despite their availability. This pattern suggests a preference for easily accessible and familiar resources over subscription-based databases that often require specialized search skills.

Regarding challenges, the study identified lack of awareness of available electronic resources and limited access to subscription databases as the most significant barriers to effective utilization. Difficulties in navigating e-resource interfaces and retrieving relevant information were also reported at a moderate level. Interestingly, inadequate ICT facilities and lack of training were perceived as less severe challenges, suggesting that infrastructure may exist but is not being optimally leveraged. These findings are consistent with the findings Ani (2013) and Tella, Orim, Ibrahim and Memudu (2018), they reported that awareness and access-related issues, rather than mere availability of ICT infrastructure, are the primary constraints to effective use of electronic information resources in Nigerian tertiary institutions. Similarly, Owate (2024) highlighted that limited knowledge of available e-resources and subscription databases remains a key barrier to lecturers' optimal engagement with digital scholarly tools.

Conclusion

This study revealed that lecturers possess a moderate level of digital literacy and ICT proficiency, particularly in basic online searching and routine computer operations. Also, the study also identified significant deficiencies in advanced digital skills, including the use of academic databases, digital content creation, cloud storage, and effective digital document management. The extent of electronic resource utilization among lecturers was found to be moderate, with greater reliance on easily accessible resources such as e-journals, e-books, and digital repositories, while institution-provided subscription databases were relatively underutilized. This pattern suggests that familiarity, awareness, and skill level play critical roles in shaping usage behaviour. Furthermore, the study identified lack of awareness of available electronic resources and limited access to subscription databases as the major challenges hindering optimal utilization, alongside difficulties in navigating resource interfaces. However, the study concludes that while the Polytechnic has made efforts to provide electronic resources, lecturers' digital literacy and ICT proficiency significantly influence the extent to which these resources are effectively utilized. Without targeted interventions to strengthen advanced digital competencies and improve awareness and access, the potential benefits of electronic resources for teaching, research, and professional development may not be fully realized.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed:

1. The Polytechnic management should organize continuous training workshops and seminars aimed at improving lecturers' advanced digital literacy and ICT skills, particularly in academic database searching, digital content creation, cloud computing, and electronic resource management.
2. The Polytechnic library should intensify awareness programmes through orientations, email alerts, and departmental briefings to inform lecturers about available electronic resources and how to access them.

3. Efforts should be made to expand and sustain access to relevant subscription-based databases, while ensuring that access procedures are simplified to encourage greater usage among lecturers.
4. Dedicated ICT and library support units should be strengthened to provide on-demand assistance, user guides, and step-by-step tutorials to help lecturers navigate electronic resources more effectively.
5. Digital literacy and ICT proficiency should be formally integrated into staff development and appraisal policies to encourage continuous skill acquisition and professional growth.

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Digital Literacy and Research Skills Influencing Library Resource Use by Postgraduates at the National Open University of Nigeria

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Abstract

This study investigated the influence of digital literacy and research skills on the utilisation of library resources among postgraduate students of the National Open University of Nigeria (NOUN). The study was motivated by concerns over the underutilisation of library resources despite their importance in supporting academic research, learning, and knowledge development. Two research questions guided the study: the types of library resources utilised by postgraduate students and the influence of digital literacy and research skills on library resource utilisation. A descriptive survey research design was adopted. The population comprised 7,460 postgraduate students enrolled in NOUN during the 2023/2024 academic session. Using the Krejcie and Morgan sample size determination table, a sample of 361 respondents was selected through stratified random sampling. Data were collected using a self-structured questionnaire validated by experts in Library and Information Science and Educational Measurement and Evaluation. The instrument yielded a Cronbach's Alpha reliability coefficient of 0.845. Data were analysed using descriptive statistics, including frequencies, percentages, means, and standard deviations. The findings revealed that textbooks (87.3%), journals (79.7%), online databases (73.7%), e-books (72.0%), and e-journals (53.4%) were the most frequently utilised library resources. In contrast, specialised resources such as bibliographies, encyclopaedias, reports, maps, atlases, and online catalogues were less frequently used. The study further established that digital literacy and research skills significantly influenced library resource utilisation, as respondents demonstrated competence in searching databases, evaluating information sources, accessing online resources, and using citation management tools. The study concluded that strengthening digital literacy and research competencies is essential for enhancing effective library resource utilisation. It recommended continuous information literacy training, improved digital infrastructure, and increased awareness of underutilised library resources to support postgraduate learning and research productivity.

Keywords: Digital Literacy, Research Skills, Library Resource, Postgraduates, National Open University of Nigeria.

Introduction

Digital literacy and research skills are essential competencies in today's information-driven society, especially within the context of modern libraries. Digital literacy refers to the ability to effectively locate, assess, utilise, and communicate information through digital technologies and online resources. In contrast, research skills encompass techniques for finding, analysing, and synthesising information to support academic, professional, or personal goals. According to Dongkai et al. (2025), as libraries transition from traditional collections to digital platforms, users equipped with strong digital literacy and research skills can more efficiently navigate electronic catalogues, databases, and online journals. These individuals are better able to identify credible sources, employ advanced search techniques, and utilise digital tools for research, thereby maximising the benefits of library services. Such skills not only enable users to critically evaluate digital sources reducing misinformation and building reliable foundations but also foster lifelong learning, independence, and confidence in managing complex information challenges.

Libraries whether at primary, secondary, or tertiary levels are vital educational resources that serve the diverse needs of communities. The term "library" derives from the Greek word "liber," meaning "book," and refers to a carefully curated collection of materials organised for reading, studying, consultation, and research. In higher education, academic libraries act as centres of learning, supporting students and faculty by providing access to scholarly literature that is often not freely available online. The effective use of library resources depends not only on access but also on the skills to actively engage with a variety of information sources. Librarians play an essential role in collecting, organising, and preserving recorded knowledge, ensuring users can easily access materials to support their academic activities. The 'Use and Gratification' theory highlights the psychological motivations behind engaging with library resources, emphasising

the importance of understanding why and how individuals utilise these sources to meet their informational needs (Mensonides et al., 2024).

Fostering digital literacy and research skills is essential for maximizing the effective use of library resources. These skills not only support academic success and professional development but also empower individuals to participate actively and responsibly in the digital society. As libraries continue to evolve in response to rapid technological advancements, the integration of digital literacy into library services ensures that users can fully avail themselves of available resources. This integration allows for the enhancement of learning and research capabilities, enabling users to contribute meaningfully to the generation of new knowledge (Ji. et al., 2024).

Cultivating digital literacy promotes informed and ethical engagement with digital resources. It empowers individuals to critically evaluate information, make informed decisions, and participate in the digital economy. Furthermore, digital literacy supports the responsible use of technology, reducing the risk of cyberbullying, online harassment, and other forms of digital exploitation. Libraries that prioritise digital literacy and research skills are well-positioned to meet the evolving needs of their communities. By providing access to digital resources, training in digital literacy, and support for research and learning, libraries can foster a culture of lifelong learning and digital engagement. As technology continues to advance, libraries will remain essential hubs for education, innovation, and community development.

Statement of the Problem

Libraries constitute the heart and soul of any academic institution, playing a vital role in shaping knowledge, fostering research, and supporting learning within a diverse community. They house a wealth of information resources, meticulously organised by dedicated professionals known as librarians. In universities, academic libraries serve as centres of activity for both students and staff, offering a range of services aimed at maximising the utilisation of library resources, which are essential for various academic pursuits such as research, teaching, learning, community engagement, and lifelong education. The quality of education at a university is often reflected in how frequently students utilise both print and digital library resources, thereby enhancing their knowledge and learning experience. These resources are designed to assist users in broadening their understanding through reading, completing assignments, and conducting research on a wide range of topics.

Currently, the University Library faces a significant challenge in adapting to the demands of the 21st century, particularly considering increasing demographic changes that have resulted in the underutilisation of its resources (Suliman, et al., 2024). Despite the numerous benefits offered by the library, postgraduate students at the National Open University appear to neglect these resources when aiming to improve their academic success. The researcher has observed that these students rarely visit the library, with weekly statistics reflecting this trend. A possible explanation for this low level of engagement may be a lack of information literacy skills, which encompass defining research tasks, developing effective information-seeking strategies, locating and accessing relevant information, as well as synthesising and evaluating resources. This underscores the urgent need to explore how enhancing information literacy skills among postgraduate students could improve their utilisation of library resources. Consequently, this research aims to investigate postgraduates' digital competence and research abilities affecting library resource application at the National Open University of Nigeria.

Research Questions

1. What are the types of library resources used by postgraduate students in the National Open University of Nigeria?
2. How does the level of postgraduates' digital competence and research abilities influence their utilisation of library resources at the National Open University of Nigeria?

Review of Literature

Types of Library Resources Used by Postgraduate Students

Library resources constitute the information materials and services made available to users to support teaching, learning, and research activities. Modern academic libraries provide both print and electronic resources, including textbooks, reference materials, journals, theses and dissertations, databases, institutional repositories, audiovisual materials, and internet-based resources. According to Suleiman, et al (2024), academic libraries have expanded beyond traditional collections to include digital resources that can be accessed remotely through library portals and electronic databases.

Postgraduate students depend heavily on various library resources because of the advanced nature of their academic and research work. Studies indicate that scholarly journals, electronic databases, theses, dissertations, and reference materials are among the most frequently used resources by postgraduate students. Dongkai, et al (2025) observed that electronic journals and online databases have become the preferred sources of information among postgraduate students due to their accessibility and currency of information. Similarly, Sunny and Ramasamy (2025) found that postgraduate students in Nigerian universities frequently utilize electronic databases such as EBSCOhost, JSTOR, ScienceDirect, and institutional repositories to obtain scholarly information for research projects and dissertations. The study further revealed that while printed books remain relevant, electronic resources are increasingly becoming the dominant source of academic information.

The emergence of digital libraries has significantly transformed information access patterns among postgraduate students. According to Dongkai et al. (2025), digital platforms enable users to access information resources irrespective of geographical location, thereby improving convenience and flexibility. This is particularly relevant for distance-learning institutions such as the National Open University of Nigeria (NOUN), where students rely heavily on online access to information resources.

Despite the availability of diverse library resources, several studies report varying levels of utilization. Suleiman et al. (2024) noted that many postgraduate students underutilize available library resources due to inadequate awareness, poor information-searching skills, and limited digital competence. This suggests that availability alone does not guarantee effective utilization of library resources.

Therefore, understanding the specific types of library resources used by postgraduate students is necessary for evaluating resource effectiveness and identifying areas requiring improvement in library service delivery.

Influence of Digital Competence and Research Abilities on Utilisation of Library Resources

Digital competence refers to the knowledge, skills, attitudes, and abilities required to effectively use digital technologies for information retrieval, communication, learning, and problem-solving. Research abilities encompass competencies associated with identifying information needs, locating relevant sources, evaluating information, analyzing data, and synthesizing findings for academic purposes.

The rapid digitization of academic information resources has increased the importance of digital competence among library users. According to Ji et al. (2024), digital competence enables students to navigate electronic databases, online catalogues, institutional repositories, and digital libraries efficiently. Students possessing higher levels of digital competence are more likely to utilize library resources effectively than those with limited technological skills. Research abilities also play a significant role in determining library resource utilization. The information literacy framework proposed by Association of College and Research Libraries emphasizes that users must be able to recognize information needs, develop search strategies, evaluate information sources, and ethically use information. These competencies directly influence the effectiveness with which students engage with library resources.

Several empirical studies have established a positive relationship between digital competence and library use. Mensonides et al. (2024), drawing on the Uses and Gratifications Theory, argued that users are more likely to engage with library resources when they possess the necessary skills to satisfy their information needs. The study found that digital literacy significantly predicts the frequency and effectiveness of library resource utilization among university students. Similarly, Suleiman et al. (2024) reported that postgraduate students with stronger digital skills demonstrated higher levels of electronic resource usage than students with limited digital competencies. The study attributed this difference to the ability of digitally competent students to conduct advanced searches, evaluate information quality, and access resources through multiple digital platforms. Research conducted by Dongkai et al. (2025) further revealed that students who possess advanced research skills are better positioned to identify credible information sources, formulate effective search strategies, and synthesize information from diverse resources. Such competencies contribute significantly to increased utilization of library resources and improved research outcomes.

In the context of open and distance learning institutions, digital competence and research abilities become even more critical because students rely primarily on online information resources rather than physical library collections. Therefore, improving these competencies among postgraduate students may enhance their access to and utilization of library resources, ultimately contributing to academic success and research productivity.

Empirical Gap

Although several studies have examined digital literacy, information literacy, and library resource utilization among university students, significant gaps remain in the existing literature. Most previous studies have focused on conventional universities where students have regular physical access to library facilities. Limited empirical attention has been given to open and distance learning institutions such as the National Open University of Nigeria, where learning and information access are predominantly technology-driven.

Furthermore, many studies have investigated digital literacy and library use independently without examining the combined influence of digital competence and research abilities on library resource utilization among postgraduate students. Existing studies have also concentrated largely on undergraduate populations, leaving postgraduate students relatively underrepresented despite their greater research demands.

In addition, while previous research has documented the availability and utilization of electronic resources, there is insufficient evidence regarding the specific types of library resources most frequently used by postgraduate students in NOUN and how variations in digital competence and research abilities influence such utilization. Consequently, this study seeks to fill this gap by investigating the types of library resources used by postgraduate students and examining the extent to which their digital competence and research abilities influence the utilization of library resources at the National Open University of Nigeria.

Methodology

Research Design

This study adopted a descriptive survey research design. The choice of this design was informed by the nature and objectives of the study, which sought to examine the influence of digital literacy and research skills on the utilisation of library resources among postgraduate students of the National Open University of Nigeria (NOUN). Descriptive survey design is appropriate because it enables the researcher to obtain data directly from a large population and describe existing conditions, behaviours, perceptions, and relationships without manipulating any variables. The design facilitates the collection of quantitative data from respondents across diverse locations, making it particularly suitable for NOUN's distance learning environment where students are geographically dispersed. Furthermore, it allows for the generation of findings that can be generalised to the wider postgraduate student population.

Population of the Study

The population of this study comprised all postgraduate students enrolled in the National Open University of Nigeria (NOUN) during the 2025/2026 academic session. According to institutional records, the postgraduate student population stood at 7,460 students. This population included students enrolled in postgraduate diploma, master's, and doctoral programmes across the various faculties and study centres of the university. The focus on postgraduate students was based on the assumption that they engage extensively in scholarly activities and therefore constitute an appropriate population for investigating the influence of digital literacy and research skills on library resource utilisation.

Sample Size

The sample size for the study was determined using the Krejcie and Morgan (1970) sample size determination table. Based on a target population of 7,460 postgraduate students, a minimum sample size of 361 respondents was considered adequate to achieve a 95% confidence level and a 5% margin of error. The selected sample size was therefore deemed representative of the study population and sufficient for statistical analysis and generalisation of findings.

Sampling Technique

The study employed a stratified random sampling technique to ensure adequate representation of the different categories of postgraduate students within the university. The population was first stratified according to the major postgraduate programme categories, namely Postgraduate Diploma (PGD), Master's, and Doctoral (PhD) programmes. Thereafter, the sample size of 361 respondents was proportionally allocated to each stratum based on the relative size of each subgroup within the total population. Within each stratum, respondents were selected through simple random sampling. This procedure enhanced the representativeness of the sample and minimised sampling bias by ensuring that all categories of postgraduate students had an equal opportunity to participate in the study.

Procedure for Data Collection

Data for the study were collected using a self-structured questionnaire developed by the researcher based on the objectives of the study and relevant literature. The questionnaire consisted of sections covering respondents' demographic characteristics, digital literacy competencies, research skills, and the extent of library resource utilisation. Prior to the main study, the instrument was subjected to expert review to establish its face and content validity. After obtaining the necessary institutional approvals, the questionnaire was administered to the selected respondents through appropriate channels accessible to postgraduate students of NOUN. Participants were informed of the purpose of the study, and their voluntary participation and confidentiality were assured.

Validity and Reliability of the Instrument

To ensure the validity of the instrument, the questionnaire was reviewed by experts in Library and Information Science and educational measurement and evaluation. Their observations and recommendations guided the revision of the instrument to ensure that the items adequately measured the constructs under investigation.

The reliability of the instrument was established through a pilot study conducted among postgraduate students who were not part of the main study population. The responses obtained were analysed using Cronbach's Alpha reliability coefficient, which yielded an overall reliability index of 0.845. This coefficient exceeded the acceptable threshold of 0.70, indicating that the instrument possessed satisfactory internal consistency and was reliable for data collection.

Method of Data Analysis

Data collected from the respondents were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were employed to summarise respondents' characteristics and describe the study variables. The choice of these statistical tools was based on their suitability for describing patterns and trends in survey data and addressing the research objectives of the study.

Table 1: Research Objective One: Types of library resources used by postgraduate students in the National Open University of Nigeria

Library Resources	Freq.	Percentage %
Textbooks	65	87.3
Journals	48	79.7
Online databases	41	73.7
e-book	48	72.0
e-journals	37	53.4
Dictionaries	30	38.1
Magazines	23	48.3
Bibliographies	19	27.1
Encyclopedias	16	26.3
Reports	12	20.3
Online Catalogue	16	24.6
Maps	4	5.9
Atlases	3	4.1

The table indicates that postgraduate students at the National Open University of Nigeria predominantly utilise core academic resources such as textbooks, journals, and online databases. Textbooks are the most frequently used resource, with an impressive 87.3% of students relying on them, emphasising their importance as primary learning materials. Journals also feature prominently, with nearly 80% of students engaging with them, highlighting the significance of current research and scholarly articles in their academic pursuits. Furthermore, a substantial proportion of students utilise online databases (73.7%) and e-books (72.0%), reflecting a strong preference for digital and readily accessible resources that support their research activities.

Beyond these core resources, students also make moderate use of e-journals, dictionaries, and magazines. Over half of the students (53.4%) access e-journals, indicating a reliance on electronic scholarly materials, although marginally less than traditional journals. Dictionaries are employed by approximately 38% of students, suggesting they serve as important reference tools for language, terminology, or clarification purposes. Magazines, which may cater to current affairs or more general interests, are utilised by nearly half of the students (48.3%), indicating some engagement with less formal or more contemporary content.

Conversely, the utilisation of less common resources such as bibliographies, encyclopaedias, reports, online catalogues, maps, and atlases is comparatively low. Bibliographies and encyclopaedias are used by about a quarter of the students, which suggests their relevance might be limited to specific research contexts. Similarly, maps and atlases are amongst the least used resources, with fewer than 6% of students relying on them, indicating their limited role in postgraduate research at this university. The data demonstrates that postgraduate students predominantly engage with scholarly, digital, and print materials directly related to academic research, while resources such as maps and atlases are only marginally relevant within this academic environment.

Table 2: Level of postgraduates' digital competence and research abilities influence their utilisation of library resources at the National Open University of Nigeria

S/N	Items	SA	A	D	SD	$\bar{X}$	Std.	Remark
	N (361)	4	3	2	1			
1.	My digital skills enable me to effectively search online databases and journals.	172(51.5)	120(35.9)	25(7.5)	17(5.1)	3.34	0.825	SA
2.	I am confident in my ability to critically evaluate online sources for academic purposes.	187(56.0)	114(34.1)	24(7.2)	9(2.7)	3.43	0.743	SA
3.	My research skills enable me to efficiently use library resources to achieve my academic goals.	166(49.7)	116(34.7)	25(7.5)	27(8.1)	3.26	0.911	SA

4.	I am familiar with the library's online resources and can access them easily.	164(49.1)	119(35.6)	22(6.6)	29(8.7)	3.25	0.918	SA
5.	My digital literacy skills help me to effectively use citation management tools.	165 (45.7%)	120 (33.2 %)	25 (6.9%)	10 (2.8%)	3.5	0.8	
6.	I believe that my research skills are sufficient to utilise library resources effectively.	170 (50%)	115 (28.2%)	25 (6.9%)	!0 (2.8%)	3.5	0.8	

The data indicates that postgraduate students at the National Open University of Nigeria generally perceive their digital skills as a crucial factor in effectively utilising library resources. A significant majority, 87.4%, agree that their digital competence enables them to efficiently search online databases and journals, with a mean score of 3.34. This reflects a high level of confidence in navigating digital tools for academic research. Similarly, 90.1% of respondents feel confident in their ability to critically evaluate online sources, supported by a mean of 3.43, highlighting strong digital literacy in assessing the quality and relevance of information.

Furthermore, the students' research skills are perceived to play an important role in their academic activities. About 84.4% agree that their research abilities help them to utilise library resources more effectively, with a mean score of 3.26. This suggests that research proficiency significantly enhances their capacity to access and use academic materials. In addition, nearly 85.2% of students are comfortable accessing online library resources, with a mean score of 3.25, indicating a good level of familiarity and ease in navigating digital library platforms.

The table also shows that digital literacy extends to managing references, with 79.1% of respondents agreeing that their skills assist them in using citation management tools effectively, supported by a mean of 3.5. Lastly, half of the students believe that their research skills are sufficient for effective resource utilisation, which is also reflected in a mean score of 3.5. The data suggests that students perceive their digital competence and research abilities as vital enablers for making effective use of library resources, which likely contributes positively to their academic success.

Discussion of Findings

The findings relating to the types of library resources utilised by postgraduate students in the National Open University of Nigeria revealed that textbooks, journals, online databases, and e-books constitute the most frequently used information resources. The predominance of textbooks (87.3%) suggests that postgraduate students continue to depend heavily on foundational and prescribed learning materials to support coursework and independent study. The high utilisation of journals (79.7%) further indicates that students recognise the importance of current scholarly literature in advancing their academic and research activities. Similarly, the substantial use of online databases (73.7%), e-books (72.0%), and e-journals (53.4%) reflects the increasing acceptance of digital resources among postgraduate students within the open and distance learning environment.

The extensive use of electronic information resources may be attributed to the flexible learning structure of NOUN, which requires students to access information remotely and independently. The findings imply that postgraduate students are adapting to the digital information landscape by integrating both print and electronic resources into their learning processes. However, the relatively low utilisation of resources such as bibliographies, encyclopaedias, reports, online catalogues, maps, and atlases suggests that these materials are either less relevant to the academic demands of the respondents or that students may lack adequate awareness and skills required to exploit these specialised resources effectively.

These findings corroborate previous studies which reported that postgraduate students tend to prioritise scholarly and electronically accessible resources that directly support research and academic tasks. Studies on information-seeking behaviour among postgraduate students have consistently shown a preference for journals, textbooks, and online databases because of their perceived usefulness, accessibility, and relevance to postgraduate research. The findings therefore suggest that university libraries should continue to strengthen access to both print and electronic scholarly resources while promoting awareness of underutilised information sources that may enrich research outcomes.

Furthermore, the findings revealed that postgraduate students perceive their digital competence and research abilities as important determinants of effective library resource utilisation. Most respondents agreed that their digital skills enable them to search online databases and journals efficiently (87.4%) and critically evaluate online information sources for academic purposes (90.1%). This demonstrates that digital literacy competencies, particularly information searching and evaluation skills, play a significant role in enabling students to navigate the increasingly digital academic information environment.

The findings also showed that respondents believed their research skills enhanced their ability to utilise library resources effectively (84.4%), while a large proportion indicated familiarity with accessing online library resources (85.2%). This

suggests that students who possess stronger research competencies are more capable of identifying relevant information needs, selecting appropriate resources, and using available library services to achieve their academic objectives. The ability to use citation management tools effectively and confidence in one's research abilities further reinforce the notion that digital literacy and research competence complement each other in facilitating successful information use.

The findings align with the propositions of the Information Literacy framework and previous empirical studies which emphasise that the ability to locate, evaluate, organise, and ethically use information significantly influences academic information behaviour. They are also consistent with studies that identified digital literacy as a predictor of effective utilisation of electronic information resources among postgraduate students. Students who possess adequate digital and research competencies are more likely to maximise the benefits of available library resources, thereby enhancing the quality of their academic work and research productivity.

The findings demonstrate that while postgraduate students at the National Open University of Nigeria actively utilise core scholarly resources and exhibit positive perceptions of their digital and research competencies, there remains a need for continuous user education programmes. Such initiatives should focus on strengthening advanced information literacy skills and promoting the use of specialised library resources that are currently underutilised. Enhancing these competencies would not only improve library resource utilisation but also contribute to the development of independent, information-literate researchers capable of thriving in contemporary knowledge environments.

Summary of Findings

According to Sunny (2025), postgraduate students predominantly relied on core academic resources such as textbooks, journals, and online databases, reflecting a preference for materials that support rigorous academic research. Yu (2025) highlighted that digital competence and research skills significantly influenced students' ability to effectively utilise library resources, with most students expressing high confidence in their digital literacy and critical evaluation abilities. Xia (2025) further noted that digital skills and research proficiency were perceived as vital enablers of academic success, suggesting that enhancing these competencies could lead to better resource utilisation and research outcomes among postgraduate learners. Additionally, Wu et al. (2025) emphasised that students' engagement with digital resources was closely linked to their overall academic performance, while Marmoah (2025) underscored the importance of institutional support in developing students' digital literacy and research skills to optimise resource use.

Conclusion

This study concluded that postgraduate students at the National Open University of Nigeria primarily utilise scholarly resources such as textbooks, journals, online databases, e-books, and e-journals to support their academic and research activities. The preference for these resources reflects their relevance and accessibility within the open and distance learning environment. In contrast, specialised resources, including bibliographies, encyclopaedias, reports, online catalogues, maps, and atlases, remain underutilised, possibly due to limited awareness, inadequate skills, or perceived irrelevance. The study further established that digital literacy and research skills significantly influence effective library resource utilisation. Students demonstrated confidence in searching databases, evaluating online information, accessing electronic resources, and using citation management tools, while also acknowledging the importance of research competencies in information retrieval and use. The findings suggest that effective utilisation of library resources depends not only on resource availability but also on strengthening users' digital and research competencies to enhance academic performance and research productivity.

Recommendations

1. The National Open University of Nigeria Library should maintain and enhance access to key scholarly resources such as textbooks, journals, databases, e-books, and e-journals while promoting greater use of underutilized resources through library orientation programmes, digital guides, and awareness campaigns. This will improve students' access to information and increase overall library resource utilisation.
2. The National Open University of Nigeria should strengthen postgraduate students' information literacy and research skills through continuous training, integration into orientation and research courses, proactive librarian support, and improved digital infrastructure to enhance access to and effective use of electronic resources.

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Digital Platforms Connections: How Academic Libraries in Imo State Are utilizing Social Media for library service delivery

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Abstract

The advent of digital platforms has significantly influenced how academic libraries communicate with users and promote information services. Social media platforms have become veritable tools for enhancing information access, engaging users, and delivering services beyond physical spaces. This study investigated how academic libraries in Imo State, Nigeria, are utilizing social media platforms to strengthen digital platforms connections and support effective information service delivery. Five research objectives were formulated to guide the study. The population of the study comprised all the professional librarians in five academic libraries in Imo State. The study adopted a descriptive survey research design. The data were analyzed using descriptive statistical tools such as frequency counts, simple percentage and tables. The results were presented in tables, frequency and percentage for easy interpretation. The Findings revealed that social media platforms such as Facebook, WhatsApp, Twitter, (X) and YouTube are the most used social media platforms. The findings also revealed that current awareness services, dissemination of information, promoting electronic resources, and facilitating virtual reference interactions are some of the services rendered with social media. The findings identified some benefits such as improved communication, increased visibility of library services and enhanced user engagement. Despite these benefits, challenges such as poor internet connectivity, irregular power supply, inadequate funding, lack of trained ICT staff and lack of institutional policy still persist. The study recommended among others: the development of formal social media policies, continuous staff training programmes, and also alternative source of power supply to enhance effective use of digital platforms in academic libraries in Imo State. The study concluded that even though social media platforms have significantly transformed library service delivery; strategic interventions are still required to maximize its potential.

Keywords: Digital platforms, social media, academic libraries, Imo State, library services, user engagement

Introduction

In the early years of the twenty first century, most libraries underwent a significant shift as emerging technologies transformed the way information was been created, accessed and disseminated. The emergence of Internet and advancements in technology has brought about great transformation in the library. Kaplan & Haenlein, (2010) rightly pointed out that the emergence of Web 2.0 applications has redefined how information is created, disseminated, and accessed, necessitating a shift from traditional service models to more interactive and user-centered approaches. In order for libraries to remain relevant they embrace social media platforms such as Facebook, Twitter, and Instagram to interact with their communities, publicize services and events, and reach users beyond their physical locations. These platforms enhanced communication, facilitated resource sharing, and supported the development of active online communities, thereby redefining the role of libraries in the digital era. Through innovative posts, inclusive outreach initiatives, and real-time engagement, libraries utilize social media to promote reading culture, encourage lifelong learning, and strengthen community connections in an increasingly digital environment.

Nwachi and Igbokwe (2019) defined social media as web-based platforms that enable users to create public or semi-public profiles within a bounded system, connect with other users, and view and navigate their own as well as others' networks. Most academic libraries are now undergoing significant transformation driven by advancements in digital technologies. Social media platforms, as core components of Web 2.0, have become indispensable tools for libraries seeking to enhance their visibility, improve service delivery, and foster user engagement. Some academic libraries in Imo State are already adopting social media platforms such as Facebook, WhatsApp, Twitter, Instagram etc. to communicate with their users, promote services, and provide access to information resources beyond their physical boundaries. These platforms support real-time interaction, collaborative knowledge sharing, and user participation, thereby aligning library services with the expectations of digitally oriented users (Aharony, 2012).

The integration of social media into library operations reflects a broader paradigm shift toward participatory librarianship, where users are not merely passive recipients of information but active contributors to knowledge creation. Consequently, libraries are repositioning themselves as dynamic, technology-driven institutions capable of responding to the evolving needs of their communities. Despite the growing adoption of social media in academic libraries, its utilization in Imo State remains limited. Most academic libraries lack the necessary ICT facilities, skilled personnel, and strategic policy frameworks required for effective implementation. It is based on this premise that this study is conducted to investigate how libraries in Imo state are utilizing social media platforms for service delivery.

Statement of the problem

The use of social media platforms and their transformational changes in information dissemination and service delivery cannot be overlooked. Social media has become a cornerstone for modern libraries, enabling them to enhance their services and build meaningful connections with their communities. From promoting events and sharing resources to fostering engagement and gathering feedback, these platforms allow libraries to stay relevant and impactful in a digital-first world. Despite the growing importance of social media in information dissemination, many academic libraries in Imo State have not fully optimized these platforms for effective service delivery. Challenges such as inadequate digital skills, poor infrastructure, and inconsistent usage limit their potential. Given this scenario, this research therefore investigated how social media platforms are being utilized in academic libraries in Imo State.

Objectives of the Study:

Specifically, this study intends to:

i. Identify the type social media platforms used in academic libraries in Imo State.
ii. Determine the services librarians used social media tools for in academic libraries in Imo.
iii. Find out the purposes of using social media platforms for library service delivery.
iv. Identify the benefits librarians derive in using of social media platforms for library service delivery.
v. Identify challenges librarians encounter in using social media platforms for library service delivery

Literature Review

Social media is often referred to as a collection of web-based programmes that support the production and dissemination of user-generated content and expand on the conceptual and technical. Bradley (2012) defined the term social media as the use of web-based and mobile technologies to turn communication into interactive dialogue underpinnings of web 2.0. It is user-centric, multifunctional, and not location- or time-constrained. The University of South Florida (2025) stated that social media encompasses online platforms and applications that enable users to create, share, and interact with each other through various forms of contents, like text, images, and videos. It facilitates the creation of online communities and networks, allowing users to stay connected, share information, and participate in conversations. According to Chuma-Ibe (2019), a social media networking site is an online portal or web service built for social relations among groups of individuals. In the context of libraries, these platforms facilitate communication, collaboration, and information dissemination. Facebook, WhatsApp, Twitter, YouTube, Instagram, blogs, and Pinterest are among the most widely used social media platforms in academic libraries. According to Aichner (2015), social media technologies include blogs, business networks, enterprise social networks, forums, microblogs, photo sharing, product/service reviews, social bookmarking, social gaming, social networks, video sharing and virtual worlds. Ezeani and Igwesi (2012) found out in their studies that Facebook and WhatsApp were the most commonly used platforms in Nigerian academic libraries due to their accessibility and ease of use. Similarly in a study carried out by Bakare, Yacob and Umar (2018), one of the findings revealed that librarians deliver library services using social media platforms like Facebook, Twitter, Blog and WhatsApp. Likewise, Adewojo and Mayowa-Adebara (2016) revealed that library staff mostly use WhatsApp and Facebook daily in rendering services to users. Omini and Osuolale (2019) also found out that academic libraries mostly used Facebook and blog to promote library resources and services. Service delivery is fundamental to libraries. Agoh and Omekwu (2021) described library and information service delivery as library processes and activities that are deployed by libraries to deliver information services and resources to library users, with the aim of enhancing the activities and productivity of library users. It is not surprising that library staff in academic libraries deliver library and information services using social media to help meet the information needs of library users. Ezeani and Igwesi (2012) in their studies found out that social media enhance library services by enabling real-time communication, virtual reference services, and current awareness services. Oyeniran and Olajide (2019) discovered that reference services, marketing of information produce and services, strategic dissemination of information, exhibition and display of new arrivals, display of reading lists, online registration of users, among others are various services rendered via social media in the library. Obi, Okore and Kanu (2019) pointed out that answering reference questions, user education, current awareness services, alert users due, display and exhibition, document delivery services and circulation services are library services rendered with social media. Social media platforms provides numerous benefits to academic libraries including improved communication, enhanced promotion of resources and enhances user engagement. Ogunjobi et al (2017) noted the following as the benefits of using social media in libraries:

- It promotes library services and disseminates news quickly, delivering this information more directly to library users;

- It helps gather feedback to enhance user services;
- Financially the cost of using social media are perceived to be low;
- It requires little training;
- It increases engagement interactions with library clientele;
- The promotion of library holdings via social media can help increase usage of information resources;
- It enhances communication both within the library and with other departments;
- It can be used for outreach activities through onward sharing, well beyond the institution itself, helping building connections and reputation more proudly.

There are some challenges impeding proper application of social media by library staff for service delivery in academic libraries. Emmanuel and Osuolale (2019) identified high cost of internet connectivity, lack of interest in utilizing internet services, low patronage of internet service, and paucity of well-trained library staff on utilization of social media platforms as constraints to effective use of social media in tertiary institutions. They also added that poor attitude towards social media platforms, low bandwidth and constant epileptic power supply in accessing internet connectivity are among the constraints. Ezeani and Igwesi (2012) noted that issues bordering on apathy, lack of awareness, insufficient bandwidth, phobia and desire to embrace this new technology inhibit use of social networking in most libraries especially in developing countries. Furthermore, Danbaki, Mohammed, Gado and Ikegwuiro (2020) maintained that lack of finance, limited bandwidth, lack of proper training of library staff in the area of using social media, low level of technology penetration, unreliable power supply and poor network connectivity are challenges facing social media use by Nigerian tertiary institution libraries. Lack of awareness, bandwidth problem, technophobia, lack of maintenance culture, unreliable power supply, lack of staff training and copyright issue are challenges librarians face in using social media (Oyeniran & Olajide, 2019). These challenges hinder proper utilization of social media in service delivery in libraries.

Methodology

The study adopted a descriptive survey research design. Simple random sampling technique was used in the selection of respondents for the study. The population of the study was made up of professional librarians selected from six (5) academic libraries in Imo State namely: Federal University of Technology, Owerri , Imo State University, Alvan Ikoku Federal University of Education , Kingsley Ozurumba Mbadiwe University and Federal Polytechnic Nekede. The instrument used for data collection was a questionnaire titled: Questionnaire on Digital Platforms Connections: How Academic Libraries in Imo State Are utilizing Social Media for library service delivery. The questionnaire consisted of two parts. Section A consisted of items on the respondents' bio-data, such as age, gender, and academic qualification, years of experience while Section B addressed issues related to the research objectives. The questionnaire link was share on the different institutional platforms and on the NLA, Imo State chapter general platform. A total of 85 respondents participated in the survey and their responses made up the sample size for this study. The data collected through Google forms were automatically exported to Google sheets for analysis. The data were analyzed using Data generated from the study were analyzed using mean (x) scores and descriptive statistical tools. Items with values of 2.50 and above respectively were positively interpreted, while items with values below 2.50 were negatively interpreted. A total of 85 copies of questionnaire were completed and returned through Google forms, representing a 100% response captured and analyzed.

Results /Findings

Analysis of data of bio data

Table 1: Institutions

Institutions	Frequency	Percentage (%)
Alvan Ikoku Federal University of Education	15	17.6
Federal Polytechnic Nekede, Owerri	11	12.9
Federal University of Technology, Owerri	43	50.6
Imo State University, Owerri (IMSU)	10	11.8
Kingsley Ozurumba Mbadiwe University, (KOMU)	6	7.1
Total	55	100

Table 1 above revealed that Federal University of Technology, Owerri (FUTO) had a response rate of 43 (50.6%), Alvan Ikoku Federal University of Education (AIFUE) had 15 (17.6%) respondents while Federal Polytechnic Nekede had 11(12.9%) respondents. Imo State University (IMSU) had 10 (11.8 %) and Kingsley Ozurumba Mdadiwe Univeristy (Komu) had 6 (7.1 %) The table revealed that Federal University Technology, Owerri had the greatest number of respondents.

Table 2: Distribution of Respondents by Gender

Genger	Frequency	Percentage (%)
Male	34	40
Female	51	6o
Total	55	100

Table 2 above revealed that most of the respondents were females 51 (60 %) and the remaining 34 (40%) were males. The table revealed that there were more female librarians their counterparts. This finding is not surprising as most men perceived librarianship as a female career.

Table 3: Academic Qualification

Academic Qualification	**Frequency**	**Percentage (%)**
Ph.D	30	35.3
MLS.MSc.	28	32.9
BLS.BSc.	17	20
HND	10	11.8
TOTAL	85	100

Table 3 above shows that 30 (35.3 %) of the respondents were Ph.D. holders . followed by 28 (32.9 %) of the respondents who had MLS/ MSc. certificate. BLS/BSc. holders had 17 (20%) respondents while HND holders had 10 (11.8 %). The table revealed that most of the respondents possessed Postgraduate qualifications. This suggest that the respondents were academically qualified to provide reliable information on the study.

Table 4: Designation of respondents

Designation of respondents	Frequency	Percentage (%)
University Librarian	1	1.2
Deputy University Librarian	13	15.3
Senior Librarian	25	29.4
Librarian I	17	20
Librarian II	10	11.8
Assistant Librarian	11	12.9
Graduate Assistant	8	9.4
Total	85	100

Table 4 above , revealed that Senior librarians and Librarian I had 25 (20.4%) and 17 (20%) number of respondents followed by Deputy Librarians (13 (15.3%) and Assistant librarians 11 912.9). The table also revealed that librarian II had 10 (11.8 %) number of respondents and 8 (9.4%) were Graduate Assistants while only 1(1.2%) of the respondents was a University Librarian.

Table 5: **Years of experience**

Years of experience of the respondents	**Frequency**	**Percentage (%)**
1-5	18	21.2
6 - 10	19	22.3
11 - 15	23	27.1
16 years and above	25	29.4
Total	55	100

Table 5 revealed that most of the respondents 25 (29.4%) had 16 and above years of experience while 23 (27.1 %) of the respondents had 11- 15 years' experience. It also revealed that 19 (22.3%) of the respondents had 6-10 year experience while 18 (22.3%) had 1 - 5 years of experience. The table revealed that most of the respondents had more than 16 years. This suggests that most of the participants in the study were quite experienced in terms of services delivery in library and library operations.

Analysis of Research Questions

Research Question 1

What type of social media platforms are used in academic libraries in Imo State?

Table 6: Type of social media platforms

Social media	Frequency	Percentage (%)
Facebook	41	74.5
WhatsApp	49	89.0
Twitter	26	47.2
Instagram	18	32.7
You Tube	22	40
Telegram	18	32.7
Linkedin	9	16.4
Library Blog	8	14.5

Table 6 above was used to answer research question 1 on types of social media technologies. The table showed that whatsApp 49(94.2%) and Facebook 41 (78.8%) are often used. This was followed by twitter 26 (50%) and You Tube 22(42.3 %). Next was Instagram and telegram with the same respondents 18(34.6%) while linkedin and library blog had 9(17.3%) and 8(154%) respondents respectively. This table revealed that many librarians used WhatsApp and Facebook while the use of other social media platforms for the delivery of services among the librarians studied is at a low ebb.

Research Question 2: What are the services librarians used social media tools for in academic libraries?

Table 7: Services delivered via Social Media Platform

Item	Frequency	Percentage (%)
Current awareness	44	80
Reference Services	38	69.0
Dissemination Services	45	82.0
Promotion of Library Resources	31	56.3
Announcements / Events	27	49.0
Virtual Services/ Chat services	24	43.6
User Education	23	41.8

Table 7 above answers research question 2 on services rendered through social media platforms. The table revealed that most of the respondents indicated that they used social media to deliver the following services Dissemination of information, current awareness and reference services 45 (86.5%) , 44 (84.6%)and 38 (73.1%) respectively. The table also revealed that few of the respondents indicated that they used social media to deliver the following service: promotion of library resources 31(59.6%), Announcements / events 27 (51.9%), visual assistants / chat service 24 (46.2%) while User education had the least 23(44.2%).

Research Question3**: What are the purposes of using social media platforms in academic libraries?**

Table 8: Mean Ratings on purposes of using social media platforms in academic libraries

S/N	Item	Strongly Agree	Agreee	Disagree	Strongly Disagreee	Mean ($\bar{X}$)	Decision
	To communicate with users	37	43	5	-	3.4	Agree
	To promote Library resources and services	35	48	2	-	3.4	Agree
	To provide quick access to information	55	27	3	-	3.6	Agree
	To increase user's engagement	48	35	2	-	3.5	Agree

To support teaching and research	37	45	3	-	3.4	Agree
To enhance visibility of library services	57	26	2	-	3.6	Agree
Grand mean					3.5	Agree

Table 8 above was used to answer research question 3. The table revealed most of the respondents agreed that social media platforms are used for communicating with users, promoting library resources and services, providing quick access to information, increasing users' engagement, supporting teaching and research and also enhancing library visibility. The grand mean of 3.22 confirms that social media platforms are widely utilized for these purposes in academic libraries.

Research Question 4**: What are the benefits of social media platforms usage in academic library?**

Table 9: Mean Ratings on Benefits of Social Media Usage

Item	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Frequency** ($\bar{X}$)	**Decision**
Improves communication with Users	45	37	3	-	3.5	Agree
Increases awareness of library services	50	33	2	-	3.6	Agree
Faster information dissemination	55	28	2	-	3.6	Agree
Wider outreach to users	57	26	2	-	3.6	Agree
Enhances user engagement	58	24	3	-	3.6	Agree
Grand mean					3.6	Agree

Table 9 was used to answer research question 4. The table revealed that most of the respondents agreed that social media usage improves communication with users, increases awareness of library services, enables faster dissemination of information, broadens user outreach, and enhances user engagement. The grand mean of 3.18 indicates that social media contributes significantly to effective service delivery in academic libraries in Imo State.

Research Question 5: **What are the challenges encountered by librarians in using social media platforms?**

Table 10: Mean Ratings on Challenges encountered in Social Media Usage

Item	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Mean** ($\bar{X}$)	**Frequency**
Poor internet connectivity	45	25	5	10	3.2	Agree
Irregular power supply	48	23	7	8	3.3	Agree
Inadequate funding	55	25	5	0	3.5	Agree
Lack of trained ICT staff	48	22	9	6	3.3	Agree
Lack of institutional policy	45	34	4	2	3.4	Agree
Grand Mean					3.3	Agree

Table 10 above was used to answer research question 5 on challenges encountered in the use of social media platforms. The table revealed that poor internet connectivity, irregular power supply, inadequate funding, lack of trained ICT staff and lack of institutional policy are major challenges affecting effective use of social media platforms in academic libraries in Imo State. The grand mean of 3.20 indicates that these challenges are prevalent among the libraries studied.

Discussion of Findings

Social media technologies used by librarians in academic libraries

The study revealed that WhatsApp, Facebook and Twitter (X) were the mostly used types of social media platform by librarians in academic libraries in Imo State. While Instagram, YouTube, Telegram were sparingly used. The finding is in tandem with the findings of Bakare, Yacob and Umar (2018) and Omini and Osuolale (2019 who revealed in their findings that librarians deliver library services using social media platforms like Facebook, Twitter, Blog and WhatsApp.

Services Delivered Through Social Media Platforms

The findings showed that librarians employ social media platforms to provide current awareness services, reference services, user education, selective dissemination of information, library orientation, and promotion of library resources and services. The finding of this study corroborates that of Oyeniran and Olajide (2019) who identified the services

delivered by library staff using social media as reference services, marketing of information produce and services, strategic dissemination of information, exhibition and display of new arrivals, user education, and current awareness services. It also corroborate the findings of Ezeani and Igwesi (2012) who found out in their studies \that social media enhances library services by enabling real-time communication, virtual reference services, and current awareness services Service delivery is fundamental to libraries.

Purposes of Using Social Media Platforms in Academic Libraries

The study revealed that librarians use social media technologies to communicate with users, promote library resources and services, provide quick access to information, support teaching and research, enhance user engagement, and increase the visibility of library services. This finding is consistent with the study of Ezeani and Igwesi (2012) who reported that social media technologies have become important tools for information sharing, collaboration, and user engagement in libraries. Similarly, Aharony (2012) found that librarians increasingly adopt social networking technologies to enhance communication with users and improve access to information resources.

Benefits of Social Media Usage in Academic Libraries

The findings revealed that social media usage improves communication with users, increases awareness of library services, enhances information dissemination, broadens user outreach, and promotes user engagement. This finding supports the assertions of Ogunjobi et al (2017 who found that social media technologies enhance interaction between libraries and users and facilitate effective dissemination of information. The result suggests that social media platforms provide libraries with opportunities to improve service quality and meet the evolving information needs of users.

Challenges Encountered in the Use of Social Media Platforms

The study revealed that poor internet connectivity, irregular power supply, inadequate funding, lack of trained ICT personnel, and absence of institutional policies constitute major barriers to the effective utilization of social media technologies in academic libraries.

This finding affirms with the findings of Emmanuel and Osuolale (2019), and Ezeani and Igwesi (2012) who stated that epileptic power supply, lack of ICT skills, poor maintenance culture and lack of government intervention amongst to others greatly affected social media use. Indeed the action and support by the government, library institutions and librarians are all required for effective deployment of social media networks for enhanced information service delivery. The findings of the study also reveal that poor internet connectivity, irregular power supply, inadequate funding, lack of trained ICT staff and lack of institutional policy are the major challenges encountered in the use of social media platforms

Conclusion

Based on the findings of the study, it is concluded that social media platforms play a significant role in enhancing service delivery in academic libraries. The technologies are widely utilized for communication, promotion of library resources and services, dissemination of information, user engagement, and support for teaching and research activities. The study further concludes that social media usage provides numerous benefits, including improved communication, increased awareness of library services, wider outreach, and enhanced interaction between librarians and users. Therefore, for academic libraries to maximize the benefits of social media platforms, there is a need for improved infrastructure, adequate funding, staff training, and supportive institutional policies. However, to maximize their benefits, libraries must address existing challenges and invest in capacity building. The future of academic libraries in information service delivery depends not only on adopting digital platform connections but also on cultivating active digital communities centred on learning, access and collaboration.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are made

- University management should provide adequate funding for the acquisition of ICT infrastructure, internet facilities, and social media management tools required for effective service delivery.
- Regular training and capacity-building programmes should be organized for librarians to enhance their competencies in the use of social media technologies and digital communication tools.
- Reliable internet connectivity and alternative power supply systems should be provided to ensure uninterrupted access to social media platforms and online library services.
- Institutional policies and guidelines on social media usage should be developed to regulate and support the effective use of social media technologies in academic libraries.

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Digital Readiness and Service Innovation in Selected Academic Libraries in Ebonyi State, Nigeria

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Abstract

This study examined digital readiness and service innovation in selected academic libraries in Ebonyi State, Nigeria. Specifically, the study assessed the availability and adequacy of digital infrastructure, librarians' digital competencies, the extent of digital service innovation, the perceived impact of digital readiness on service innovation, and associated challenges. A descriptive survey research design was adopted. The study's population comprised of 125 librarians, who were all included using a total enumeration sampling technique. Structured close-ended Google Foirm designed questionnaire was used as the instrument for data collection. The instrument was distributed with link shared via the WhatsApp group of NLA members in Ebonyi State. 106 valid responses were recorded and analyzed using descriptive statistics. The findings revealed that while basic ICT infrastructure is available, advanced digital infrastructure is largely inadequate, thereby limiting the delivery of innovative library services. Librarians were found to possess basic digital competencies; however, significant gaps exist in advanced digital skills required for contemporary service innovation. The extent of digital service innovation was generally low across the libraries. Despite this, respondents acknowledged that digital readiness has a significant positive impact on service innovation. Key challenges include inadequate funding, insufficient management support, poor infrastructure, and limited opportunities for professional training. The study concludes that improving digital readiness is essential for enhancing service innovation in academic libraries. It recommends increased investment in digital infrastructure, continuous capacity building for librarians, and the promotion of an institutional culture that supports innovation and technological advancement.

Keywords: **Digital Readiness, Service Innovation, Academic Libraries**

Introduction

Modern academic libraries are not just repositories of knowledge and nerve centres for intellectual development in higher institutions, they are centres for the incubation of novel ideas birthed by the fusion of innovativeness and timely and efficient service delivery philosophy. The 21st century 5th Industrial Revolution information landscape has continued to influence information services delivery in such a manner which academic libraries cannot afford to ignore or neglect. Therefore, proper attention is required by libraries and information professionals to enhance the provision of reliable, timely, current, and appropriate information to their users in the most ethical and contemporary manner.

Iroeze (2021) opines that the academic library has become an indispensably instrumental subsystem of the tertiary institution in the promotion of literacy and quality education for the users of the library. The target group of users includes faculty, staff, students, and its immediate environment (Hotsonyame, 2023). This fact underpins the establishment of libraries in academic institutions to facilitate the speedy realization of the education mandates of their parent bodies by equipping members of the academic with the critical knowledge needed for the attainment of the objectives of the parent body, and by extension, societal goals (Ilo, Nkiko, Izuagbe, & Furfuri, 2020).

The institutional objectives of academic institutions expand with societal demands for development, and as the expansion of the information society continues to experience rapid exponential changes through the emergence and domination of digital technologies, the library environment is also expected to align with contemporary trends in order to continue to sustain its mandate. This is why Idiegbeyan-Ose and Idahosa (2025) assert that digital technologies have the power to transform Nigerian academic libraries into vibrant hubs of innovation and learning. This position can only be attained if the library is in possession of personnel with the right technical know-how to deliver the contemporary services that are commensurate with the needs of the users through the efficient and result-oriented use of digital technologies. It therefore becomes necessary to evaluated the digital readiness and the innovativeness in the services delivery of the academic library in Nigeria in order to meet the expanding societal and institutional goals.

Granicus (2026) defines digital readiness as an organization's preparedness to adopt and implement digital technologies, focusing on the foundational infrastructure, skills, and tools needed to start digital transformation. Baidoo and Nwagwu (2024) had earlier noted that technology readiness relates to the preparedness to effectively use modern technologies and new equipment, tools, devices and software. It includes the readiness of a technology-oriented innovation to effectively deliver the services for which it was established. It is considered crucial for public sector organizations (including academic libraries) as it ensures they can effectively deliver accessible, efficient, and secure services in a rapidly evolving digital landscape (Granicus, 2026). The above explanation links the main objective of digital readiness to the delivery of accessible, efficient and secure services in a distinctively rapidly evolving digital

information landscape, which the current library environment is an integral part of. In the context of librarianship, Emmatrice and Ekoko (2025) explain that digital readiness refers to the extent to which librarians possess the knowledge, skills, attitudes, and institutional support necessary to adopt and effectively use emerging technologies in library operations. Library and Information Science, being a service-oriented filed among other information professions lays great emphasis on user satisfaction through service delivery. Umoh (2017) states that to facilitate academic success, academic libraries must provide access to a broad range of information resources and services.

Service delivery in the context of academic libraries is the process of providing access to various resources using cyber-physical systems and intelligent technology poised to improve user experience and efficiency for staff in pursuit of excellence and effectiveness (Modiba & Chisita, 2023). Innovation on the other hand is described by Colaklar (2014) as the synthesis of new ideas and thoughts which will re-construct or re-combine present things, and it is an inner feature of human. Meanwhile, innovative library service delivery involves a multifaceted range of activities and practices, requiring a user-centered approach, integration of modern technologies, diverse and inclusive collections as well as active community engagement, by continuously adapting to the changing needs of library patrons and embracing innovative solutions (Osisanwo & Adeola, 2024). These services are crucial for academic libraries to fulfill their roles as community hubs, educational support centers, and repositories of knowledge of its parent bodies.

The modern information econsystem is getting more complex, competitive and complicated. Thus, librarians cannot afford not to innovate in their services delivery. Having established the vital role played by technology in innovativeness in the digital information landscape, it is important to evaluate the preparedness of Nigerian academic libraries to integrate digital technologies in their present services delivery towards service innovation. Ebonyi State, one of Nigeria's youngest states is one of such states where a large number of academic institutions are relatively new compared to other older states with longer years of experience in academic library services delivery. Thus, the status of readiness for innovation among the libraries remains relatively unknown. This research seeks to examine the digital readiness and service innovation in selected academic libraries in Ebonyi State, with emphasis on their implications for the future of librarianship in Nigeria, especially as the struggle for sustained relevance of librarianship among other information professions continues to be intensified.

Statement of the Problem

Academic libraries worldwide are undergoing rapid transformation driven by advances in digital technologies, evolving user expectations, and the growing demand for innovative information services. This is already well-established in academic libraries in developing countries. In Nigeria, this shift is particularly significant as libraries strive to remain relevant in an increasingly digital knowledge environment. Despite these changes, many academic libraries especially in developing countries like Nigeria, based on observed anedoctal experiences and revelations in literature, appear to face challenges related to digital readiness, including inadequate technological infrastructure, limited funding, competent staff, and resistance to change (Khan, 2020; Onunka, Onunka, Fawole, Adeleke, Daraojiba, 2023; Shahzad, Ahmed and Khan, 2025). These challenges may hinder abilities of these libraries to effectively adopt and implement innovative services that meet the needs of 21st-century users and the attainment of the institutions the libraries serve.

There is a growing concern that many academic libraries in Nigeria including those in Ebonyi state may not be adequately prepared to leverage emerging digital technologies such as digital institutional repositories, virtual reference services, makerspace, and automated library systems. Observation reveals that services offered by many of the libraries appear to be basically traditional. For instance, Okunlaya, Abdullah and Alias (2022) report low adoption rate by the university libraries in adopting Artificial intelligence (AI) to provide innovative alternative services due to absence of such technologies in their strategic plan for service delivery. This suggests the existence of a gap between digital readiness and service innovation, which raises critical questions about the future of librarianship in Nigeria. If academic libraries in Ebonyi State are unable to adapt to the digital environment, they risk becoming obsolete in the face of alternative information providers. While several studies have examined ICT adoption in Nigerian libraries, there is limited empirical evidence specifically linking digital readiness to service innovation within the context of academic libraries in Ebonyi State.

Therefore, the problem of this study lies in the unclear extent to which digital readiness influences service innovation in selected academic libraries in Ebonyi State, and how this relationship impacts the future role and relevance of librarianship in Nigeria. Addressing this gap is essential for informing policy, improving practice, and ensuring that academic libraries remain dynamic and responsive to the evolving information landscape.

Objectives of the Study

The main objective of the study is to examine the **digital readiness and service innovation in selected academic libraries in Ebonyi State, and the implications for the future of librarianship in Nigeria. The specific objectives are to:**

i. **Assess the availability and adequacy of digital infrastructure** in the selected academic libraries in Ebonyi State
ii. **Determine the level of digital competencies of librarians** in the selected academic libraries in Ebonyi State.

iii. **Examine the extent of digital service innovation** in the in the selected academic libraries in Ebonyi State

iv. **Analyse the perceived impact of digital readiness on service innovation** in the selected academic libraries in Ebonyi State

v. **Identify challenges hindering digital readiness and service innovation** in the selected academic libraries in Ebonyi State

Literature Review

A number of related studies have been conducted on digital readiness in academic libraries. Salamzadeh, Damij, Issa and Khaan (2026) note that digital readiness is an organization's ability to adapt to and leverage digital technologies effectively, including its infrastructure, processes, workforce skills, and cultural mindset. A digitally ready organisation is said not only to possess the requisite technological infrastructure (or tries to gain them) but also cultivates a culture of innovation, transformation and agility**. According to Granicus (2026), digital readiness is measured with metrics such as** digital infrastructure readiness, digital skills and workforce readiness, technology adoption rate, data management capabilities, user experience and engagement, regulatory compliance and risk management, innovation and agility, and cost efficiency. Some of these metrics are considered vital to the current study.

Çolaklar (2014) defines innovative library services as new, improved, or repurposed, methods and technologies adopted by libraries to enhance user engagement, information access, and service delivery beyond existing traditional models. These initiatives leverage on contemporary technology, such as digital platforms, AI, and augmented reality, and community-focused programming to meet evolving user information needs in the digital age. Some of the services that arise from innovativeness in academic libraries, according to Colaklar (2014) include interactive programmes to enhance research and learning culture, author activities, interviews, seminars, exhibitions, and events, theatre, cinema and film shows, assistance in job searching and career planning, social responsibility projects, supportive programmes for distant learning, retrospective conversion and digitisation, faculty-librarian collaboration, information literacy, organization of creative writing courses, among others.

Baidoo and Nwagwu (2024) examined user and service provider assessment of technology readiness of library commons in selected universities in Ghana. The study found significant relationships between the availability of technological learning resources and users' experience, use and satisfaction with the commons. This is corroborated by Emmatrice and Ekoko (2025) who also studied librarians' readiness for the adoption of emerging technologies and sustainable funding of university libraries in two states in South-South, Nigeria, and reported a significant positive relationship between librarians' digital readiness and effective technology adoption. Similarly, Idhalama, Oredo, and Makori (2025) who evaluated the availability and accessibility of digital resources and services in public university libraries in Nigeria reported that there is a significant evidence of digital infrastructural deficit prevalence among public university libraries in Nigeria. This reported infrastructural deficit remains some of the major challenges that have hindered digital readiness and service innovations in academic libraries.

On the issue of digital literacy skills of librarians needed for digital readiness and service innovation, Dube, Rammutloa and Matatiele (2024) reports that the needed digital literacy skills for the contemporary academic librarians are troubleshooting skills, scholarly communication (including e-publishing) skills, self-training skills, digital pedagogical skills, AI skills, mentorship and teamwork skills, digital content creation and management skills, coding skills and database management skills, research citation and mapping skills, data curation and management skills, videoconferencing skills, metadata management skills, web navigation skills, among others. Meanwhile, when the impact of such skills were examined by Okoro and Musa (2025) in a study on digital literacy skills and innovative service delivery in university libraries in North-West, Nigeria, the findings revealed that digital literacy skills had a positive significant impact on innovative service delivery. Also, Hamad, Al-Fadel, M, and Shehata (2024) studied the level of digital competencies for the provision of smart information service at academic libraries in Jordan. The results indicated a strong and positive relationship between the level of smart information services at the investigated libraries and the level of digital competencies among the librarians. While these studies examined the digital competence and its impact on service innovation, none was focused on Ebonyi State, establishing a major gap for the current study.

In a cross-sectional survey, targeting entry-level librarians across Nigerian universities, Oladokun, Ogunjimi, Oyetola, Orubebe, and Enakrire (2025) conducted a study titled "Library management in an era of disruption: assessing skills and knowledge of future academic librarians in Nigeria". The findings revealed a moderate level of awareness of digital technologies, and a lack of preparedness to adopt innovative practices. Conversely, Okeji, Tralagba and Obi (2020) conducted an investigation of the digital literacy skills and knowledge-based competencies among librarians working in private and public university libraries in Nigeria. The study revealed that almost half of the librarians rated their level of digital literacy skills to be moderate. Only few librarians rated their digital literacy skills to be excellent. The findings of the two studies reviewed above reemphasise the challenge associated with the gaps created by inadequate digital competence among Nigerian academic librarians.

Etebu and Zacchaeus (2020) assessed innovative library services (ILS) in different types of libraries in Bayelsa, State, Nigeria. The findings revealed that the innovations in the libraries studied include online business support service for starts-up; web design services; blogging service; podcasting service; electronic publishing services; online

information search service; short message alerts services; online training and workshops; digital references services; database production/distribution services; online entertainment services; mobile application services and digital marketing service. The findings imply that most of the contemporary innovativeness in contemporary libraries are influenced by digital technologies. **This is further emphaised by** Omeluzor, Ugochi, and Izuakolam (2020) and Potiskum and Abdullahi (2025) who asserted that the adoption of technological tools in libraries to deliver services can promote innovation in services delivery.

Baidoo and Nwagwu (2024) reported that library/commons managers identified key digital preparedness challenges such as inadequate planning and poor space allocation. Furthermore, negative feelings among library/commons managers, such as insecurity, resistance to change and low confidence were identified as challenges to digital preparedness in libraries. These challenges are also similar to the findings of Etebu and Zacchaeus (2020), Atchrimi and Ogunbodede (2024), and Idhalama, Oredo, and Makori (2025) who revealed that inadequate funding, inadequacy of specific skills, inadequate deployment of ICT infrastructure, unstable power supply, and resistance to change were some of the challenges identified as hindrances to innovative library services in Nigeria.

To address the numerous challenges affecting the integration of modern digital technologies to enhance digital readiness in academic libraries, Dube, Rammutloa and Matatiele (2024) reported that academic libraries should develop strategies to expose librarians to novel technological competencies that align with the goals of the institution, enhance investment in technology adoption, and embark on strategic policy reviews, while Adeoye, Oladokun, and Opalere (2022) suggest that libraries should explore and maximise the use of open source technologies such as social media to enhance their readiness for digital reference services delivery, while encouraging continuing capacity development and reorientation for librarians concerning the use of digital devices and online tools to eliminate any phobia for the use of digital technologies among librarians.

In terms of the future implications of digital readiness in Nigerian libraries, as noted by Fasola, Oyadeyi and Iyoro (2024), tapping into the potential of digital technologies such as blockchain technology has the potential to revolutionize library services by enhancing their efficiency, security, and transparency. **However, Owolabi, Yemi-Peters, Oyetola, Bello and Oladokun (2022) revealed that the readiness of university libraries in Nigeria towards the adoption of robotics technology is nothing to write home about. This has a negative implication for the delivery of innovative information services in Nigerian university libraries. Odunlade and Ojo (2023) who studied the pre-and post COVID digital transformation in Nigerian university libraries also revealed** that digital transformation is yet to be fully embraced in Nigerian university libraries, as there is no significant change in the use of digital technologies in the deployment of library services in Nigerian academic libraries pre and post COVID-19 era. The implication of this for the future of library services delivery, as reported by **Odunlade and Ojo (2023),** is that digital transformation may yet remain an illusion even when the global narrative is already tending towards 5th industrial revolution, unless strategic steps are taken to resolve the challenges such as paucity of funds, power issues, inadequate personnel digital competence, and policy issues associated with the transformation of academic library services in Nigeria.

While the available empirical studies revealed that there is adequate studies on digital readiness from the perspective of other regions in and outside Nigeria, there is an obvious empirical gap on digital readiness and service innovation in the context of Ebonyi State academic libraries. The geographical gap in literature lends credence to the need for the current study, as it seeks to determine peculiarities or general relationships with current trends reported in literature, thereby providing contextual approach to the situation in Ebonyi and providing a general.

Methodology

This study adopted a descriptive survey research design, with a population of 125 library staff from five (5) selected academic libraries; Alex Ekwueme Federal University Library, Ndufu-Alike (42), Akanu Ibiam Federal Polytechnic Library Unwana (35), Ebonyi State University Library (27), Ebonyi State College of Education (12), and Evangel University Library (9). These institutions were selected to ensure a balanced spread among the three types of academic institutions in state (University, Polytechnic, and College Libraries), the ownership structures of these institutions which is federal, state and private tertiary institutions. More university libraries were also selected for a balanced representation since there more universities than other types of tertiary institutions in the state. Total enumeration sampling was used since the population was manageable. An e-questionnaire designed with the use of Google Form was used to collect data from the respondents through the official WhatsApp group of Ebonyi State Chapter of the Nigerian Library Association. 106 of the responses, representing 84.80% of the expected 125 responses were recorded on time for data analysis. This formed the basis of data analysis for the study. The data in the research question part of the questionnaire were analysed with descripotive statistics, with 2.5 as the acceptable benchmark for the 4-point rating scale adopted by the study, since 2.5 is the average mark for points rated 4, 3, 2, and 1. This means 4+3+2+1=10. Thus, 10/4 (points) = 2.5. This implies that point scored below 2.5 will be decided as “rejected”, while those from 2.5, and above will be decided as “accepted”.

Data Analysis and Discussion of Findings

Section A (Demographic Data)

Table 1: Gender

SN	Gender	Frequency	Percentage%
A	Male	62	58.48
B	Female	44	41.50
	Total	106	100

Table 1 shows that 62 (58.48%) of the respondents are male librarians while 44 (41.50%) of the respondents are female. This shows that there are more male librarians in the selected academic libraries.

Table 2: Institution

SN	Institution	Frequency	Percentage
A	Akanu Ibiam Federal Polytechnic Library Unwana	29	27.35
B	Alex Ekwueme Federal University Library	38	35.84
C	Ebonyi State College of Education Library	10	9.43
D	Ebonyi State University Library	23	21.69
E	Evangel University Library	6	5.66
	Total	106	100

Table 2 shows that respondents were drawn from five academic libraries in Ebonyi State. The largest proportion of respondents, 38 (35.84%), were from Alex Ekwueme Federal University Library, followed by 29 (27.35%) from Akanu Ibiam Federal Polytechnic Library, Unwana. Ebonyi State University Library contributed 23 (21.69%) respondents, while Ebonyi State College of Education Library and Evangel University Library contributed 10 (9.43%) and 6 (5.66%) respectively.

This indicates that the study had wider representation from federal institutions, particularly Alex Ekwueme Federal University, suggesting a stronger response rate from larger or more established academic libraries.

Table 3: Division

SN	Division	Frequency	Percentage
A	Readers' Services	61	57.54
B	Technical Services	29	27.35
C	Others	16	15.09
	Total	106	100

Table 3 reveals that the majority of respondents, 61 (57.54%), were from the Readers' Services division. Technical Services accounted for 29 (27.35%), while 16 (15.09%) were from other units. This implies that most respondents are directly involved in user services, which strengthens the validity of responses related to service delivery and digital innovation in libraries.

Table 4: Highest Academic Qualification

SN	Highest Academic Qualification	Frequency	Percentage
A	ND/Diploma	17	16.03
B	HND/BSc/BLIS	53	50
C	MLIS/MSc	31	29.24
D	PhD	5	4.71
	Total	106	100

Table 4 indicate that half of the respondents, 53 (50%), possess HND/BSc/BLIS qualifications. This is followed by 31 (29.24%) with MLIS/MSc degrees, while 17 (16.03%) hold ND/Diploma qualifications. Only 5 (4.71%) possess PhDs.

This suggests that the workforce is predominantly composed of first-degree holders, with relatively low representation of doctoral-level professionals, which may have implications for advanced digital innovation and research capacity in the libraries.

Section B (Research Questions)

Table 5: Research Question 1: What is **the extent of availability and adequacy of digital infrastructure** in the selected academic libraries in Ebonyi State? VHE: Very High Extent (4); HE: High Extent (3); LE: Low Extent (2); VLE: Very Low Extent (1).

SN	Availability and adequacy of digital infrastructure	VHE	HE	LE	VLE	Total	Mean	Decision
A	**Digital Institutional Repositories**	5(4.71)	9(8.49)	49(46.22)	43(40.56)	106 (100)	1.77	Rejected
B	**Digital Maker Spaces and Multimedia Laboratories**	21(19.81)	23(21.69)	32(30.18)	30(28.30)	106 (100)	2.33	Rejected
C	Library Management Systems (LMS)	8(7.5)	13(12.26)	36(33.96)	49(46.22)	106 (100)	1.81	Rejected
D	Radio Frequency Identification (RFID) Technologies	10(9.43)	12(11.32)	48(45.28)	36(33.96)	106 (100)	1.96	Rejected
E	Extended Reality(XR) e.g. Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR)	15(14.15)	14(13.20)	56(52.83)	21(19.81)	106 (100)	2.21	Rejected
F	Blockchain Technologies	8(7.5)	13(12.26)	36(33.96)	49(46.22)	106 (100)	1.81	Rejected
G	Web Server and High Speed Networking e.g. Wi-Fi and Li-Fi	49(46.22)	43(40.56)	5(4.71)	9(8.49)	106 (100)	3.24	Accepted
H	Cloud Computing Technologies	14(13.20)	17(16.03)	45(42.45)	30(28.30)	106 (100)	2.14	Rejected
I	Internet of Things Technologies	12(11.32)	13 (12.26)	33 (31.13)	48(45.28)	106 (100)	1.89	Rejected
J	Contemporary Digital Hardware e.g. Laptops, desktops, printers, scanners, multimedia projectors, etc.	33 (31.13)	48(45.28)	12(11.32)	13 (12.26)	106 (100)	2.95	Accepted
K	Digital Accessibility Platforms e.g. Online Public Access Catalogue, WebPAC, Databases, etc.	10(9.43)	12(11.32)	48(45.28)	36(33.96)	106 (100)	1.96	Rejected
L	Library Websites and Portals	19(17.92)	14(13.20)	36(33.96)	37(34.90)	106 (100)	2.14	Rejected
M	Assistive Laboratories and Technologies e.g. Text-to-Speech tools	10(9.43)	12(11.32)	48(45.28)	36(33.96)	106 (100)	1.96	Rejected

Table 5 shows that most digital infrastructure components are available at a **low extent**, as evidenced by mean scores below the acceptance benchmark. Specifically, digital institutional repositories (Mean = 1.77), LMS (1.81), RFID (1.96), IoT (1.89), and blockchain technologies (1.81) were all rated low. Emerging technologies such as Extended Reality (Mean = 2.21) and cloud computing (2.14) also recorded low availability. However, two components stood out. Web servers and high-speed networking (Mean = 3.24) and Contemporary digital hardware (Mean = 2.95). These were accepted, indicating that basic ICT infrastructure is relatively available. Overall, the result implies that while foundational technologies are present, while advance and emerging digital infrastructure is largely inadequate in the selected academic libraries.

Table 6: Research Question 2: What is **the level of digital skills/competencies of librarians** in the selected academic libraries in Ebonyi State? VHE: Very High Level (4); HE: High Level (3); LE: Low Level (2); VLE: Very Low Level (1).

SN	Level of digital competencies of librarians	VHL	HL	LL	VLL	Total	Mean	Decision
A	Digital curation skills	13 (12.26)	12(11.32)	48(45.28)	33(31.13)	106 (100)	2.04	Rejected
B	Digital information retrieval skills	35(33.01)	42(39.62)	24(22.64)	5(4.71)	106 (100)	3.00	Accepted

C	Digital information and data literacy	12(11.32)	10(9.43)	36(33.96)	48(45.28)	106 (100)	1.86	Rejected
D	Digital content creation and management skills	2(1.88)	13(12.26)	42(39.62)	49(46.22)	106 (100)	1.69	Rejected
E	Digital communication skills	33 (31.13)	49(46.22)	13(12.26)	11(10.37)	106 (100)	2.98	Accepted
F	Digital collaboration skills	7(6.60)	13(12.26)	36(33.96)	50(47.16)	106 (100)	1.78	Rejected
G	Digital information security skills e.g. encryption and firewall	15(14.15)	19(17.92)	31(29.24)	41(38.67)	106 (100)	2.07	Rejected
H	Digital mobile technology application skills	37(34.90)	37(34.90)	25(23.58)	7(6.60)	106 (100)	2.98	Accepted
I	Technical operation skills e.g. troubleshooting of systems	9(8.49)	11(10.37)	43(40.56)	43(40.56)	106 (100)	1.86	Rejected
J	Digital ethics and legal awareness e.g. AI ethical use, digital citation and reference data management	49(46.22)	42(39.62)	13(12.26)	2(1.88)	106 (100)	3.41	Accepted
K	Digital pedagogical and instructional skills e.g. teaching with the use of digital technologies	11(10.37)	19(17.92)	32(30.18)	44(41.50)	106 (100)	1.97	Rejected
L	Coding and programming skills	9(8.49)	15(14.15)	43(40.56)	39(36.79)	106 (100)	1.94	Rejected
M	Robotics and AI application skills	5(4.71)	11(10.37)	31(29.24)	59(55.60)	106 (100)	1.64	Rejected

Table 6 reveals a mixed level of digital competencies among librarians. High-level competencies were observed in: digital information retrieval skills (Mean = 3.00), digital communication skills (Mean = 2.98), mobile technology application skills (Mean = 2.98), and digital ethics and legal awareness (Mean = 3.41). However, several critical competencies such as digital curation (2.04), data literacy (1.86), content creation (1.69), collaboration (1.78), programming (1.94), and AI/robotics (1.64) were low. This suggests that librarians are proficient in basic and operational digital skills, but lack competencies in advance, technical, and emerging digital areas, which are essential for innovation.

Table 7: Research Question 3: What is **the extent of digital service innovation** in the selected academic libraries in Ebonyi State? VHE: Very High Extent (4); HE: High Extent (3); LE: Low Extent (2); VLE: Very Low Extent (1).

SN	Extent of digital service innovation	VHE	HE	LE	VLE	Total	Mean	Decision
A	Artificial Intelligence (AI)-powered services e.g. Library chatbots and virtual assistants	2(1.88)	5(4.71)	35(33.01)	64(60.37)	106 (100)	1.48	Rejected
B	Online Public Access Catalogue services	19(17.92)	14(13.20)	36(33.96)	37(34.90)	106 (100)	2.14	Rejected
C	Extended Reality services e.g. Digital tours and exhibition	8(7.5)	13(12.26)	36(33.96)	49(46.22)	106 (100)	1.81	Rejected
D	Self-Service Technologies: RFID systems, smart library kiosks, and apps	10(9.43)	11(10.37)	36(33.96)	49(46.22)	106 (100)	1.83	Rejected
E	Maker space services	8(7.5)	13(12.26)	35(33.01)	50(47.16)	106 (100)	1.80	Rejected
F	Internet of Things and smart library services	15(14.15)	14(13.20)	21(19.81)	56(52.83)	106 (100)	1.83	Rejected

G	Digital references services e.g. Digital Document delivery, digital Current Awareness Services, etc.	13(12.26)	21(19.81)	36(33.96)	36(33.96)	106 (100)	2.10	Rejected
H	Audio-Visual and Multimedia services	8(7.5)	13(12.26)	36(33.96)	49(46.22)	106 (100)	1.81	Rejected
I	Open Educational Resources services	13 (12.26)	12(11.32)	36(33.96)	45(42.45)	106 (100)	1.93	Rejected
J	Social media services	15(14.15)	14(13.20)	21(19.81)	56(52.83)	106 (100)	1.83	Rejected
K	Special events services e.g. e-conferences (videoconferencing), webinar, etc.	10(9.43)	10(9.43)	38(35.84)	48(45.28)	106 (100)	1.83	Rejected
L	Digital literacy services	15(14.15)	19(17.92)	31(29.24)	41(38.67)	106 (100)	2.07	Rejected
M	Research consultancy services	13(12.26)	21(19.81)	36(33.96)	36(33.96)	106 (100)	2.10	Rejected
N	Online Learning services e.g. Massive Open Online Courses (MOOCs) assistance	12(11.32)	10(9.43)	38(35.84)	46(43.39)	106 (100)	1.88	Rejected
O	Electronic publishing services	10(9.43)	12(11.32)	48(45.28)	36(33.96)	106 (100)	1.96	Rejected

Table 7 indicates that digital service innovation is generally low across the libraries under study. All listed services—including AI-powered services (Mean = 1.48), IoT services (1.83), Maker space services (1.80), Digital reference services (2.10), Online learning services (1.88) were rejected. Even commonly expected services such as OPAC services (Mean = 2.14), Social media services (Mean = 1.83) were rated low. This implies that digital service innovation is still at a developmental stage, with limited integration of modern technologies into library services.

Table 8: Research Question 4: What are **the perceived impacts of digital readiness on service innovation** in the selected academic libraries in Ebonyi State? SA: Strongly Agree (4); A; Agree (3); D: Disagree (2); SD: Strongly Disagree (1).

SN	Perceived impacts of digital readiness on service innovation	SA	A	D	SD	Total	Mean	Decision
A	Ease and efficiency of services delivery	33 (31.13)	49(46.22)	13(12.26)	11(10.37)	106 (100)	2.98	Accepted
B	Proper management of human resources	48(45.28)	36(33.96)	12(11.32)	10(9.43)	106 (100)	3.15	Accepted
C	Enhanced time management	33 (31.13)	48(45.28)	12(11.32)	13 (12.26)	106 (100)	2.95	Accepted
D	Improved user satisfaction	57(53.77)	49(46.22)	-	-	106 (100)	3.53	Accepted
E	Improved library reputation and relevance	48(45.28)	33 (31.13)	11(10.37)	14(13.20)	106 (100)	3.08	Accepted
F	Enhanced user access to information resources	35(33.01)	42(39.62)	24(22.64)	5(4.71)	106 (100)	3.00	Accepted

G	Strengthened research and learning support	49(46.22)	57(53.77)	0 (0)	0 (0)	106 (100)	3.46	Accepted
H	Greater institutional visibility	48(45.28)	36(33.96)	12(11.32)	10(9.43)	106 (100)	3.15	Accepted
I	Enhanced information resources security	33 (31.13)	49(46.22)	13(12.26)	11(10.37)	106 (100)	2.98	Accepted
J	Improved job satisfaction	37(34.90)	39(36.69)	13 (12.26)	17(16.03)	106 (100)	2.90	Accepted

Table 8 indicates that despite low infrastructure and innovation levels, respondents strongly agreed that digital readiness has significant positive impacts. All items were accepted, including improved user satisfaction (Mean = 3.53), strengthened research support (3.46), human resource management (3.15), institutional visibility (3.15), access to information (3.00). This indicates a strong awareness among librarians of the transformative potential of digital readiness, even though it is not yet fully realized in their various libraries.

Table 9: Research Question 5: What are the **challenges hindering digital readiness and service innovation** in the selected academic libraries in Ebonyi State? SA: Strongly Agree (4); A; Agree (3); D: Disagree (2); SD: Strongly Disagree (1).

SN	**Challenges hindering digital readiness and service innovation**	**SA**	**A**	**D**	**SD**	**Total**	**Mean**	**Decision**
A	Inadequate management support	33 (31.13)	49(46.22)	13(12.26)	11(10.37)	106 100%	2.98	Accepted
B	Paucity of funds	35(33.01)	42(39.62)	24(22.64)	5(4.71)	106 100%	3.00	Accepted
C	Absence of strategic institutional policy on digital technologies	43(40.56)	49(46.22)	5(4.71)	9(8.49)	106 100%	3.18	Accepted
D	Technophobia among staff members	52 (49.05)	33 (31.13)	13 (12.26)	8 (7.54)	106 100	3.21	Accepted
E	Resistance to change	8(7.5)	13(12.26)	36(33.96)	49(46.22)	106 100%	1.81	Rejected
F	Poor technological infrastructure	44(41.50)	39(36.79)	10(9.43)	13(12.26)	106 (100)	3.07	Accepted
G	Poor space allocation	35(33.01)	42(39.62)	24(22.64)	5(4.71)	106 (100)	3.00	Accepted
H	Inadequate opportunities for digital literacy skills acquisition	48(45.28)	36(33.96)	12(11.32)	10(9.43)	106 (100)	3.15	Accepted

From the results on *Table 9*, the study identified several challenges such as technophobia among staff (Mean = 3.21), lack of institutional policy (3.18), inadequate digital skills opportunities (3.15), poor infrastructure (3.07), paucity of funds (3.00), and poor space allocation (3.00). Interestingly, resistance to change (Mean = 1.81) was rejected, suggesting that librarians are willing to embrace change.

Discussion of Findings

The findings of this study reveal important insights into the state of digital readiness and service innovation in selected academic libraries in Ebonyi State. The demographic distribution shows that the majority of respondents were drawn from major institutions, Alex Ekwueme Federal University Library, Akanu Ibiam Federal Polytechnic Library, Unwana, Ebonyi State College of Education, Ebonyi State University and Evangel University Libraries. This suggests that the data largely reflect the realities most academic libraries, in Ebonyi State. Additionally, most respondents were from the Readers' Services division, indicating that the findings are strongly grounded in the perspectives of librarians who are directly involved in user service delivery. This strengthens the reliability of responses related to digital service innovation.

The results further indicate that the workforce in the selected libraries is largely composed of first-degree holders (HND/BSc/BLIS), with fewer respondents possessing postgraduate qualifications. This distribution has implications for digital transformation, as higher-level academic and professional training is often associated with advanced digital competencies, research capacity, and innovation adoption. The limited number of highly qualified personnel may partly explain the low level of digital innovation observed in the study.

With respect to the availability and adequacy of digital infrastructure, the findings show that most modern and emerging technologies are available at a low extent. Technologies such as digital institutional repositories, library management systems, RFID, blockchain, Internet of Things, and extended reality were all rated below the acceptable benchmark. This suggests that the libraries are yet to fully embrace the technological advancements required for modern information service delivery. This is consistent with the findings of Idhalama, Oredo, and Makori (2025) who reported that there is a significant evidence of digital infrastructural deficit prevalence among university libraries in Nigeria. While the basic technological environment exists, it has not been sufficiently expanded to support advanced digital services.

In terms of digital competencies, the study reveals a mixed outcome. Librarians demonstrated relatively high competence in fundamental digital skills such as information retrieval, communication, mobile technology use, and digital ethics. These are essential operational skills that support everyday library functions. However, competencies in more advanced and innovative areas, such as digital content creation, data literacy, programming, artificial intelligence, and robotics were found to be low. This indicates a significant skills gap that may hinder the ability of librarians to design and implement innovative digital services. The findings suggest that while librarians can effectively use existing systems, they may lack the expertise required to drive digital transformation. This conforms to the findings of Oladokun, Ogunjimi, Oyetola, Orubebe, and Enakrire (2025) who revealed a moderate level of awareness of digital technologies among librarians, but also found inadequate knowledge of strategies for navigating these technological disruptions among librarians, and a lack of preparedness to adopt innovative practices.

The extent of digital service innovation in the libraries was found to be generally low. All identified digital services, including AI-powered services, IoT-based services, maker spaces, digital reference services, and online learning support were rated below the acceptable level. Even widely expected services such as online public access catalogues and social media services did not meet the benchmark. This finding reflects a limited integration of digital technologies into service delivery and suggests that the libraries are still operating largely within traditional service models. The low level of innovation may be directly linked to inadequate infrastructure and insufficient digital competencies among staff. For instance, Okoro and Musa (2025) and Hamad, Al-Fadel, M, and Shehata (2024) had revealed that digital literacy skills/ competencies had a positive significant impact on innovative and smart information service delivery.

Interestingly, despite the low level of infrastructure and innovation, respondents strongly agreed on the positive impacts of digital readiness. The study found high agreement that digital readiness enhances service efficiency, improves user satisfaction, strengthens research support, and increases institutional visibility. This indicates a high level of awareness among librarians regarding the benefits of digital transformation. The implication is that the challenge is not a lack of understanding of the importance of digital readiness, but rather the inability to translate this awareness into practice due to existing constraints. The findings buttress the studies of Omeluzor, Ugochi, and Izuakolam (2020), Baidoo and Nwagwu (2024), and Potiskum and Abdullahi (2025) who asserted that the availability and adoption of technological tools in libraries can promote innovation in services delivery, *significantly enhance the utilization of information resources and promote* users' satisfaction.

The study also identified several critical challenges hindering digital readiness and service innovation such as technophobia, lack of institutional policies on digital technologies, inadequate funding, poor technological infrastructure, insufficient training opportunities, and poor space allocation. These challenges highlight systemic and structural issues rather than individual resistance to change, suggesting that librarians are generally willing to adopt new technologies if enabling conditions are provided. This finding underscores the need for institutional support, strategic planning, and investment in digital capacity building. This is in tandem with the findings of Atchrimi and Ogunbodede (2024), who reported inconsistent power supply, poor ICT facilities, and lack of ICT training opportunities among others as some of the challenges faced by librarians in acquiring digital skills, as against the findings of Etebu and Zacchaeus (2020) who revealed that alongside inadequate funding, inadequacy of specific skills, inadequate deployment of ICT

infrastructure, resistance to change is a major factor. The case may be different in the selected academic libraries in Ebonyi due to the presence of several emerging librarians much familiar with the digital information landscape.

In summary, the findings reveal serious implications for the future of librarianship in Nigeria as the current state of digital readiness could lead to professional obsolescence, reduced library patronage, persistent digital divide, declining relevance of libraries, and low research productivity. This implies that the relevance of academic libraries is being threatened by an increasingly digital information landscape unless strategic proactive actions are executed. This is corroborated by **Owolabi, Yemi-Peters, Oyetola, Bello and Oladokun (2022) who revealed that the readiness of university libraries in Nigeria towards the adoption of robotics technology is not encouraging, and Odunlade and Ojo (2023) who iterated that** digital transformation is yet to be fully embraced in Nigerian university libraries, as there is no significant change in the use of digital technologies in the deployment of library services in Nigerian academic libraries, and that digital transformation may yet remain an illusion even when the global narrative is already tending towards 5th industrial revolution.

Conclusion

Librarianship in Nigeria and all over the world is experiencing a highly competitive information environment marked by an exponential increase in the digital technologies that continue to reshape the information landscape. To contextualize this situation to the Nigerian Library and Information Service community, this study examined **digital readiness and service innovation in selected academic libraries in Ebonyi State, with the objective of establishing the implications for the future of librarianship in Nigeria. The findings indicate that** *b*asic digital infrastructure exists, but advanced technologies are lacking. The study indicates that the librarians possess foundational digital skills, but lack advanced competencies. Also, the study reveals that digital service innovation is minimal. Although, the awareness of the benefits of digital readiness on service innovation is high, the level of implementation is low. Systemic challenges such as institutional, financial, and capacity-related barriers hinder progress in service innovation in the libraries. The situation poses serious risks to the future of librarianship in Nigeria as it threatens the professional relevance of librarians, research productivity, library patronage, and expands persistent digital divide and inequality. It also limits access to global opportunities, service delivery and general redundancy in service delivery.

The study reveals that academic libraries risk becoming marginalized in an increasingly digital information environment unless proactive measures are implemented to address the anomalies. The study points at a clear disconnect between awareness and implementation. While librarians recognize the importance and benefits of digital readiness, the lack of adequate digital infrastructure, skills, and institutional support continues to limit the extent of digital service innovation. Addressing these gaps is essential for ensuring the sustainability and relevance of academic libraries in the digital age, and the protection and security of the future librarianship as a competitive information profession in Nigeria.

Recommendations

Against the backdrop of the findings of the study, the following recommendations are proposed:

I. Continuous capacity building for librarians to ensure that librarians are technically prepared and equipped for the challenges of innovative digital services delivery.
II. Increased investment in digital infrastructure in order to enhance the provision of advanced digital technologies for the delivery of innovative library services to users.
III. Promotion of an institutional culture that supports innovation and technological advancement through strategic policy design and implementation on the adoption of digital technologies in critical institutional sectors such as academic libraries in other to enhance the potentials of innovativeness in service delivery in academic libraries towards meeting the goals of the academic libraries, and by extension, their parent institutions.
IV. Alocation of adequate space for innovative library services delivery in academic libraries should be encouraged in order to maximise the potentials of the digital competencies acquired by academic librarians for innovative services delivery.

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Electronic Resources and Academic Activities in Federal University Libraries in North-East Nigeria: Users' Perception and Utilization

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Abstract

The emergence of electronic resources has transformed academic library services globally and has significantly reshaped access to information for teaching, learning, research, and scholarly communication. In university environments, electronic resources such as electronic journals, electronic books, online databases, institutional repositories, and other digital information systems have become indispensable tools for supporting academic activities. This study investigates users' perception and utilization of electronic resources for academic activities in Federal university libraries in North-East, Nigeria. Specifically, the study examines users' perceptions toward electronic resources, the extent to which these resources are utilized for academic purposes, challenges affecting effective use, and strategies for improving utilization. The study adopts a descriptive survey research design. The population consists of undergraduate students, postgraduate students and academic staff in selected federal universities in North-East, Nigeria. Stratified random sampling technique was used for selecting respondents, while data were collected through a structured questionnaire and analyzed using descriptive and inferential statistics. Findings indicate that users generally possess positive perceptions toward electronic resources and utilize them considerably for research, assignments, teaching preparation, literature review and current awareness services. However, infrastructural deficiencies such as unstable electricity supply, poor internet connectivity, inadequate information literacy skills and low awareness continue to constrain optimum electronic resources utilization. The study concludes that although electronic resources have become integral to academic activities, improved infrastructure, user education, increased funding, and sustainable digital resource management are essential for maximizing their benefits. The study recommends strengthening electronic resource services in federal university libraries through improved policy implementation, ICT support and regular training programs.

Keywords: Academic Activities, Electronic Resources, University Libraries, Users' Perception, Utilization

Introduction

Academic libraries have historically served as the intellectual hub of universities through the acquisition, organization and dissemination of knowledge resources. Traditionally, these functions relied heavily on print collections including books, journals, indexes and reference materials. However, developments in information and communication technologies have altered the information landscape, transforming academic libraries from predominantly print-based institutions into hybrid and digital information centers (Aina, 2021; Creswell & Creswell, 2023). This transition has led to the emergence and rapid growth of electronic resources as critical components of academic library collections.

Electronic resources have become central to modern scholarship because they provide timely, current and remote access to scholarly information. They include electronic journals, electronic books, online databases, institutional repositories, digital archives, open educational resources and internet-based information systems. Unlike print resources, electronic resources allow simultaneous access by multiple users, offer sophisticated search capabilities, support remote learning and enable users to retrieve current scholarly information regardless of geographical barriers (Nwachukwu, 2020; Ezeani, 2023)

In higher education institutions, electronic resources support diverse academic activities, including teaching, learning, assignment preparation, research, thesis writing, publication and professional development. Their role has become increasingly significant with the growth of digital scholarship, blended learning and online education. Students and faculty members depend on electronic resources not only for obtaining current literature but also for accessing multidisciplinary research outputs, citation databases, indexing services and scholarly communication platforms.

In Nigeria, university libraries have increasingly embraced electronic resources through subscriptions to databases such as JSTOR, ScienceDirect, EBSCOhost, AGORA, HINARI and institutional repositories. This development reflects broader efforts to modernize library services and align academic libraries with global digital information practices. Nevertheless, despite investments in electronic resources, evidence suggests that utilization in many Nigerian universities remains inconsistent and sometimes below expectations (Issa, Sadiku, & Kpakiko, 2021; Igbinovia, 2024). While resources may be available, several factors influence whether users perceive them positively and use them effectively.

Federal university libraries in North-East Nigeria operate in a context shaped by infrastructural limitations, funding constraints and varying levels of ICT development. Given these realities, investigating users' perception and utilization of electronic resources in these institutions becomes necessary for improving library service delivery and enhancing academic productivity. This study therefore examines electronic resources and academic activities in federal university libraries of North-East, Nigeria with emphasis on users' perception and utilization.

Statement of the Problem

University libraries in Nigeria have made considerable investments in electronic resources to support teaching, learning and research. These investments are intended to improve access to scholarly information, enhance academic productivity and strengthen the quality of university education. Despite these efforts, observations indicate that many subscribed electronic resources remain underutilized by users. In several instances, users depend more on general internet search engines and freely accessible online materials than on specialized scholarly databases subscribed to by their libraries.

This situation raises concerns about the extent to which investments in electronic resources are achieving their intended goals. If users do not fully utilize available electronic resources, the academic benefits expected from such investments may not be realized. Previous studies have attributed underutilization to factors such as poor internet connectivity, unstable electricity supply, inadequate awareness of available resources, low digital literacy skills, authentication challenges and insufficient user training (Yusuf, 2022; Idhalama, Oredo, & Makori, 2025)

In the context of federal university libraries in North-East Nigeria, these challenges may be more pronounced due to regional infrastructural limitations and resource constraints. Yet empirical evidence specifically examining users' perception and utilization of electronic resources in these institutions remains limited. This gap necessitates investigation into how users perceive electronic resources, the extent to which they utilize them for academic activities, the challenges affecting utilization and strategies for improvement.

Objectives of the Study

The broad objective of this study is to investigate users' perception and utilization of electronic resources for academic activities in Federal university libraries in North-East, Nigeria. Specifically, the study seeks to:

1. examine users' perception of electronic resources in federal university libraries in North-East, Nigeria.
2. determine the extent of utilization of electronic resources for academic activities.
3. identify academic activities supported through electronic resources.
4. investigate challenges affecting effective utilization of electronic resources.
5. suggest strategies for improving users' access to and utilization of electronic resources.

Research Questions

The study is guided by the following research questions:

1. What are users' perceptions of electronic resources in federal university libraries in North-East Nigeria?
2. To what extent are electronic resources utilized for academic activities Federal University Libraries in North-East Nigeria?
3. What academic activities are supported through electronic resources?
4. What challenges affect effective utilization of electronic resources?
5. What strategies can improve users' access to and utilization of electronic resources?

Research Hypotheses

The study tests the following null hypotheses:

H01: There is no significant relationship between users' perception and utilization of electronic resources in federal university libraries in North-East Nigeria.

H02: There is no significant difference in the utilization of electronic resources among undergraduate students, postgraduate students and academic staff.

H03: Infrastructure-related challenges have no significant effect on electronic resource utilization.

Literature Review

Concept of Electronic Resources

Electronic resources are information materials stored, accessed and disseminated through electronic means. They include e-journals, e-books, bibliographic databases, full-text databases, online reference sources, digital repositories and web-based scholarly information sources. Their emergence has transformed information provision in academic libraries by improving access, convenience and efficiency. Scholars have noted that electronic resources differ from traditional print materials in several important ways. They permit simultaneous access by multiple users, provide powerful search and retrieval features, support remote accessibility and often offer current information more rapidly than print collections. Their value in supporting research and scholarly communication has made them indispensable in academic libraries (Aina, 2021; Okorie, 2022)

Electronic resources have become particularly important in the contemporary knowledge environment where research productivity depends heavily on access to current and credible information. For university libraries, the integration of electronic resources reflects a shift toward user-centered digital information services capable of meeting the evolving needs of scholars.

Users' Perception of Electronic Resources

Perception refers to the way users understand, interpret and evaluate electronic resources in terms of usefulness, accessibility, reliability and relevance. Users' perceptions often influence acceptance and usage behavior. Where users perceive electronic resources as beneficial and easy to use, they are more likely to adopt and utilize them effectively. Studies have generally shown positive perceptions among university users toward electronic resources (Salah, Bello, & Gwarzo, 2024)

Many users recognize their convenience, speed and usefulness for research and academic tasks. However, perceptions may also be affected by challenges such as complex interfaces, access restrictions, unreliable internet connectivity and inadequate user skills. These factors can influence whether users consider electronic resources easy to use and worthwhile (Alabi, 2021; Ajisebutu et al., 2024).

The Technology Acceptance Model provides useful insight into the relationship between perception and use by emphasizing perceived usefulness and perceived ease of use as key determinants of technology adoption. This framework is relevant to understanding users' interaction with electronic resources (Davis, 1989, as applied in Ezeani, 2023)

Utilization of Electronic Resources for Academic Activities

Utilization refers to the extent to which users access and employ electronic resources in carrying out academic tasks. In university environments, electronic resources support numerous academic activities, including literature searches, assignment preparation, teaching preparation, project writing, data analysis, current awareness and scholarly publishing.

Many studies have reported increasing use of electronic resources for research-related activities, particularly among postgraduate students and faculty. Students frequently use e-journals and databases for assignments and project work, while academic staff use them for teaching materials, publication and research (Yusuf, 2022; Achugbue et al., 2023)

Nevertheless, frequency and depth of utilization often vary depending on awareness levels, digital skills, discipline, resource availability and institutional support. Effective utilization therefore depends not merely on access but also on users' competencies and the enabling environment.

Challenges Affecting Utilization

Despite their importance, electronic resources face numerous challenges affecting utilization, especially in developing countries. One major challenge is poor internet connectivity, which limits access speed and frustrates users. Another is unstable electricity supply, which disrupts access to digital services (Nwachukwu, 2020; Atanda et al., 2025)

Low awareness of available resources also affects utilization. In some cases, users may not know which databases are available or how to access them. Inadequate information literacy skills can further hinder effective searching and retrieval. Other challenges include authentication barriers, insufficient ICT facilities, limited funding and inadequate technical support. These challenges suggest that improving utilization requires attention not only to resource acquisition but also to infrastructure, training and user support services.

Theoretical Framework

This study is anchored on the Technology Acceptance Model (Davis, 1989, as applied in Ezeani, 2023). The model posits that users' acceptance and use of technology are influenced primarily by perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which users believe a technology will improve performance, while perceived ease of use refers to the extent to which they consider it free from difficulty.

Applied to this study, users are likely to utilize electronic resources when they perceive them as useful for supporting academic activities and easy to access and navigate. The model therefore provides a suitable framework for understanding the relationship between users' perceptions and utilization behavior.

Methodology

The study adopted a descriptive survey research design because it enables the collection of data from a representative sample to describe users' perceptions, utilization patterns, and challenges associated with the use of electronic resources. The population comprised undergraduate students, postgraduate students, and academic staff from selected federal universities in North-East Nigeria, namely: University of Maiduguri, Federal University Kashere, Federal University Gashua, Federal University Wukari, and Modibbo Adama University. A sample size of 400 respondents was drawn from the population using the Taro Yamane formula. Stratified random sampling was employed to ensure adequate representation across the various user categories, while simple random sampling was used to select individual respondents. Data were collected using a structured questionnaire titled "Users' Perception and Utilization of Electronic Resources Questionnaire (UPUERQ)." The instrument consisted of sections covering demographic information, users' perceptions of electronic resources, the extent of utilization, challenges affecting utilization, and strategies for improving access and use.

The questionnaire employed a five-point Likert scale to measure users' perceptions and challenges associated with electronic resource utilization, while utilization frequency was assessed using categories such as daily, weekly, monthly, and rarely. The instrument was subjected to face and content validation by experts in Library and Information Science

as well as Measurement and Evaluation. Reliability was established through a pilot study using the Cronbach Alpha reliability coefficient. Data were analyzed using frequency counts, percentages, mean scores, and standard deviations to answer the research questions. Furthermore, Chi-square, Analysis of Variance (ANOVA), and regression analysis were used to test the hypotheses at the 0.05 level of significance.

Findings

Table 1. Users' Perceptions of Electronic Resources

Statements	Mean	Std. Dev.	Decision
Electronic resources are useful for research	4.32	0.72	Accepted
Electronic resources improve academic performance	4.21	0.81	Accepted
Electronic resources are easy to access	3.68	0.89	Accepted
Electronic resources are reliable sources of information	4.15	0.76	Accepted
I prefer electronic resources to print resources	3.84	0.92	Accepted
Grand Mean	4.04		Accepted

Table 1 revealed a grand mean score of 4.04, which is higher than the criterion mean of 3.00. This indicates that respondents generally possess positive perceptions of electronic resources. The finding suggests that users recognize the usefulness, reliability, and academic value of electronic resources.

Table 2. Extent of Utilization of Electronic Resources for Academic Activities

Academic Activities	High Extent (%)	Moderate Extent (%)	Low Extent (%)
Research	72	22	6
Assignment Preparation	76	18	6
Teaching Preparation	68	24	8
Literature Review	71	20	9
Current Awareness	65	27	8

Table 2 indicated a high level of utilization of electronic resources for research, assignment preparation, and literature review activities. Assignment preparation recorded the highest utilization rate (76%), suggesting that users rely heavily on electronic resources to accomplish academic tasks.

Table 3. Electronic Resources Commonly Utilized by Respondents

Electronic Resources	Frequently Used (%)	Occasionally Used (%)	Rarely Used (%)
E-journals	74	19	7
E-books	61	28	11
Online Databases	69	22	9
Institutional Repositories	57	30	13
Internet Scholarly Sources	82	14	4

Table 3 revealed that Internet scholarly sources (82%) and e-journals (74%) were the most frequently utilized electronic resources among respondents. This finding implies that users depend extensively on online scholarly information sources to access current and relevant academic materials.

Table 4. Challenges Affecting Utilization of Electronic Resources

Challenges	Mean	Decision
Poor Internet Connectivity	4.55	Accepted
Unstable Electricity Supply	4.49	Accepted

Inadequate Awareness	4.20	Accepted
Limited User Training	4.11	Accepted
Authentication Problems	3.96	Accepted
Grand Mean	4.26	Accepted

Table 4 showed that poor Internet connectivity (Mean = 4.55) and unstable electricity supply (Mean = 4.49) were the most significant challenges affecting the utilization of electronic resources. Since all identified challenges recorded mean scores above the benchmark mean of 3.00, they were considered significant barriers.

Table 5. Strategies for Improving Utilization of Electronic Resources

Strategies	Mean	Decision
Improve Internet Facilities	4.61	Accepted
User Education Programmes	4.52	Accepted
Increase Funding for Databases	4.46	Accepted
Improve Remote Access Systems	4.28	Accepted
Alternative Power Supply	4.39	Accepted

Table 5 indicated that respondents strongly agreed that improving Internet facilities, implementing user education programmes, increasing funding for electronic databases, improving remote access systems, and providing alternative power supplies are critical strategies for enhancing the utilization of electronic resources.

Test of Hypotheses

Table 6: Chi-Square Analysis of Relationship Between Users' Perception and Utilization

Variables	X^2 Calculated	X^2 Critical	df	Decision
Perception and Utilization	34.56	9.49	4	Reject H01

The tested hypothesis revealed that since the calculated chi-square value of 34.56 is greater than the critical value of 9.49, the null hypothesis is rejected. This indicates a significant relationship between users' perception and utilization of electronic resources.

Table 7: ANOVA Showing Difference in Utilization Among User Categories

Source of Variation	Sum of Squares	df	Mean Square	F	Sig
Between Groups	26.41	2	13.21	5.62	.004
Within Groups	932.17	397	2.35		
Total	958.58	399			

Table 7 shows that since p = .004 is less than .05, a significant difference exists in utilization among undergraduate students, postgraduate students and academic staff. Thus, the null hypothesis is rejected.

These findings support the assumptions of the Technology Acceptance Model and align with previous studies indicating that both user attitudes and infrastructural conditions shape utilization patterns.

Discussion of Findings

The findings revealed that users generally possess positive perceptions toward electronic resources and utilize them substantially for research, assignments and teaching-related activities. However, infrastructural barriers significantly affect effective utilization. The hypotheses tested also established significant relationships among perception, user categories and utilization patterns.

Findings reveal that users generally hold positive perceptions toward electronic resources, corroborating with earlier studies (Alabi, 2021; Ajisebutu et al., 2024). Respondents agreed that electronic resources are useful for research, improve academic performance, support learning and provide reliable information. Positive perceptions suggest substantial acceptance of electronic resources among users.

The study also found considerable utilization of electronic resources for academic activities, consistent with previous findings (Yusuf, 2022; Abdulrazaq et al., 2026). Respondents frequently used electronic resources for assignments, literature review, research projects, teaching preparation and current awareness. Research and assignment preparation emerged as major activities supported by electronic resources.

However, utilization patterns varied among user groups, with postgraduate students and academic staff demonstrating relatively higher use than undergraduates. This difference may be associated with varying information needs, research intensity and digital competencies.

Regarding challenges, findings showed that poor internet connectivity and unstable electricity supply were major constraints affecting use, supporting related studies (Nwachukwu, 2020; Idhalama et al., 2025). Inadequate awareness of available databases, limited user training and authentication difficulties also emerged as significant barriers.

Hypothesis testing showed a significant relationship between users' perception and utilization of electronic resources, indicating that positive perceptions contribute to higher use. Infrastructure-related challenges were also found to significantly affect utilization.

Conclusion

Electronic resources have become indispensable components of academic library services and play significant roles in supporting academic activities in federal university libraries. This study has shown that users generally perceive electronic resources positively and utilize them substantially for research, assignments and teaching-related activities. However, utilization is constrained by infrastructural deficiencies, limited awareness and inadequate training. These challenges affect the extent to which users can maximize available electronic resources. The study concludes that improving electronic resource utilization requires not only acquisition of digital resources but also investments in infrastructure, user education and supportive institutional policies.

Recommendations

Based on the findings, the study recommends that:

- University management and library administrators should improve internet bandwidth and ICT infrastructure to support efficient access to electronic resources.
- Regular user education and information literacy programs should be organized by the library administrators to improve awareness and search competencies among users.
- Government and university authorities should increase funding for subscriptions to relevant electronic databases and maintenance of digital library services.
- Libraries should strengthen remote access systems and authentication mechanisms to facilitate seamless off-campus access.
- Alternative power solutions such as solar and backup systems should be provided by the university management to address unstable electricity supply.
- Libraries administrators should conduct regular orientation and database training workshops for students and academic staff. Continuous assessment of users' needs and utilization patterns should be carried out for improvement of electronic resource services.

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EMERGING TECHNOLOGIES FOR RESEARCH PROCESS: AN EXPLORATION OF LECTURERS' PERCEPTIONS AND USABILITY

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Abstract

This study investigated lecturers' perceptions and usability of emerging technologies (ETs) in the research process. ETs such as artificial intelligence (AI), machine learning, big data analytics, and digital collaboration tools have increasingly transformed academic research by improving efficiency, accuracy, and innovation. Despite these benefits, their adoption and use among lecturers remains inconsistent. The study adopted a descriptive survey research design, and data were collected from 175 lecturers from Five selected faculties in Federal University Oye-Ekiti, using a structured questionnaire as research instrument. Data were analyzed using descriptive statistics such as frequency counts, percentages, means, and standard deviation. Findings revealed that lecturers generally hold a positive perception of ETs (grand mean = 3.31), acknowledging their relevance in improving research quality, efficiency, and collaboration. However, the extent of use was moderate (grand mean = 2.95), indicating a gap between perception and actual usage. The study further found that key enablers of adoption include perceived usefulness, ease of use, access to digital resources, internet availability, and institutional support (grand mean = 3.24). Conversely, major challenges hindering adoption include high cost of technology, inadequate training opportunities, limited access to tools, lack of institutional support, and insufficient digital skills (grand mean = 2.99). The study concludes that although lecturers are positively disposed toward ETs, their full integration into research practices is constrained by institutional, technological, and individual barriers. It recommends improved infrastructure, continuous training, adequate funding, and supportive institutional policies to enhance effective adoption and use of ETs in academic research.

Keywords: Emerging Technologies (ETs), Perception, Usability, Lecturers, Research Process, Technology Adoption.

Introduction

The landscape of academic research is undergoing a profound transformation as emerging technologies (ETs) increasingly shape how scholars generate, analyse, and disseminate knowledge. Arviansyah, Azis, Sondari and Harsanto (2024) revealed that digital technologies have significantly transformed research processes by enhancing access to information, improving data analysis capabilities, and facilitating collaboration among scholars. ETs have enhanced personalization, and research productivity in higher education, helping researchers improve efficiency and depth (Matos, et al., 2025). The adoption of ETs across all stages of the research process ranging from literature searching and data collection to analysis, visualization, and dissemination of results has become increasingly prevalent in contemporary research practice. Onyema et al. (2024) stated that ETs provide easy access to vast amounts of information and

educational resources that support employment chances of academic professionals. ETs such as artificial intelligence (AI), machine learning, learning analytics, and extended reality (XR) are reshaping how academic research is conceptualized and executed, offering opportunities for enhanced efficiency, accuracy, and creativity in scholarly work. Chen, Lin and Li (2025) found that ETs such as AI, VR/AR, and big data are profoundly reshaping research and educational systems by enabling new models of innovation, interdisciplinary integration, and knowledge creation. Similarly, Isiaka et al. (2025) stated that AI tools have emerged as powerful enablers of research processes as AI applications are now widely used in literature searching, data mining, statistical analysis, plagiarism detection, academic writing assistance, and even peer review processes.

Emerging technologies are becoming central not just in pedagogical practices but also in research workflows, enabling lecturers and researchers to re-imagine traditional methods and embrace digital innovations that enhance research quality and impact. Onyema et al. (2024) stated that ETs provide easy and instant access to vast amounts of information and resources and researchers can explore a wide range of online materials, research papers, e-books, and educational videos to enhance their knowledge and skills. AI tools using natural language processing (NLP) and machine learning can automate literature search, screening, and data extraction, significantly reducing workload in systematic reviews (Bolaños, Salatino, Osborne and Motta, 2024). Furthermore, learning analytics and extended reality tools are not only enhancing teaching and learning environments but also providing researchers with real-time insights into data, user behavior, and system performance, thereby expanding methodological capabilities in empirical research contexts. Riordan et al. (2023) stated that learning analytics combined with AI provides scalable insights into learner and researcher behaviours, enabling data-driven decision making and personalisation. This technological integration promises important benefits in accelerating research processes, improving methodological rigor, and supporting evidence-based decision making in scholarly workflows.

Despite the potential for ETs to enrich research practices, the actual adoption and utilization of these tools by university lecturers vary widely. Empirical studies show that even when lecturers are aware of and have positive attitudes toward ETs such as artificial intelligence, the frequency and depth of actual usage remain low in many contexts. For example, Sheu (2025) found that lecturers perceive AI as beneficial for enhancing research design and methodological quality, but utilization of AI tools in research and assessment practices was low, with recommendations that institutions take active steps to promote effective implementation of AI. Furthermore, research from Nigerian higher education institutions indicates that access to reliable internet connectivity, institutional subscriptions to digital databases, training opportunities, and supportive policies significantly shapes lecturers' perceptions and willingness to use ETs for research (Uzorka et al., 2023). Ibrahim et al. (2025) indicated that users' perceptions of usefulness, ease of use, and trust significantly shape behavioural intention and actual use behaviour, confirming the mediating role of perception in adoption processes. However, lecturers' perceptions and usability of ETs are multidimensional and context-dependent, shaped by a combination of personal beliefs, institutional conditions, and ethical considerations rather than by technological availability alone.

Lecturers' perceptions and usability of ETs entail their attitudes, beliefs, and experiences regarding the usefulness, ease of use, accessibility, and effectiveness of these technologies in supporting various stages of the research process. Moreover, broader research on educational technology adoption underscores that perception plays a pivotal role in shaping technology use. Theoretical frameworks such as the Technology Acceptance Model (TAM) show that perceived usefulness and ease of use significantly influence lecturers' behavioural intentions to employ new technologies, including those relevant for research activities. Uzorka et al. (2023) suggests that lecturers and academic staff often face challenges related to digital literacy, access to infrastructure, professional development, and institutional support, which can influence their perceptions and actual use of emerging technology tools in research activities. Understanding lecturers' perception and usability of ETs in research is therefore critical for identifying gaps in adoption and use ethically. Given this landscape, examining how lecturers perceive and use ETs in the research process provides valuable insights into the enablers and barriers at both personal and institutional levels. This research contributes to that effort by examining how lecturers perceive and use emerging research technologies, identify factors influencing lecturers' adoption and use of emerging research technologies, and the implications for enhancing research productivity and academic excellence.

Research Questions

The following research questions are tailored for this study:

1. What are the lecturers' perceptions of ETs and their relevance to the research process?
2. What is the extent to which lecturers use ETs in various stages of research process?
3. What are the enablers of lecturers' adoption and use of ETs for research process? and
4. What are the challenges lecturers face in adopting ETs for research process?

Literature Review

In the context of research, emerging technologies (ETs) refer to innovative digital tools and systems that enhance research productivity, efficiency, and quality. These include artificial intelligence (AI), machine learning, big data analytics, extended reality (XR), cloud computing, and digital collaboration platforms. It is innovative and evolving

digital tools and systems that enhance and transform research processes by improving efficiency, analytical capacity, collaboration, and the dissemination of scholarly knowledge. According to Sembey, Hoda and Grundy (2024), ETs such as artificial intelligence (AI), learning analytics, and extended reality (XR) are rapidly gaining attention in higher education due to their transformative potential for teaching, learning, and research practices, even though many are still in early stages of adoption. Similarly, Qian (2025) refers to ETs has technologies that are in a rapid growth phase, significantly transforming teaching, learning, and scholarly activities while still undergoing refinement and integration into mainstream practice. Also, Veletsianos and Kimmons (2012) stated that ETs in higher education are characterized by their potential to disrupt traditional academic practices and introduce new ways of conducting research and knowledge production. Onyema et al. (2024) stated that ETs have revolutionized the research and publication process and that online databases, digital libraries, and academic search engines enable researchers to access a vast array of scholarly articles and publications.

Emerging technologies encompass a wide range of digital innovations including artificial intelligence (AI), machine learning, big data analytics, extended reality (XR), and learning analytics that are increasingly integrated into various higher education functions. Sembey, Hoda and Grundy (2024) stated that technologies have been used in higher education for many years and the use of ETs in education such as artificial intelligence, extended reality technologies such as virtual reality has proliferated in recent times. In academic research, ETs are increasingly acknowledged for their capacity to transform traditional research processes, including literature searching and discovery, data collection, analysis, and the dissemination of research outputs. Veletsianos and Kimmons (2012) stated that ETs have transformed traditional research practices by automating routine tasks, enabling advanced data analysis, and supporting collaborative research across geographic boundaries. Similarly, Bond et al. (2024) emphasized that ETs and AI technologies enhance research and academic performance by supporting data-driven decision-making, automation of tasks, and improved efficiency, particularly when aligned with user needs and institutional contexts. A comprehensive review shows that AI (especially NLP and machine learning) is widely used to automate searching, screening, data extraction, and synthesis, thereby reducing manual workload and improving efficiency and consistency in systematic reviews (Ofori-Boateng, Aceves-Martins, Wiratunga, Moreno-Garcia, 2024).

Notwithstanding the advantages that ETs provide for academic research practices and processes, lecturers' perceptions play a crucial role in determining the extent to which these technologies are adopted. Perception in this study refers to lecturers' subjective beliefs, attitudes, and evaluations regarding the usefulness, ease of use, and value of ETs in supporting research practices and processes. Positive perceptions, such as recognition of efficiency gains, and improved research quality increase lecturers' willingness to adopt these tools. According to Davis (1989), perceived usefulness and perceived ease of use are key determinants of individuals' acceptance of new technologies, directly influencing their intention to use them in the Technology Acceptance Model (TAM). Ibrahim et al. (2025) revealed that perceived usefulness remains the strongest predictor of intention to use emerging technologies, confirming that perception drives both adoption and effective utilization. Also, Venkatesh et al. (2003) emphasized that performance expectancy and facilitating conditions strongly shape users' adoption behaviour through the Unified Theory of Acceptance and Use of Technology (UTAUT). Granić (2022) stated that lecturers' confidence in their own digital competence has been identified as a key determinant of perception and adoption of technology and that lecturers with higher levels of digital literacy are more open to using AI-driven analytics and digital research platforms than those with limited exposure or training. Zawacki-Richter et al. (2019) argued that academics are more inclined to adopt ETs such as artificial intelligence when they perceive clear benefits for research efficiency, quality, and innovation, reinforcing the central role of perception in technology adoption decisions.

Usability on the hand, refers to the extent to which a system, tool, or technology can be employed by its intended users in a manner that is effective, efficient, and satisfying, enabling them to accomplish specific tasks or goals with minimal difficulty or frustration. According to Nielsen (2012), usability is a quality attribute that assesses how easy user interfaces are to use, encompassing learnability, efficiency, memorability, error frequency, and user satisfaction. For this study, usability refers to lecturers' ability to effectively, efficiently, and satisfactorily use ETs to perform research-related tasks, including literature searching, data collection, analysis, and dissemination of findings. International Organization for Standardization (ISO 9241-11) (2018) described usability as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. ETs may offer transformative capabilities but their actual impact on adoption for research depends heavily on usability. Zawacki-Richter et al. (2019) argued that academics are more likely to adopt ETs when they are user-friendly, reduce cognitive load, and align with researchers' workflows. Similarly, ISO 9241-11 (2018) emphasized that usability is a critical factor in determining whether users can effectively achieve their goals with a system. These highlighted the link between system design and successful adoption and reinforced the central role of usability in realizing the potential benefits of technological innovation.

Despite the fact that ETs play a crucial role in enhancing research practices by facilitating tasks such as data analysis, literature search and discovery, and collaborative knowledge, numerous barriers continue to hinder their widespread adoption among researchers. These barriers include limited digital literacy, inadequate infrastructure, insufficient institutional support, high costs, resistance to change, and ethical or privacy concerns, all of which can reduce the

effectiveness and integration of these technologies into regular research workflows. Onyema et al. (2024) stated that limited access to high-speed internet, computers, or other necessary digital tools can create barriers to fully leveraging the potential of ETs for academics. Similarly, Zhu and Yan (2025) identified data privacy, data leakage, and unauthorized access as major risks, noting that AI systems can expose sensitive academic and personal information due to weak data protection and excessive data collection. Furthermore, Mosha et al. (2026) reported that technical challenges such as poor infrastructure, system limitations, and difficult-to-use interfaces cause user frustration and restrict effective use of technologies, thereby negatively affecting academic activities. Studies indicated that lecturers have expressed concerns about plagiarism, data privacy, algorithmic bias, and over-reliance on AI tools, which shape cautious or conditional perceptions of ETs (Zawacki-Richter et al., 2019; Kasneci et al., 2023). These barriers underscore the need for comprehensive strategies that address both technical and human factors in ETs adoption for research. Okojie and Awoyemi (2024) emphasized that researchers are required to possess essential knowledge and skills to gather the necessary literacy and competence required to align the broader goals of AI with that of the academic community.

Despite increasing awareness of ETs, limited empirical research has focused specifically on lecturers' perceptions and usability of these technologies in the research process and practices. Most existing studies focus on teaching, learning, or general technology adoption, leaving a gap in understanding how these tools are utilized for scholarly research. For instance, studies by Mutanga et al. (2024) and Granić (2022) examined AI, digital platforms and ETs in higher education primarily in the context of teaching and student engagement rather than research workflows. Also, Zawacki-Richter et al. (2019) reviewed the adoption of learning analytics and AI tools across universities but noted a paucity of studies addressing the integration of these technologies into research-specific activities, such as literature review automation, data analysis, or collaborative research processes. This highlighted the critical need for empirical investigations that examine both perceptions and usability of ETs among lecturers to better understand adoption patterns and barriers in scholarly research which this study has done.

Methodology

This study adopted a descriptive survey research design to investigate lecturers' perceptions and usability of adopting ETs for research process. The target population comprises lecturers from Federal University Oye-Ekiti. A purposive sampling technique was used to select Five (5) faculties based on their discipline nature and active research involvement and familiarity with digital research tools. Data was collected using a structured questionnaire designed with Google Form, designed to capture information on lecturers' perceptions, extent of use, enablers, and challenges of ETs adoption for research process. The questionnaire employed Likert-scale items for quantitative analysis. The questionnaire link was shared electronically to the respondents via emails and WhatsApp platforms and it was left active for the period of 30 days. Respondents were informed about the purpose of the study and assured of the confidentiality of their responses. The researcher followed up with reminders to ensure a satisfactory response rate. Data obtained was analyzed using descriptive statistics (frequencies, percentages, mean scores and standard deviation) and presented in simple tables for easy interpretation and understanding. Ethical considerations, including informed consent and confidentiality, were strictly observed throughout the study to ensure the protection of respondents' rights.

Data Analysis and Results

Table 1: *Response Rate of the Study according to Faculty*

Faculty	**Frequency**	**Percentage (%)**
Faculty of Arts	32	18.27
Faculty of Communication and Media Studies	24	13.7
Faculty of Computing	13	7.4
Faculty of Education	67	38.2
Faculty of Social Science	39	22.2
Total	**175**	**100**

The distribution of respondents across faculties shows that the Faculty of Education recorded the highest representation with 67(38.2%) respondents, indicating that a substantial proportion of the participants were drawn from education-related disciplines. This suggests that the findings of the study may strongly reflect perspectives from the education sector. The Faculty of Social Science followed with 39(22.2%) respondents, while the Faculty of Arts accounted for 32(18.27%) respondents, both contributing a moderate share of the sample. The Faculty of Communication and Media Studies had 24(13.7%) respondents, indicating a relatively lower level of participation. The least represented faculty was the Faculty of Computing, with only 13(7.4%) respondents, suggesting limited input from technology-oriented disciplines. Generally, the distribution indicates that while the study captured responses from diverse academic fields, participation was uneven, with a strong dominance from the Faculty of Education and comparatively lower

representation from computing-related disciplines. This variation may influence the overall perspectives on ETs, particularly given the differing levels of technological exposure across faculties.

Table 2: *Lecturers' perceptions of ETs and their relevance to research process.*

Lecturers' Perceptions of ETs	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
The use of emerging technologies enhances the quality of research outputs.	92(52.6)	60(34.3)	15(8.6)	8(4.6)	3.35	0.74
Emerging technologies make literature search and discovery easier.	88(50.3)	65(37.1)	14(8.0)	8(4.6)	3.33	0.73
Emerging technologies are relevant to modern research activities.	95(54.3)	58(33.1)	12(6.9)	10(5.7)	3.36	0.77
The use of emerging technologies improves data analysis accuracy.	85(48.6)	63(36.0)	17(9.7)	10(5.7)	3.28	0.80
Emerging technologies useful in conducting my research tasks.	90(51.4)	60(34.3)	15(8.6)	10(5.7)	3.31	0.79
Emerging technologies are essential tools for contemporary academic research.	87(49.7)	62(35.4)	16(9.1)	10(5.7)	3.29	0.79
The integration of emerging technologies positively impacts research productivity.	89(50.9)	61(34.9)	14(8.0)	11(6.3)	3.30	0.81
Emerging technologies simplify collaboration among researchers.	80(45.7)	66(37.7)	18(10.3)	11(6.3)	3.23	0.82
Emerging technologies support innovation in research practices.	93(53.1)	58(33.1)	14(8.0)	10(5.7)	3.34	0.78
Emerging technologies improve the overall efficiency of the research process.	91(52.0)	60(34.3)	14(8.0)	10(5.7)	3.33	0.79
Grand Mean = 3.31						

Decision Rule: *If Mean Range is 1.00 – 1.49 (Strongly Disagree); 1.50 – 2.49 (Disagree); 2.50 – 3.49 (Agree) and 3.50 – 4.00 (Strongly Agree).*

The analysis of lecturers' perceptions of ETs reveals a strongly positive disposition toward their use in research processes. Across all items, the majority of respondents selected Strongly Agree (SA) and Agree (A), with combined percentages consistently exceeding 80%, indicating widespread acceptance of the relevance and usefulness of ETs in academic research. Specifically, over half of the respondents strongly agreed that ETs enhance the quality of research outputs (52.6%), support innovation in research practices (53.1%), and improve overall research efficiency (52.0%). Similarly, a significant proportion acknowledged that these technologies make literature search and discovery easier (50.3%) and are relevant to modern research activities (54.3%). These findings suggest that lecturers recognize the transformative potential of ETs in improving research effectiveness and productivity. Although a small proportion of respondents expressed disagreement across some items (generally below 10%), this indicates minimal resistance and suggests that negative perceptions are relatively limited. The mean scores for all items range between 3.23 and 3.36, with a grand mean of 3.31, confirming that lecturers generally agree with the positive statements regarding ETs. Furthermore, the relatively low standard deviation values (approximately 0.73–0.82) indicate consistency in responses, suggesting that lecturers share similar views on the benefits and relevance of ETs in research process.

Table 3: *Extent use of emerging technologies in various stages of research process.*

Extent of Use of ETs	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
I use emerging technologies for literature search and review.	70(40.0)	68(38.9)	25(14.3)	12(6.9)	3.12	0.89
I use emerging technologies for research writing and editing.	65(37.1)	70(40.0)	28(16.0)	12(6.9)	3.07	0.90
I use emerging technologies for dissemination of research findings.	55(31.4)	72(41.1)	32(18.3)	16(9.1)	2.95	0.96
I use emerging technologies for referencing and citation management.	60(34.3)	68(38.9)	30(17.1)	17(9.7)	2.97	0.97
I use AI-powered tools (e.g., text generation, analytics tools) in my research work.	50(28.6)	65(37.1)	35(20.0)	25(14.3)	2.80	1.05

I use emerging technologies for data collection.	58(33.1)	66(37.7)	32(18.3)	19(10.9)	2.93	0.99
I integrate digital platforms and tools throughout my research process.	57(32.6)	67(38.3)	31(17.7)	20(11.4)	2.92	1.00
I use emerging technologies for collaboration with other researchers.	62(35.4)	69(39.4)	27(15.4)	17(9.7)	3.00	0.96
I use emerging technologies for data visualization.	52(29.7)	64(36.6)	34(19.4)	25(14.3)	2.82	1.04
I use emerging technologies for data analysis.	54(30.9)	66(37.7)	33(18.9)	22(12.6)	2.87	1.02
Grand Mean = 2.95						

Decision Rule: *If Mean Range is 1.00 – 1.49 (Strongly Disagree); 1.50 – 2.49 (Disagree); 2.50 – 3.49 (Agree) and 3.50 – 4.00 (Strongly Agree).*

The analysis of the extent to which lecturers use ETs in the research process indicates a moderate level of utilization across the various stages of research activities. The results show that the majority of respondents selected Strongly Agree (SA) and Agree (A) across most items, although the combined percentages are generally lower than those observed for perception, suggesting a gap between perception and actual usage. Specifically, the highest levels of use were recorded in literature search and review (40.0% SA, 38.9% A; $\bar{x}$ = 3.12) and research writing and editing (37.1% SA, 40.0% A; $\bar{x}$ = 3.07), indicating that lecturers are more comfortable applying ETs in these foundational aspects of research. Similarly, a considerable proportion of respondents reported using these technologies for collaboration with other researchers ($\bar{x}$ = 3.00), reflecting the role of digital platforms in facilitating academic interaction. However, usage is relatively lower in more advanced or specialized areas. For instance, the use of AI-powered tools recorded the lowest mean score ($\bar{x}$ = 2.80), followed by data visualization ($\bar{x}$ = 2.82) and data analysis ($\bar{x}$ = 2.87), suggesting limited integration of sophisticated technologies into research workflows. Additionally, moderate usage levels were observed in data collection, referencing and citation management, and dissemination of research findings, with mean scores ranging between 2.92 and 2.97. The grand mean of 2.95 further confirms that lecturers utilize ETs to a moderate extent in their research process. The relatively higher standard deviation values (approximately 0.89–1.05) indicate variation in usage patterns, implying that while some lecturers actively use these technologies, others use them minimally.

Table 4: *Enablers of adoption and use of emerging technologies for research process.*

Enablers of Adoption and Use of ETs	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
Availability of reliable internet access enables my use of emerging technologies for research.	85(48.6)	62(35.4)	18 (10.3)	10(5.7)	3.27	0.81
My level of digital literacy enables me to adopt emerging technologies in research.	80(45.7)	65(37.1)	20 (11.4)	10(5.7)	3.23	0.82
Access to online databases and digital libraries supports my research activities.	88(50.3)	60(34.3)	17 (9.7)	10(5.7)	3.30	0.80
Positive attitude toward technology encourages my use of emerging tools.	90(51.4)	58(33.1)	17 (9.7)	10(5.7)	3.31	0.80
Access to up-to-date digital tools and software supports my adoption of emerging technologies.	82(46.9)	63(36.0)	20 (11.4)	10(5.7)	3.24	0.82
Availability of funding or grants supports my use of emerging technologies.	70(40.0)	65(37.1)	25 (14.3)	15(8.6)	3.09	0.90
Institutional provision of research technologies encourages my use of emerging tools.	78(44.6)	64(36.6)	21 (12.0)	12(6.9)	3.19	0.85
Perceived usefulness of emerging technologies motivates me to adopt them.	92(52.6)	55(31.4)	18 (10.3)	10(5.7)	3.32	0.80
Ease of use of emerging technologies encourages their integration into my research.	84(48.0)	61(34.9)	20(11.4)	10(5.7)	3.25	0.82
Collaboration with colleagues enhances my use of emerging technologies.	76(43.4)	66(37.7)	21(12.0)	12(6.9)	3.18	0.85
Grand Mean = 3.24						

Decision Rule: *If Mean Range is 1.00 – 1.49 (Strongly Disagree); 1.50 – 2.49 (Disagree); 2.50 – 3.49 (Agree) and 3.50 – 4.00 (Strongly Agree).*

The analysis of enablers of lecturers' adoption and use of ETs reveals a generally high level of agreement among respondents, indicating that several facilitating factors support the integration of these technologies into research processes. Across all items, the majority of respondents selected Strongly Agree (SA) and Agree (A), with combined

percentages consistently above 75%, suggesting that these enablers are widely recognized. Notably, perceived usefulness of ETs recorded the highest mean score ($\bar{x}$ = 3.32), indicating that lecturers are strongly motivated to adopt technologies when they perceive clear benefits for their research processes. This is closely followed by positive attitude toward technology ($\bar{x}$ = 3.31) and access to online databases and digital libraries ($\bar{x}$ = 3.30), highlighting the importance of both individual disposition and availability of research resources in driving adoption. Similarly, availability of reliable internet access ($\bar{x}$ = 3.27), ease of use of technologies ($\bar{x}$ = 3.25), and access to up-to-date digital tools and software ($\bar{x}$ = 3.24) were identified as strong enablers, emphasizing the role of infrastructure and usability in facilitating effective use. Digital literacy ($\bar{x}$ = 3.23) also emerged as a critical enabler, indicating that lecturers' competence with digital tools allows their ability to adopt ETs. However, some factors showed relatively lower influence. For instance, availability of funding or grants recorded the lowest mean score ($\bar{x}$ = 3.09), suggesting that financial support, although important, may not be as strong an enabler as perceived usefulness or accessibility. Likewise, institutional provision of research technologies ($\bar{x}$ = 3.19) and collaboration with colleagues ($\bar{x}$ = 3.18) were moderately rated, indicating room for improvement in institutional and collaborative support systems. The grand mean of 3.24 confirms that enablers of adoption and use of ETs are strongly present among lecturers. Additionally, the relatively low standard deviation values (approximately 0.80–0.90) indicate consistency in responses, suggesting that lecturers share similar views regarding the factors that facilitate technology adoption.

Table 5: *Challenges of adopting emerging technologies for research process*

Challenges of Adoption of ETs	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
Poor internet connectivity limits my use of emerging technologies.	35(20.0)	47(26.8)	51(29.1)	42 (24.0)	2.43	1.06
Inadequate digital skills when using emerging technologies.	60(34.3)	85(48.6)	10(5.7)	20 (11.4)	3.06	0.92
I find some emerging technologies complex and difficult to use.	62(35.4)	80(45.7)	12(6.9)	21(12.0)	3.05	0.95
Ethical concerns (e.g., plagiarism, data privacy) discourage my use of emerging technologies.	78(44.6)	60(34.3)	22(12.6)	15(8.6)	3.15	0.90
Time constraints make it difficult to learn and use emerging technologies.	58(33.1)	88(50.3)	10(5.7)	19(10.9)	3.06	0.91
Lack of institutional support hinders my use of emerging technologies.	82(46.9)	63(36.0)	20(11.4)	10(5.7)	3.24	0.82
Lack of training opportunities affects my ability to use emerging technologies.	86(49.1)	60(34.3)	19(10.9)	10(5.7)	3.27	0.82
Limited access to relevant tools and software affects my research process.	84(48.0)	61(34.9)	20(11.4)	10(5.7)	3.25	0.82
Resistance to change affects my willingness to adopt new technologies.	70(40.0)	65(37.1)	25(14.3)	15(8.6)	3.09	0.92
High cost of technology tools limits their use in my research.	90(51.4)	58(33.1)	17(9.7)	10(5.7)	3.30	0.83
Grand Mean = 2.99						

Decision Rule: *If Mean Range is 1.00 – 1.49 (Strongly Disagree); 1.50 – 2.49 (Disagree); 2.50 – 3.49 (Agree) and 3.50 – 4.00 (Strongly Agree).*

The analysis of challenges affecting lecturers' adoption of ETs reveals a generally high level of agreement that several factors hinder effective utilization of these tools in research processes. The grand mean of 2.99 indicates that respondents agree to a moderate extent that these challenges exist, suggesting that barriers to adoption are noticeable but vary in intensity across different factors. Among the identified challenges, high cost of technology tools ($\bar{x}$ = 3.30), lack of training opportunities ($\bar{x}$ = 3.27), and limited access to relevant tools and software ($\bar{x}$ = 3.25) emerged as the most notable constraints. This suggests that institutional and financial limitations play a major role in restricting lecturers' effective use of ETs. Similarly, lack of institutional support ($\bar{x}$ = 3.24) was also highly rated, indicating that inadequate organizational backing continues to hinder technology integration in research activities. Other notable challenges include ethical concerns such as plagiarism and data privacy ($\bar{x}$ = 3.15), as well as resistance to change ($\bar{x}$ = 3.09), which reflect psychological and ethical dimensions affecting adoption behavior. These findings suggest that beyond infrastructural issues, personal attitudes and ethical considerations also shape lecturers' engagement with ETs. Furthermore, challenges such as inadequate digital skills ($\bar{x}$ = 3.06), time constraints ($\bar{x}$ = 3.06), and complexity of technologies ($\bar{x}$ = 3.05) indicate that capacity-related issues also affecting usage. However, poor internet connectivity

($\bar{x}$ = 2.43) recorded the lowest mean, suggesting that while it remains a barrier, it is relatively less severe compared to other challenges in this study context.

Discussion of Findings

The findings of this study reveal that lecturers generally hold a positive perception of ETs, with a grand mean of 3.31, indicating agreement that such technologies enhance research quality, efficiency, collaboration, and innovation. This aligns with recent systematic reviews which show that ETs such as artificial intelligence, learning analytics, and extended reality are increasingly perceived as valuable tools for improving academic performance, enhancing efficiency, and supporting collaborative and innovative research practices (Sembey et al., 2024; Matos, et al., 2025). It also aligns with the Technology Acceptance Model (TAM) by Davis (1989), which posits that perceived usefulness and perceived ease of use significantly influence users' acceptance of technology. In this study, lecturers' strong agreement that ETs improve research processes suggests that perception is a key driver of potential adoption. In addition, Mena-Guacas et al. (2025) emphasized that ETs foster collaboration, interaction, and innovation by enabling dynamic engagement with digital tools and research environments, which strengthens their perceived relevance and usefulness in academic contexts. These findings collectively support the conclusion that positive perceptions among lecturers are driven by the observable benefits of ETs in enhancing research productivity and scholarly outcomes.

However, despite this positive perception, the extent of actual use of ETs is only moderate (grand mean = 2.95). This indicates a clear gap between perception and practice, where awareness and positive attitudes do not fully translate into consistent or advanced usage. This finding supports recent study by Sofi and Al-Fattal (2026), which identify a persistent "attitude–behaviour gap" in technology adoption, where favourable perceptions do not always result in actual use. Similarly, Galimova et al. (2024) revealed that although perceived usefulness and ease of use significantly influence behavioural intention, external factors such as accessibility, training, and institutional support determine whether intention is translated into actual usage. Furthermore, Zawacki-Richter et al. (2019) observed that although academics recognize the value of AI and digital tools in higher education, their practical integration into research activities remains limited due to contextual constraints. Also, a recent study by Maziriri (2026) highlights the broader intention–behaviour gap, showing that individuals may express strong positive attitudes toward technologies but fail to adopt them in practice due to complexity, uncertainty, or contextual limitations. These findings collectively explain why, despite positive perceptions of ETs, their actual use among lecturers remains moderate.

The study further found that the key enablers of adoption include perceived usefulness, positive attitude, access to digital resources, internet availability, and ease of use. These findings are consistent with recent systematic reviews by Feng et al. (2025), which identify perceived usefulness, ease of use, and facilitating conditions as core determinants of technology adoption across educational and research contexts. Found that performance expectancy (perceived usefulness) and effort expectancy (ease of use) significantly influence technology adoption, while facilitating conditions such as infrastructure and technical support serve as critical enablers of actual use. Similarly, Venkatesh et al. (2003) in the Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasized performance expectancy, effort expectancy, and facilitating conditions as major predictors of technology adoption. Institutional support and digital literacy also emerged as important enablers, highlighting the role of both organizational and individual readiness. Furthermore, a recent study Susanto et al. (2026), grounded in the Technology Acceptance Model showed that perceived usefulness and perceived ease of use remain the most influential predictors of technology adoption, shaping users' attitudes and behavioural intentions toward usage. In addition, empirical evidence from developing contexts indicated that internet availability, access to digital resources, and institutional support significantly enhance technology adoption, while poor infrastructure constrains usage (Muraina et al., 2025). Also, Duan et al. (2026) highlighted that positive user attitudes, digital literacy, and enabling environments (such as reliable internet and access to tools) play a crucial role in translating intention into actual technology use, reinforcing the importance of both psychological and infrastructural enablers in adoption processes.

Conversely, the study identified several challenges that hinder adoption of ETs. The most prominent barriers include high cost of technology, lack of training opportunities, limited access to tools, and inadequate institutional support. These findings corroborate recent systematic reviews which consistently report that financial constraints, insufficient digital skills, poor infrastructure, and weak institutional support remain major obstacles to effective technology adoption in higher education and research environments (Sembey et al., 2024; Adil, 2025). Also, a recent empirical by Muraina et al. (2025) revealed that poor access to digital resources and insufficient institutional readiness are persistent barriers that prevent sustained use of ETs in academic settings. Furthermore, Bond et al. (2023) found that limited funding, inadequate training, and lack of technical support significantly reduce users' ability to fully integrate digital tools into academic work, even when perceptions are positive and intention to use is high. In addition, a recent review on AI and digital transformation in education by Liu and Yushchik (2024) highlighted that cost of implementation, lack of technical

capacity, and weak organizational support structures are key limiting factors affecting adoption and scalability of ETs. These studies collectively suggest that despite the transformative potential of ETs, their effective adoption is constrained by structural, financial, and capacity-related challenges within academic institutions.

Conclusion

This study examined lecturers' perceptions, extent of use, enablers, and challenges of adopting ETs in the research process. The findings reveal that lecturers generally hold a positive perception of ETs, recognizing their importance in enhancing research quality, efficiency, collaboration, and innovation. This strong perception indicates that lecturers are aware of the potential benefits of these technologies in advancing scholarly research. However, despite this positive outlook, the actual extent of use of ETs remains moderate, suggesting a noticeable gap between awareness and practical application. While lecturers frequently use ETs for basic tasks such as literature search, writing, and collaboration, their use of more advanced tools such as AI-powered applications, data visualization, and data analysis remains relatively limited. The study further established that key enablers of adoption include perceived usefulness, ease of use, positive attitude toward technology, access to digital resources, internet availability, and institutional support. These factors collectively facilitate lecturers' willingness and ability to integrate ETs into their research activities. Conversely, several challenges hinder effective adoption, including high cost of technology tools, lack of training opportunities, inadequate institutional support, limited access to relevant software, and insufficient digital skills. Ethical concerns and resistance to change also contribute to the slow pace of adoption. The study concludes that although lecturers are positively inclined toward ETs, their full integration into research processes is constrained by structural, institutional, and individual barriers. Bridging this gap requires sustained investment in digital infrastructure, capacity-building programs, and supportive institutional policies that encourage the effective and ethical use of ETs in academic research.

Recommendations

Based on the findings of the study, the following recommendations are made to enhance lecturers' adoption and effective use of ETs in the research process:

1. The university should organize regular workshops, seminars, and hands-on training programmes to improve lecturers' digital literacy and technical competence in using ETs such as AI tools, data analytics software, and digital research platforms.
2. The university should invest in reliable internet connectivity, updated digital tools, and research software to ensure seamless access to ETs across all academic departments.
3. Government and university management should provide dedicated funding or grants to support the acquisition of research technologies and subscription to relevant academic databases and software tools.
4. Continuous professional development programmes should be introduced to enhance lecturers' confidence and competence in using advanced digital tools for research purposes.
5. Awareness campaigns should be carried out to reduce resistance to change and encourage lecturers to embrace ETs as essential tools for modern research.
6. The university should provide clear ethical guidelines on the use of ETs, particularly regarding plagiarism, data privacy, and responsible use of AI tools in research.
7. The university should encourage collaboration among lecturers through digital platforms to promote peer learning and shared use of ETs in research activities.

Suggestions for Further Research

Based on the scope and findings of this study, the following areas are suggested for further investigation:

1. Further studies may extend the investigation to postgraduate students and early-career researchers, to understand how ETs influence research development across different academic levels.
2. Future studies should consider conducting a comparative analysis across different faculties or universities to determine whether lecturers' perceptions and usage of ETs vary across diverse academic disciplines and environments.
3. Further research could adopt a mixed-methods approach, combining quantitative surveys with qualitative interviews or focus group discussions to gain deeper insights into lecturers lived experiences with ETs.
4. Studies may also examine the impact of specific ETs (e.g., artificial intelligence tools, machine learning applications, or data analytics software) on individual aspects of research productivity such as publication output, research quality, and citation impact.
5. Future research should explore the role of institutional leadership and policy frameworks in shaping the adoption and sustainability of ETs in higher education research practices.

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Emerging Trends Shaping the Future of Library and Information Science Research in Lokoja Journal of Information Science in Nigeria: A Descriptive Content Analysis

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ABSTRACT

This study explored the future of Library and Information Science in Nigeria through a systematic and descriptive content analysis of articles published in the Lokoja Journal of Information Science Research (LJISR). The Journal is a publication of the Department of Library and Information Science at Federal University Lokoja, Nigeria. Analyzing the contents of these articles provided valuable insight into the evolving direction of LIS in Nigeria. By means of a well-structured content analysis checklist, seventy peer-reviewed research articles were subjected to analysis in this article to identify dominant research themes, methodological orientations, authorship patterns, and their conformity with contemporary LIS development. The research findings indicate that the libraries in Nigeria place a great emphasis on ICT and digital. Research on user studies and information literacy also was featured prominently, showing sustained interest in access, user behaviour and service effectiveness. There is also a growing intellectual interest in knowledge management, research data management, and health information. Methodologically, the journal shows a heavy reliance on quantitative survey design, with limited use of qualitative or mixed-method approaches. Authorship analysis indicates a high level of inter-institutional collaboration within Nigeria and no international collaboration. The study concluded that while LJISR effectively captures indigenous scholarship and national technological adaptations, there is a need to align with global trends while responding to local realities. The study therefore recommended greater methodological diversity, increased international collaboration, and expanded attention to underexplored thematic areas to strengthen the future relevance and impact of Nigerian LIS scholarship. It was concluded that Lokoja Journal of Information Science Research has demonstrated strong relevance as a platform for documenting and advancing the intellectual direction of Library and Information Science research in Nigeria which covers major trends in digital transformation, new technologies, digital information literacy, scholarly communication and research support.

INTRODUCTION

Scholarly journals is one of the central infrastructures of scholarly communication. This has remained one of the major mechanisms through which scholarship is evaluated, improved and made trustworthy over the years. Academic journals are the principal platform through which scholars articulate, negotiate and reposition their research agendas. They do not function as passive repositories of complete research but acts as active gatekeepers that determine which topics gain legitimacy, which methodologies become normative, and which research directions receive sustained attention. The impact of journals on society is wider than academia as they facilitate the conversion of research into public knowledge. When scholarly work is effectively published, discovered, and preserved, it becomes available for teaching, policy, professional practice, innovation, community development, health communication, and informed public debate. Supporting this assertion Tenopir et al (2021) asserts that journals bridge the gap between research and practice; making sure that a new knowledge is not flowing between academics but also to policymakers, practitioners and the public. Journals have many uses in the life of scholars and researchers.

i. Journals serve as a lasting record of intellectual development. Knowledge is never in isolation; hence every issue adds to the knowledge base of future researchers. (Smith, 2020) The absence of this archival function could result in losses, fragmentation, or distortions.
ii. Published Journals serve as agenda-setting. What journals publish influences what students read, what practitioners adopt, what researchers imitate, and what institutions consider legitimate lines of inquiry
iii. Scholars get recognized in their field mainly by publishing their research in respectable journals or any other academic contribution.

iv. Scholarly journals bring together academicians to interface with other scholars anywhere in the world. This fosters inter-disciplinary cooperation and allows for ideas to become available worldwide (Beall, 2023)

Scholarly journals also have an impact on curriculum development, institutional policies, library practices, and the development of professional positions. For instance, library services and information management policies may rely on peer-reviewed evidence published in reputable journals.

Content Analysis of Journals

Journal articles as the primary evidence base for identifying how the field evolves over time, what topics gain legitimacy, what methods are normalized, and which lines of inquiry become central or marginal. Aharony (2012) posits that content analysis provides insight into the development of a profession as it indicates the subject trends and major issues that occupy the profession within a given period of time. Scholars have established that large-scale content analyses of LIS journals have shown that shifts in article topics, units of analysis, and methodological choices provide a reliable way to trace disciplinary change longitudinally (Aharony, 2012; Armann-Keown & Patterson, 2020; Järvelin & Vakkari, 2022; Tuomaala et al., 2014). For a field like LIS, where professional practice and scholarly discourse are tightly intertwined, journal content can therefore be read as a special useful indicator of emerging priorities, silences, methodological preferences, and collaborative patterns. This makes journal-based content analysis a credible route for evaluating how Nigerian LIS scholarship is positioning itself in relation to both local and global realities. Content analysis assists in analyzing the dominant themes, research approaches, data collection methods, authorship patterns, type of evidence, and intellectual evolution of a discipline, among others.

Lokoja Journal of Information Science Research

Lokoja Journal of Information Science Research is a Gold Open Access, peer-reviewed, bi-annual academic journal published by the Department of Library and Information Science at Federal University Lokoja Kogi State Nigeria. The journal was established in 2023 and has published six volumes. The scope of the journal includes librarianship, information science, data management, big data, digital scholarship, scholarly communication, digital and information literacy, fake news, digital information systems, and knowledge management. This relevance matters greatly for a study of emerging trends because it captures many of the major themes shaping LIS globally. Manuscripts are accepted continuously through out the year and published twice in the year. This ensures that the journal remain s responsive to the rapid development and current trends in LIS.

Statement of the Research Problem

Academic journals have been recognized as a major tool that provide evidence of dominant research interest, methodological orientation and for disseminating research outcomes. They also serve as primary mechanism through which academic disciplines define, negotiate and redirect their research agendas. A systematic analysis of all the contents of LIS journals is essential for understanding the growth, direction and future priorities of the discipline. The study of Library and Information Science have been thriving in the wake of the digital savvy users and emerging technologies. Despite the growth of LIS journals in Nigeria, there is little or no systematic evidence on their themes, methods, authorship patterns, affiliations, and trends. LJISR provides a platform for researchers to publish their articles, however the extent to which the articles published in the journal reflect emerging trends shaping the future of Library and Information Science in Nigeria has not been sufficiently examined through a systematic content analysis. This creates a knowledge gap in understanding the journal's intellectual contribution and relevance to LIS development. This study therefore seeks to conduct a content analysis of articles published in LJISR in order to identify dominant research themes, methodological approaches, authorship and institutional patterns, and the extent to which the journal reflects emerging global trends shaping the future of Library and Information Science research in Nigeria.

Research Objectives

i. To identify the dominant research themes covered in articles published in the Lokoja Journal of Information Science Research
ii. To identify the research methodologies and statistical techniques used in the article published
iii. To analyse the authorship patterns, collaboration trends, and instructional affiliations of contributors
iv. To determine the extent to which the articles reflect emerging global trends shaping library and information science research in Nigeria
v.

Literature Review

Literatures related to the area of the study was reviewed. Hence an overview of a discourse domain in dominant themes and topics published in LIS journal; authorship patterns and collaboration trends; authors institutional collaboration in LIS Research; research methodologies and statistical techniques used; and Emerging Global Trends in Library and Information Science Research

Dominant Themes and Topics Published in LIS Journals

There is a significant paradigm shift in the research themes of library and information science (LIS), from traditional focuses like classification, cataloguing, library services, information-seeking behaviour, bibliographic control, information retrieval etc., towards the digital transformation and data-centric. Currently researches are being dominated by the innovative technologies, namely, artificial intelligence (AI), big data and blockchain technology, which are bringing changes in information management and library services. The technological evolution is accompanied by a rise in scholarly communication and open access research which have emerged as high-growth dominant areas of investigation. Even though there is shift from traditional library themes, themes such as information literacy, information seeking behavior and user education remain stable across literatures (Ma & Lund, 2021). There is a notable increase in research that focus on social and ethical aspects of digital technology, data privacy, digital divide and artificial intelligence. Emerging research trends are increasingly shaped by emerging issues such as artificial intelligence, digital transformation, misinformation, data ethics, open science, digital inclusion, and the changing information behavior of users in digital environment (IFLA, 2024). Therefore, dominant library and information science research themes are no longer limited to traditional library operations, they now include broader concerns about access to information technology adoption, digital equity, and artificial intelligent.

Authorship Patterns and Collaboration Trends

Authorship patterns depict the occurrence of single-authored and multi-authored publications. Studies have shown that authorship patterns in library and information science have undergone a definitive transition from a traditional solo scholarship to a predominantly collaborative model (Heneberg & Chumanchenko, 2025 and Song et al., 2025). It can be argued that the infusion of technology and interdisciplinary nature of LIS have been the driving force toward collaborative and multi-authored research. Supporting this assertion Thavamani (2015) and Abu & Verma (2019) asserts that research on LIS journals has demonstrated that co-authorship is increasingly prevalent, especially regarding digital libraries, bibliometrics, information behaviour, scholarly communication and information technology. To illustrate, Abu and Verma (2019) discovered that most articles in the Annals of Library and Information Studies were multi-authored, indicating a strong level of cooperation among LIS researchers. Author collaboration enhances intellectual exchange, enhances credibility, engenders mentorship, fosters interdisciplinary thinking, and improves distribution and impact in scholarly writing. Supporting this assertions Kademani et al., (2005), posits that collaboration between researchers enhances research quality as authors can share ideas, critique each other's argument, improve the design of research and produce more robust scholarly work. Recent Nigerian LIS journal studies show that two-author and institutional collaboration are becoming more visible, although international collaboration remains relative limited (Martins & Joshua, 2024).

Authors Institutional Collaboration in LIS Research

Authors' institutional affiliation collaboration in research refers to research publication of authors who are from the same institution, different institution and from different country. It is an important indicator to measure the magnitude of research networking, institutional productivity, scholarly diversity, and knowledge sharing in discipline. The increasing dominance of authors collaboration both within and between institutions has been documented to enhance efficiency and productivity as well as produce better science (Wuchty, Jones & Uzzi, 2007). The institutional affiliation of authors is one of the most common attributes of authorship studied in LIS. It is usually studied along with some of the following attributes: authorship, occupation, National Affiliation, co-authorship, etc. The importance of institutional collaboration indicates whether a few institutions dominate LIS research or whether it is a reflection of wider participation of universities, libraries, research centres and professional communities. According to Owens (2023), co-authorship in academic librarianship journals is on the rise emphasizing that global cooperation in LIS can enhance the quality of research and broaden its visibility. It follows that by examining the institutional affiliations of authors in LIS research, one can understand the collaboration patterns, the representation of institutions, inclusiveness of research and the degree to which LIS scholarship benefits from wider academic and professional networks.

Research Methodologies and Statistical Techniques Used

Research methods and statistical techniques are essential indicators of the processing quality, empirical strength, and methodological direction of journal articles. The studies on Library and Information Science (LIS) articles have shown that survey research, content analysis, bibliometric analysis, case study, experimental design, a qualitative inquiry, and mixed-methods are largely used (Chu, 2015; Hider & Pymm, 2008). Earlier content analysis of LIS journal articles also revealed that empirical research strategies have remained central to the discipline particularly in studies dealing with information use, library services, information retrieval and user behaviour (Järvelin & Vakkari, 1993). Statistical techniques used in literature information science articles depend on the type of research and data. But the mostly included are frequency counts, percentages, mean, standard deviation, correlation, chi-square, regression, and other inferential statistics. These statistical analysis support objective interpretations of data and strengthen the credibility of findings. As a result, a detailed analysis of the methods and statistical tools used in these articles helps us to determine whether the articles being published are descriptive, empirical, qualitative, quantitative, or mixed-methods type. Chu (2015) further observed that LIS research has expanded in its use of diverse methods, showing that methodology and statistical analysis are useful indicators of research maturity, rigour and disciplinary growth.

Emerging Global Trends in Library and Information Science Research

The emerging global trends in LIS research are increasingly driven digital technology, Artificial Intelligence, open science, research data management, disinformation, digital inclusion, user experience, and ethical information governance. The 2024 IFLA Trend Report shows that the future of libraries is being influenced by changes in the information and knowledge environment including technology, trust and access, privacy, sustainable development and other similar issues (Dezuanni et al. 2024). Furthermore, current reports on academic library trends reveal that library research and practice are now mainly focused on generative AI, AI literacy, open access and open science, student well-being, and the digital learning environment (ACRL Research Planning and Review Committee, 2024). Research in Artificial intelligence in library relates to information retrieval, knowledge organisation, user-centred services, digital information management, and ethical issues as well (Islam & Guangwei, 2025). Furthermore, another important global trend is that of research data management. Libraries are being increasingly expected to support data sharing, reuse, preservation, data literacy, and open research practices (Subaveerapandiyan & Ugwulebo, 2024). Consequently, LIS research is broadening its focus from traditional library services to encompass digital innovation, ideal technology, openness, data and information stewardship, information ethics and equitable access to knowledge.

Methodology

The methodology adopted for this study was descriptive content analysis in order to examine, quantify and analyze articles published in the Lokoja Journal of Information Science Research from 2023 to 2025. Library and information Science researchers have used this methodology to analyze a variety of data sources. According to Krippendorff (2013), descriptive content analysis, is a research technique often used in the social sciences "for making replicable and valid inferences from texts to the contexts of their use". Beck and Manuel (2008) posits that descriptive content analysis is a very attractive method for library researchers because it is non-reactive, unobtrusive, and not limited by geography location. It has been adopted by many disciplines to analyze documentation and communications of various formats, including journal articles

The population of the study consisted 70 articles that were published in Lokoja Journal of Information Science Research (LJISR) from 2023 through 2025 (Volumes 1–6). The entire population of the study was taken as the sample size because of the small size. A structured content analysis checklist was used as the instrument for data collection. The checklist captured variables such as article title, year of publication, research theme, methodology adopted, statistical techniques used, number of authors, pattern of collaboration and emerging global trends in Library and information Science. Data for the content analysis of journal articles was collected from the official site of the journal https://ljisr.net.ng/lis/en. The data collected was analysed using frequency counts, percentages, and tables to show patterns and tends in the published article.

Data Analysis

This data analysis aims to conduct a systematic empirical assessment of the Lokoja Journal of Information Science Research (LJISR). This was based on the journal's 2023-2025 volumes. This section examines a sample of 70 peer-reviewed articles to break down the journal's structural, thematic, and methodological configurations. The distribution of the 70 articles in six different journal issues for a period of three years is shown in table 1. The number of publications remains fairly stable, having between at least 9 articles in Vol. 2 No.1 (2024) and a maximum of 14 articles in Vo. 2 No.2 (2024).

Table 1: Articles Published in LJISR from 2023 - 2025

S/N	Volume/Issue	Year	No. of articles identified
1	Vol. 1 No. 1	2023	12
2	Vol. 1 No. 2	2023	13
3	Vol. 2 No. 1	2024	9
4	Vol. 2 No. 2	2024	14
5	Vol. 3 No. 1	2025	11
6	Vol. 3 No. 2	2025	11
Total Articles			70

Dominant Research Themes Covered in Articles Published in LJISR (2023–2024)?

The study sought to identify the dominant research themes covered in the articles published in LJISR between 2023 – 2025. The result is shown in Table 2, and from the thematic analysis of the 70 articles, ten (10) dominant theme clusters ranked by frequency of occurrence were established. The analysis revealed that Digital and open educational resources and library systems top the rank with 20.0%, closely followed by emerging technologies, AI and automation with 18.6%.

Community, inclusion and development communication as well as Environmental information, climate and disaster management were the least dominant theme with 4.3%

Table 2: Dominant Themes Across All LJISR Issues

Rank	Dominant theme	No. of articles	Approx. share
1	Digital/open educational resources and library systems	14	20.0%
2	Emerging technologies, AI and automation	13	18.6%
3	Information literacy, user education and information behavior	8	11.4%
4	Scholarly communication, research productivity and research support	8	11.4%
5	Library workforce, competencies and job performance	6	8.6%
6	Health information, misinformation and bibliotherapy	6	8.6%
7	Library services, user engagement and marketing	5	7.1%
8	Records, archives and information management	4	5.7%
9	Community, inclusion and development communication	3	4.3%
10	Environmental information, climate and disaster management	3	4.3%
TOTAL		70	100%

The data clearly indicates that more than one-third of the journal's scholarly output focuses in technology-mediated information services and digital innovation

Research Design in LJISR (2023-2025)

Table 3 provides a detailed breakdown of research methodologies employed in LJISR articles from 2023 to 2025, categorizing studies by research design and presenting both frequency and percentage distributions. This analysis is crucial for understanding the epistemological approaches, empirical strategies, and methodological preferences that characterize LJISR scholarship over the years. It was discovered that survey research is the dominant methodology, with 48 articles representing 68.6%. This is closely followed by descriptive survey with 35 articles representing 50.0%. Experimental or quasi-experimental design is the most unpopular research design appeared in only 1 article, representing 1.4%.

Table 3: Research Methodologies in LJISR (2023–2025)

Research Design	Frequency	Percentage
Survey Research	48	68.6%
Descriptive Survey	35	50.0%
Literature Review/Survey	8	11.4%
Case Study	6	8.6%
Comparative Study	3	4.3%
Content Analysis	2	2.9%
Experimental/Quasi-Experimental	1	1.4%
Mixed Methods	2	2.9%

This reliance on descriptive surveys implies that while the field is generating plenty of measurable data, it lacks deep, context-rich qualitative insight. Relying heavily on self-reported survey data can limit the critical rigor and global impact of the journal's scholarship.

Authorship Pattern

Table 4 shows the authorship pattern of the 70 articles published in LJISR between the years of 2023 to 2025. The publications are categorized according to their number of authors from single-authored to five-or-more co-authored. Authorship patterns indicate collaborative culture, knowledge production and distribution mechanisms as well as scholarly networking in a discipline.

Table 4: Authorship Pattern

Authorship Type	Number of Articles	Percentage
Single Author	18	25.7%
Two Authors	28	40.0%
Three Authors	15	21.4%
Four Authors	6	8.6%
Five or More Authors	3	4.3%

According to the data in table 4, the single-authored articles were 18 (25.7 %). Most publications (28 articles) comprised two authors, representing 40.0%. Out of the total 70 articles, 15 articles or 21.4% were by three-author articles followed by 6 articles or 8.6% were by four-author articles. The least represented were articles with five or more authors, which had 3 publications, 4.3%.

Institutional Collaboration

Detailed analysis of institutional collaboration patterns among the authors of LJISR from 2023 to 2025 is shown in table 5. This analysis reveals whether LJISR research is intra-institutional (authors were from the same institution), inter-institutional domestic (authors were from different Nigeria institutions), or international (authors were Nigerian and foreign institutions). The awareness of the collaborative pattern of institutions will help determine the extent of scholarly networks and knowledge flow patterns

Table 5: Institutional Collaboration Types

Collaboration Type	Number	Percentage
Intra-institutional	38	54.3%
Inter-institutional (Domestic)	24	34.3%
Inter-institutional (International)	0	0.0%
Single Author	18	25.7%

Table 5 presents the institutional collaboration patterns represented in LJISR articles. The data show that intra-institutional collaboration had the highest occurrence, with 38 articles representing 54.3%. Inter-institutional domestic collaboration accounted for 24 articles, representing 34.3%. International collaboration recorded 0 articles, representing 0.0%, while single-author articles accounted for 18 publications, representing 25.7%

Alignment of LJISR Articles with Emerging Global Trends

The researchers sought to ascertain the extent to which LJISR articles conform to emerging global trends in the area of Library and Information science research. This study is important for assessing the relevance of LJISR articles to current international LIS discourse and its potential contribution to global discourse while addressing Nigeria-specific issues. Table 6 shows the outcome of the analysis.

Table 6: Alignment of LJISR Articles with Emerging Global LIS Trends (2023–2025)

Rank	Global LIS trend area	No. of LJISR articles aligned	Percentage
1	Digital transformation and digital access	14	20.0%

2	Artificial intelligence and emerging technologies	13	18.6%
3	Open science, scholarly communication and research support	8	11.4%
4	Information literacy, misinformation and trust	8	11.4%
5	Workforce skills, professional competencies and job performance	6	8.6%
6	Health information and social well-being	6	8.6%
7	User experience, engagement and service innovation	5	7.1%
8	Records, archives and documentation	4	5.7%
9	Equity, inclusion and community engagement	3	4.3%
10	Sustainability, climate and disaster resilience	3	4.3%
	Total	**70**	**100%**

Table 6 examines the extent to which LJISR articles align with emerging global trends in Library and Information Science. The strongest area of alignment is **digital transformation and digital access,** with 14 articles representing 20.0%. This is followed by **artificial intelligence and emerging technologies**, with 13 articles representing 18.6%. These two areas show very high percentage of articles published in LJISR align with global LIS trends. The least research areas that does not align with global trend was recorded in **equity, inclusion and community engagement** and **sustainability, climate and disaster resilience,** each with 3 articles representing 4.3%.

Discussions of Findings

The findings in table 2 clearly reveals that LJISR reflects the current technological transformation within the field of Library and Information Science. Evidently, Nigerian LIS scholars are responding to the digital information environment because they have written strong articles on digital resources, library systems, artificial intelligence, automation and emerging technologies. This finding supports Chen et al. (2018) who observed that that LIS research has shifted away from conventional cataloguing and classification, and target instead digital transformation, big data, artificial intelligence and technology-based information service. It also agrees with IFLA (2024), which identified artificial intelligence, digital inclusion, misinformation, data ethics and digital access as major trends shaping the future of LIS research.

However, the relative low representation of themes such as environmental information, climate change, disaster management, inclusion and community development suggests that researchers submitting their articles to the journal underexplore these areas. This means although LJISR is strong in more scholarship that is technology-related, it should also have open submissions for more articles that discuss climate information services, indigenous knowledge systems, inclusive librarianship, disability access, community informatics, data ethics and misinformation

The data in table 3 clearly indicate that LJISR articles are heavily dominated by survey research, particularly descriptive survey design. This suggests that most contributors rely on questionnaires and quantitative description to examine issues related to library users, information resources, digital tools, staff competencies and service delivery. This pattern is not unusual in LIS research. Chu (2015) and Hider and Pymm (2008) observed that survey research is one of the most frequently used methods in Library and Information Science because many LIS studies focus on users, institutions, services, attitudes, awareness and patterns of use. The implication of this finding is that LJISR has a strong empirical orientation, but the methodological diversity of the journal is still limited. Heavy dependence on survey design may restrict the depth of interpretation, especially for complex issues such as artificial intelligence ethics, user experience, information behaviour, institutional culture and digital inclusion. This finding supports Järvelin and Vakkari (1993), who noted that empirical research has remained central to LIS, but it also reinforces Chu's (2015) argument that LIS research needs greater methodological variety to reflect the maturity and complexity of the discipline.

Table 4 reveals that LJISR article is dominated by collaborative authorship. Multiple authored articles account for 52 out of 70 articles, representing 74.3%. The dominance of two-author articles suggests that collaboration in the journal is active but mostly occurs in small research teams. This finding supports Heneberg and Chumanchenko (2025) and

Song et al. (2025), who observed that authorship in Library and Information Science has shifted from solo scholarship to collaborative research. It also agrees with Thavamani (2015) and Abu and Verma (2019), who found that multi-authorship has become increasingly visible in LIS journals, especially in areas such as digital libraries, bibliometrics, information behaviour and scholarly communication. Collaboration can improve research quality because authors bring different perspectives, skills and experiences to the research process. This supports Kademani et al. (2005), who argued that collaboration enhances research quality through shared ideas, critique and improved research design. However, the low proportion of articles with five or more authors suggests that large-scale interdisciplinary research teams are still limited. LJISR may therefore encourage more multi-institutional and interdisciplinary studies involving librarians, computer scientists, educationists, data scientists, health information professionals and policy experts.

Results of the study as showed in table 5 revealed collaboration within Nigerian LIS scholarship; however, it is largely domestic. This indicates the Nigerian LIS scholars are working together and building national scholarly network. The absence of international collaboration is an indication that LJISR has not yet fully connected with global research networks. This supports Martins and Joshua (2024), who observed that Nigerian LIS journals are increasingly showing evidence of collaboration, although international collaboration remains limited. Unfortunately, the absence of international collaboration may limit the journal's global visibility, citation impact, methodological diversity and exposure to wider theoretical perspectives.

A strong alignment with digital transformation (20.0%) and AI (18.6%) indicates that LJISR performs well in technology-driven changes currently reshaping Nigerian libraries. The combined 38.6 percent emphasis on technological themes positions LJISR as responsive to global trends. This supports the finding of ACRL (2024) which posits that a significant trend for academic libraries includes generative AI; AI literacy; open access and open science. The high number of articles on AI and emerging technologies demonstrates that LJISR is in complaints with the global trend. LJISR must expand the scope of its themes for coverage so as to bring research on green libraries, climate information services, inclusive library services, indigenous knowledge systems, access for disabilities, data justice, privacy, misinformation and ethical information governance.

Conclusion and Recommendations

The content analysis has provided a comprehensive evidence that Lokoja Journal of Information Science Research has demonstrated strong relevance as a platform for documenting and advancing the intellectual direction of Library and Information Science research in Nigeria. The journal covers major trends in digital transformation, new technologies, digital information literacy, scholarly communication and research support. In order to enhance its future relevance and global competitiveness, the following recommendations are made: ensure relevance and worldwide competition in the future, it is recommended that:

1. The editorial board should intentionally increase its thematic space by promoting more articles under-represented themes like climate change information services, green libraries, native knowledge systems, digital divide, misinformation, data ethics and privacy, health information literacy, and community informatics.
2. The Department of Library and Information Science, Federal University Lokoja, should begin to seek a grant for the conduct of a specialized workshop and training clinic for authors. The sessions should include advanced research paradigms, such as qualitative phenomenology; case studies; content analysis; and mixed-method research designs.
3. The editorial board should develop strategies to attract international authors and reviewers. This can be achieved through special issues, international calls for papers, collaboration with foreign LIS schools, and inclusion of international scholars in the editorial advisory board
4. Efforts must be made to facilitate inter-disciplinary and inter-professional collaboration. LIS researchers must collaborate with scholars in computer science, education, communication, health sciences, data science, artificial intelligence, archives, public administration and environmental studies.
5. The editors should think about producing themed issues in these areas to stimulate scholarship. This will help it become the leading Nigerian journal for research into the future of Library and Information Science.

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EMOTIONAL INTELLIGENCE AS A PREDICTOR OF RESEARCH PRODUCTIVITY AMONG MEDICAL LECTURERS IN FEDERAL UNIVERSITIES IN NORTH-WEST NIGERIA: A QUANTITATIVE STUDY

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Abstract

The study investigated emotional intelligence as a predictor of research productivity among medical lecturers in Federal universities in North-West Nigeria. The specific objectives of the study are to determine the degree of emotional intelligence of medical lecturers; ascertain the level of research productivity of medical lecturers; and to test null hypothesis on significant relationship between emotional intelligence and research productivity of medical lecturers in federal universities in North-West Nigeria. Correlational type of descriptive research design was employed and the target population of this study comprises 775 medical lecturers teaching in the five fully operational medical colleges in Federal Universities in North-West, Nigeria. The study applied Yamane's (1967) formula at a 0.05 margin of error, a sample size of 264 medical lecturers was used for the study through simple random sampling technique. Structured questionnaire (with four point Likert scale) was used as instrument for data collection. However, 264 copies of questionnaire were distributed to the medical lecturers out of which 209 (79.2%) were duly filled, returned and found usable for the analysis using descriptive and inferential statistics. The study revealed that medical lecturers in the surveyed federal universities demonstrated high degree of emotional intelligence, especially in self-awareness, self-regulation and empathy. Equally, the study found that medical lecturers in federal universities in North-West Nigeria demonstrated high level of research productivity. The study established that there is significant relationship between emotional intelligence and research productivity of medical lecturers in the studied Federal Universities in North-West, Nigeria. In conclusion, this study shows that medical lecturers in federal universities in North-West Nigeria possess high degree of emotional intelligence and substantial research productivity, with emotional intelligence strongly impacting their research productivity. Based on the findings of the study, it is therefore recommended that management of the studied federal universities in North-West Nigeria should promote emotional intelligence development through regular training and professional development programmes for medical lecturers. Emotional intelligence skills should be integrated into staff development and mentoring initiatives to enhance research productivity. Policy makers and federal university administrators in North-East Nigeria should consider emotional intelligence as a supportive factor in the improvement strategies for research performance.

Keywords: Emotional intelligence; Federal universities; Medical lecturers; Nigeria; Research productivity.

Introduction

Research productivity is a key metric of academic achievement and institutional effectiveness worldwide. It denotes the extent to which academic staff generates new knowledge through scholarly publications, research funding, innovations, conference presentations, supervision of postgraduate students, and other research-related endeavours. In universities, research productivity is a criterion for the promotion and professional recognition of academic staff, including medical lecturers, and is a significant factor affecting institutional ranking, prestige, funding opportunities, and contributions to national and global development.

Research productivity in medical and health sciences is crucial for improving healthcare quality, medical education, and clinical practices. Medical lecturers are expected to conduct significant research on pressing health issues such as

communicable and non-communicable diseases, maternal and child health, mental health, antimicrobial resistance, and cancer. The quantity and quality of their research outputs significantly affect their academic standing and contributions to public health improvements. However, researchers have characterised research productivity as the quantity and calibre of scholarly outputs generated by academic staff within a specified timeframe, encompassing number of published textbooks as single author, chapters in books, articles in journals, public debates and lectures, editorial work, co-authored textbooks, conference proceedings, teaching, ongoing research, supervision, community services, obtaining research grants, and curriculum development (Jaunch & Glueck, 2020).

Furthermore, personal characteristics like emotional intelligence have been recognised as significant predictors of academic achievement and research productivity. Emotional intelligence means the ability to recognise, comprehend, manage, and regulate both one's own emotions and those of others (Kannaiah & Shanthi, 2015). In the academic setting, emotional intelligence affects how educators handle work-related stress, manage research demands, cooperate with peers, address problems, and maintain motivation for long-term research objectives.

Emotional intelligence encompasses essential elements including self-awareness, self-regulation, motivation, empathy, and social skills. These competencies empower medical lecturers to navigate frustration from research setbacks, adapt to technological challenges related to electronic databases, maintain motivation during protracted research processes, and collaborate effectively in research endeavours (Rashidi *et al.*, 2023). Medical lecturers possessing elevated emotional intelligence are consequently more skillful in managing the emotional necessities of research endeavours, and sustaining a constant research output.

Therefore, it is essential to investigate the relationship between emotional intelligence and research productivity. Comprehending the relationship of these aspects is crucial within the framework of Federal Universities in North-West Nigeria, where limitations pertaining to infrastructure, training, and individual capacity may influence research results.

Statement of the Problem

Research productivity is essential for evaluating academic efficacy in medical and health sciences, directly influencing healthcare and education. Nigerian medical lecturers experience low and inconsistent research output comparative to worldwide standards, which may be attributed to diminishing publication rates and challenges in securing research grants. Their considerable teaching and administrative duties further constrain their research potentials. There is a notable scarcity of empirical studies investigating the correlation between emotional intelligence and research output among medical lecturers. Addressing this deficiency is crucial for formulating focused strategies to improve both emotional capabilities and research productivity in the medical domain.

Literature Review

Research productivity of medical lecturers is influenced by a combination of individual and institutional factors. Academics concur on its importance for scholarly advancement and institutional development; yet, there is no consensus on the primary determinants. These varied perspectives reveal deficiencies in both theory and practice, particularly within federal universities in North-West Nigeria. Popoola (2019) opined that publication output substantially affects the productivity of academic personnel. It allows medical lecturers to disseminate insights, exhibit academic research, achieve recognition for innovative thinking, and ultimately establish a reputation for knowledge in a specialised field.

Similarly, Bassey et al. (2018) noted that publication output is critically important for academic staff, making their promotions mostly contingent upon it. The aforementioned indicates that publication output significantly impacts the career advancement of medical lecturers and garners both local and international attention for academic institutions. This attention may manifest in cash grants, partnerships, and research collaborations. Popoola (2019) asserted that the publication output of medical lecturers can be quantified by tallying the number of journal articles, technical reports, conference papers, books, or book chapters published over a specified timeframe. The predominant methods for assessing research productivity entail quantifying the number of published journal articles.

Emotional intelligence on the other hand, it involves managing moods and emotions in the workplace to achieve desired performance levels (Kamel *et al.,* 2022). Medical lecturers, as professionals, must develop strategies to effectively manage their emotions in both teaching and clinical settings. In the view of Davoudi *et al. (*2020), emotional intelligence is about effectively dealing with emotions and emotional issues, expressing them appropriately, and working together toward common goals. In addition to that, emotional intelligence, therefore, involves understanding one's own and others' feelings and emotions, as well as the ability to regulate emotions and engage in emotional reasoning. EI, according to Ahsan (2023), is the ability to perceive and understand personal feelings and those of others. It encompasses self-awareness, empathy, self-regulation, motivation, and social skills.

Emotional intelligence in this study refers to as a medical lecturer's ability to recognize and manage their emotions, affecting their research-related thoughts, behaviors, and decisions. There are varying viewpoints on the relationship between emotional intelligence and the research productivity of lecturers, especially its connection to positive results like improved academic performance, supportive learning environments, and increased psychological well-being for educators and students.

However, scholars like Suleman *et al.* (2019) have found that there is a positive effect between emotional intelligence and academic as well as professional success. This indicates that there can be a positive effect between emotional

intelligence and the research productivity of medical lecturers at Federal Universities in the North-West. Researchers found a positive correlation between emotional intelligence and academic achievement (Aithal *et al.* 2016, Ibrahim *et al.* 2017, Moslehi *et al*. 2015, Wijekoon *et al.* 2017). The present study investigated the relationship between emotional intelligence and the research productivity of medical lecturers in Federal Universities in the North-West of Nigeria.

Objectives of the Study

The main objective of this study is to investigate the emotional intelligence as a predictor of research productivity among medical lecturers in federal universities in North-West Nigeria. The specific objectives are to:

1. determine the degree of medical lecturers emotional intelligence in Federal Universities in North-West, Nigeria;

2. ascertain the level of research productivity among medical lecturers in Federal Universities in the universities under study; and

3. determine the relationship between emotional intelligence and research productivity of medical lecturers in Federal Universities in North-West, Nigeria.

Methodology

In an attempt to achieve the objectives of this study, a quantitative research approach was adopted. Correlational type of descriptive research design was employed and the target population of this study comprises 775 medical lecturers teaching in the five fully operational medical colleges in Federal Universities in North-West, Nigeria. The study applied Yamane's (1967) formula at a 0.05 margin of error, a sample size of 264 medical lecturers was used for the study through simple random sampling technique. Structured questionnaire (with four point Likert scale) was used as instrument for data collection. However, 264 copies of questionnaire were distributed to the medical lecturers out of which 209 (79.2%) were duly filled, returned and found usable for the analysis using descriptive and inferential statistics.

Data Presentation and Analysis

Emotional Intelligence among Medical Lecturers

To ascertain the medical lecturers emotional intelligence of electronic databases for research productivity in Federal Universities in North-West, Nigeria is the response to this objective. Fifteen items were assessed. The views of the medical lecturers were sought on the items concerning the objective. The decision was based on a benchmark mean of 3.18. Their responses are attained in mean and standard deviations as well as complete information were also provided in Table 1

Table 1: Medical Lecturers' Emotional Intelligence in Federal Universities in North-West, Nigeria

S/N	Statements	SA 4		A 3		D 2		SD 1		FX	X	SD	Decision
		F	%	F	%	F	%	F	%				
1	I am aware of my strength and weakness for research productivity	101	48.3	98	46.9	8	3.8	2	1.0	716	3.42	0.615	High
2	Time spent on electronic databases has helped my research productivity	60	28.7	48	22.9	82	39.2	19	9.1	567	2.71	0.748	Low
3	My level of recognition, feelings and emotions affect others at both academic and clinical settings has helped my research productivity	76	36.4	102	48.8	24	11.5	7	3.3	665	3.18	0.763	High
4	I believe self-regulation enhances my research productivity	97	46.4	101	48.3	7	3.3	4	1.9	709	3.39	0.653	High
5	Self-regulation effectively meet my demand for research productivity	117	56.0	69	33.0	19	9.1	4	1.9	717	3.43	0.678	High

6	My level of sensation, attitudes and feelings of others has helped my research productivity	98	46.8	35	16.7	47	22.5	29	13.9	620	2.96	0.665	Low
7	I feel encouraged to continue working on research even when I face setback	84	40.2	82	39.2	36	17.2	7	3.3	661	3.16	0.828	Low
8	I maintain a positive attitude during the research process regardless of difficulties	99	47.4	85	40.7	14	6.7	11	5.3	690	3.30	0.724	High
9	My ability to always create time to mentor colleagues has helped my research productivity	104	49.8	83	39.7	13	6.2	9	4.3	700	3.34	0.783	High
10	I find that electronic databases anticipate and provide relevant information resources on my research queries	119	56.9	72	34.4	13	6.2	5	2.4	723	3.45	0.720	High
11	I satisfied with the responsiveness of electronic databases on issues encountered during research	78	37.3	24	11.5	85	40.7	22	10.5	576	2.75	0.670	Low
12	I understand the emotions of my colleagues when we collaborate on research project	93	44.5	85	40.7	26	12.4	5	2.4	684	3.27	0.758	High
13	Interactive features of electronic databases enhance my research productivity	98	46.9	86	41.1	23	11.0	2	1.0	698	3.33	0.710	High
14	Electronic databases facilitate collaboration with other researchers through communication tools	80	38.3	77	36.8	31	14.8	21	10.0	634	3.03	0.757	Low
15	My relationship with a wide circle of individuals including medical librarians has helped my electronic resources collection development	69	33.3	83	39.7	43	20.6	14	6.7	625	2.99	0.699	Low
	Weighted Mean										**3.18**	**0.865**	

Key: SA= Strongly Agree, A= Agree, D= Disagree, SD= Strongly Disagree, N= 209 number of retrieved questionnaire, X= Mean, SD= Standard Deviation. Decision - Weighted average 47.7/15 (Weighted mean=3.18)

Table 1 revealed that out of the fifteen items listed on Medical lecturers emotional intelligence in Federal Universities in North-West, Nigeria; nine items produced mean scores which were above the weighted mean of 3.18 and S.D of 0.865. These items include item 1: I am aware of my strength and weakness for research productivity ($\bar{x}$ =3.42; SD =0.615), item 3: My level of recognition, feelings and emotions affect others at both academic and clinical settings has helped my research productivity ($\bar{x}$ =3.18; SD =0.763), item 4: I believe self-regulation enhances my research productivity ($\bar{x}$ =3.39; SD =0.653), item 5: Self-regulation on electronic databases effectively meet my demand for research productivity ($\bar{x}$ =3.43; SD =0.678), item 8: I maintain a positive attitude during the research process regardless of difficulties ($\bar{x}$ =3.30; SD =0.724), Item 9: My ability to always create time to mentor colleagues has helped my research productivity ($\bar{x}$ =3.34; SD =0.783), item 10: I find that electronic databases anticipate and provide relevant information resources on my research queries ($\bar{x}$ =3.45; SD =0.720), item 12: I understand the emotions of my colleagues when we collaborate on research project ($\bar{x}$ =3.27; SD =0.758), and item 13: Interactive features of electronic databases enhance my research productivity ($\bar{x}$ =3.33; SD =0.710).

On the other hand, six items produced low mean scores which were below the weighted mean of 3.18 and S.D of 0.865. These items include items 2,6,7,11,14 and 15. Hence, there is low level on awareness of time spent on electronic databases has helped my research productivity, low level of sensation, attitudes and feelings of others, low level on feeling encouraged to continue working on research even when they face setback, low level of satisfaction with the responsiveness of electronic databases on issues encountered during research, low level on understanding the emotions of their colleagues when collaboration on research project, and low level on their relationship with a wide circle of individuals including medical librarians has helped electronic resources collection development.

Furthermore, this study finding revealed that out of the fifteen items listed, nine items produced mean scores which were above the average decision benchmark of 3.18 and S.D of 0.865, and only six items listed produced low mean scores which were below the average decision benchmark of 3.18 and S.D of 0.865 this is an indication that medical lecturers in the surveyed federal universities demonstrated a high degree of emotional intelligence, particularly in self-awareness, self-regulation and empathy.

Level of Research Productivity among Medical Lecturers

To ascertain the level of research productivity of medical lecturers in Federal Universities in North-West, Nigeria is the response to this objective. Fifteen items were assessed. The views of the medical lecturers were sought on the items concerning the objective. The decision was based on a benchmark mean of 2.51. Their responses are attained in mean and standard deviations as well as complete information were also provided in Table 2

Table 2: Level of Research Productivity of Medical Lecturers in Federal Universities in North-West, Nigeria

S/N	Variables	16 above		11-15		6-10		1-5		FX	X	SD	Decision
		VHL		HL		LL		VLL					
	Statements	F	%	F	%	F	%	F	%				
1	Number of published textbooks as single author	33	15.8	32	15.3	15	7.2	129	61.7	387	1.85	1.251	Low
2	Number of chapters-in-book	38	18.2	37	17.7	27	12.9	107	51.2	424	2.02	1.098	Low
3	Number of articles in learned journals	97	46.4	55	26.3	25	11.9	32	15.3	635	3.03	1.001	High
4	Number of editorial works	21	10.0	47	22.5	51	24.4	90	43.1	417	1.99	1.038	Low
5	Number of co-authored textbooks	89	42.6	54	25.9	35	16.7	31	14.8	619	2.96	1.160	High
6	Number of papers published in conference proceedings	21	10.0	62	29.7	69	33.0	57	27.2	465	2.22	1.142	Low
7	Number of students supervised	70	33.5	62	29.2	28	13.4	49	23.4	571	2.73	1.324	High
8	Number of collaborative researches	96	46.0	57	27.2	23	11.0	33	15.8	634	3.03	1.110	High
9	Number of research grants	33	15.8	61	29.1	88	42.1	27	12.9	518	2.47	1.184	Low
10	Number of curriculum development	25	12.0	41	19.6	44	21.1	99	47.4	410	1.96	1.115	Low
11	Number of ongoing researches	74	35.4	59	28.2	42	20.1	34	16.3	591	2.82	1.055	High

12	Number of technical reports	44	21.1	46	22.0	33	15.8	86	41.1	466	2.22	1.188	Low
13	Number of community services	73	34.9	61	29.2	36	17.2	39	18.7	586	2.80	1.048	High
14	Number of citation indices (i.e. Google scholar, Scopus, EBSCOhost, Web of science etc.)	65	31.1	74	35.4	56	26.8	14	6.6	608	2.99	1.171	High
15	Number of courses teaching	64	30.6	58	27.8	38	18.2	49	23.4	555	2.65	1.111	High
	Weighted Mean										**2.51**	**1.065**	

Key: VHL = Very High Level, HL = High Level, LL= Low Level, VLL = Very Low Level, N= 209 number of retrieved questionnaire, X= Mean SD= Standard Deviation. Decision - Weighted average 37.74/15 (Weighted mean=2.51)

Table 2 revealed that out of the fifteen items listed on level of research productivity of medical lecturers in Federal Universities in North-West, Nigeria; eight items produced mean scores which were above the weighted mean of 2.51 and S.D of 1.065. These items include item 3: Number of articles in learned journals ($\bar{x}$ =3.03; SD =1.001), item 5: number of co-authored textbooks ($\bar{x}$ =2.96; SD =1.160), item 7: number of supervisees ($\bar{x}$ =2.73; SD =1.324), item 8: Number of collaborative researches ($\bar{x}$ =3.03; SD =1.110), item 11: number of ongoing researches ($\bar{x}$ =2.82; SD =1.055), item 9: number of research grants ($\bar{x}$ =2.77; SD =1.184), item 13: number of community services ($\bar{x}$ =2.80; SD =1.048), item 14: number of citation index i.e. Google scholar, Scopus, EBSCOhost, Web of science etc. ($\bar{x}$ =2.99; SD =1.171), and item 15: number of courses taught ($\bar{x}$ =2.65; SD =1.111).

On the other hand, six items produced low mean scores which were below weighted mean of 2.51 and S.D of 1.065. These items include items 1,2,4,6,9,10 and 12. Hence, there is low level on number of published textbooks as single author, low level on number of chapters-in-book, low level on number of editorial works, low level on number of papers published in conference proceedings, low level on number of research grants obtained, low level on number of curriculum development, and low level on number of technical reports.

However, this study finding revealed that out of the fifteen items listed, eight items produced mean scores which were above the average decision benchmark of 2.51 and S.D of 1.065, and seven items listed produced low mean scores which were below the average decision benchmark of 2.51 and S.D of 1.065, this shows that medical lecturers demonstrate reasonable strength in core academic and collaborative research activities with notable weaknesses in grant acquisition. The overall finding indicates a moderate to high level of research productivity among medical lecturers in Federal Universities in North-West Nigeria.

Relationship between Emotional Intelligence and Research Productivity among Medical Lecturers

Ascertain if there is any relationship between emotional intelligence and research productivity among medical lecturers in Federal Universities in North-West, Nigeria.

To test the hypothesis and analyze the data, Pearson Product Moment Correlation (PPMC) was used. A correlation test was carried out by associating both medical lecturers emotional intelligence on electronic databases and research productivity of medical lecturers in Federal Universities in North-West, Nigeria. The result of the analysis is presented in the Table 3.

Table 3 Relationship between emotional intelligence on electronic databases and research productivity of medical lecturers

Variables	Mean	Std. Deviation	N	DF	R	P-value
Emotional Intelligence	50.50	6.73	209			
Research Productivity	33.64	11.22	209	207	.198**	0.004

*P<0.05 is significant, DF: degree of Freedom; **R= correlation*

The result presented in the table 3 indicates the relationship between emotional intelligence on electronic databases and research productivity of medical lecturers. The relationship was found to be significant with (r = 0.198, Df =207, P = 0.004 i.e less than 0.05). This implies that there is significant relationship between emotional intelligence on electronic databases and research productivity of medical lecturers in Federal Universities in North-West, Nigeria.

Discussion of Findings

The findings indicated that medical lecturers in the surveyed federal universities demonstrated a high degree of emotional intelligence particularly in self-awareness, self-regulation and empathy. The emotional competencies have positively influenced research productivity by improving motivation, interpersonal relationships, and resilience in addressing academic challenges. Their capability to regulate emotions, demonstrate empathy, and maintain focus on

long-term research objectives has been advantageous in academic and clinical settings. The findings highlight the necessity for focused strategies to improve the emotional and collaborative skills of medical lecturers.

This study is in line with the study findings of Tegegnea and Wondimua (2024) that the instructors had high levels of emotional intelligence and effective communication but low levels of organisational commitment. There were significant positive correlations among these variables. Effective communication partially mediated the relationship between emotional intelligence and organisational commitment. It was the strongest predictor of organisational commitment, followed by emotional intelligence. This study concurs with Agyemang *et al.* (2021) in asserting that high emotional intelligence enhances stress management, facilitates effective collaboration, and promotes persistence in academic tasks, all of which are critical for sustained research output. Researchers with high emotional intelligence tend to engage with electronic databases in a patient, strategic, and adaptable manner, particularly when faced with access limitations or technical challenges (Eziagu *et al*., 2022).

This study found that medical lecturers in federal universities in North-West Nigeria demonstrate a high level of research productivity in the areas of number of chapters-in-book, number of co-authored textbooks, number of supervisees, number of research grants, number of ongoing researches, number of community services, number of citation index i.e. Google scholar, Scopus, EBSCOhost, Web of science etc., and number of courses taught.

The findings support Udo and Asuquo's (2020) assertion that significant engagement with co-authored works and research supervision is particularly notable, indicating robust collaborative relationships and a persistent dedication to academic mentoring and capacity development. Similarly, this finding aligns with Bassey et al. (2018), indicating that universities create an environment conducive to research-oriented activities, provide academic staff with equitable opportunities for research, and enhance government funding to support university research initiatives. This study finding is contrary to the findings of Bai (2022), that the research productivity of 182 Chinese academics teaching English as a foreign language from 2014 to 2018 was relatively low, particularly in terms of the quality of their research. Accordingly, the researcher synthesised the findings from the study and presented a framework for Chinese institutions and teaching English as some foreign language departments to enhance their teaching English as a foreign language academics' research capacity.

On the relationship between emotional intelligence and research productivity among medical lecturers in Federal Universities in North-West, Nigeria, the result indicated that emotional intelligence and research productivity have significant relationship. This could be due to the ability of emotionally intelligent lecturers to mitigate technology-induced stress, sustain motivation, and employ proficient problem-solving abilities. This study finding corroborated with the submission of Tegegnea and Wondimua (2024) that identified substantial positive correlations between emotional intelligence and organisational commitment among university professors, with emotional intelligence serving as a robust predictor of professional results.

It is also in line with Al-Oweidat *et al.,* (2023) who found out that there was a substantial positive correlation between emotional intelligence and organisational commitment among nurses in Jordanian government hospitals, suggesting that individuals with elevated emotional intelligence exhibit superior work performance and engagement. Similarly, Seif *et al.* (2023) demonstrated that critical aspects of emotional intelligence, specifically emotion regulation and emotion utilisation, were significantly correlated with enhanced academic performance in medical students.

Conclusion and Recommendations

Medical lecturers in the surveyed federal universities demonstrated a high degree of emotional intelligence especially in the areas of self-awareness, self-regulation, and empathy. These emotional competencies seem to positively impact research productivity by promoting intrinsic ambition, reinforcing interpersonal relationships, and improving resilience against academic obstacles. The capacity to adeptly manage emotions, exhibit sympathetic comprehension, and maintain concentration on long-term research objectives represents a notable positive correlation existed between emotional intelligence and research productivity.

Based on the findings of this study, the following recommendations were drawn:

1. University management of the studied federal universities in North-West Nigeria should promote emotional intelligence development through regular training and professional development programmes for medical lecturers.
2. Emotional intelligence skills should be integrated into staff development and mentoring initiatives to enhance research productivity.
3. Policy makers and federal university administrators in North-East Nigeria should consider emotional intelligence as a supportive factor in the improvement strategies for research performance.

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Empowering African Information Professionals through Cooperative Librarianship and Technological Innovation for Sustainable Service Delivery

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Abstract

This paper examines the intersection of technological development, innovative practices, and the future of library and information professionals with a call for cooperative librarianship in Africa. The study seeks to present a discourse on innovation and library services as a concept, discuss the rationale for innovative library practice in current dispensation; highlight on concept of co-operative librarianship with reference to digital environment; articulate the factors driving innovative library practice and co-operative librarianship, explain the factors limiting sustainable innovative and co-operative librarianship in technological driven age. This study adopts a qualitative conceptual approach, employing narrative content analysis of existing literature to generate data for the study. Discourses on innovative library services as a concept with an analysis of the technological situation in developing countries were presented; the concept of co-operative librarianship with reference to digital environment is also explained. The strategies for developing innovative leadership and enhancing innovative library practice in this digital era include possession of technology-driven skills, enhanced strategic leadership, good working conditions, formulation of innovative library policy, and willingness to adapt and adopt new technologies. The limitations to sustainable innovative library practice and co-operative librarianship include resistance to changes by library leaders cum managers, dearth of digital infrastructures that facilitate digital oriented services, shortage of digitally-trained librarians, low level of funding, the proliferation of technological devices, high cost of implementing digital-related services, etc. This paper contributes to existing literatures in innovations and technological applications in the field of librarianship. It provides a framework for further studies relating to technological applications to library practices within the context of co-operative librarianship. The paper concludes by presenting justification for cooperative librarianship in the areas of recruitment of well-trained and skilled personnel, training and re-training of library and information professionals, acquisition and provision of digital infrastructure and resources, etc.

Keywords: **Co-operative librarianship, Innovative practices, Technological development**

Introduction

The global library and information science (LIS) environment has witnessed significant transformation driven by rapid advancements in digital technologies, artificial intelligence, and networked information systems. Libraries worldwide are increasingly adopting innovative tools and collaborative frameworks to enhance service delivery, improve access to information, and meet the evolving needs of users. Within this context, cooperative librarianship encompassing resource sharing, inter-library collaboration, and joint service initiatives has become a critical mechanism for maximizing efficiency, expanding collections, and fostering innovation. In other words, the 21st century, libraries are no longer viewed solely as static repositories of books and other information resources; they are dynamic, multifaceted institutions that respond to the evolving needs of society (Isa & Hassan, 2025). The contemporary library environment is characterized by inevitable change due to pervasiveness of the application of information, technology and communication to the operation. By implication, the integration of innovative technologies into library services represent a paradigm shift in how libraries function and deliver value to their communities (Omolade, Funmilola & Peter, 2025).

However, though libraries and information centers have been using innovative technologies in providing services to satisfy the diverse information needs of their users; as well as it is acknowledged that embracing innovative technologies is essential for libraries to remain relevant and continue to meet the diverse and dynamic needs of their patrons in a rapid changing information landscape (Ogunmodede & Popoola, 2021; Ogonu & West, 2024), the situation in Africa reflects a different reality. Many libraries across the continent continue to grapple with persistent challenges such as inadequate funding, limited technological infrastructure, insufficient professional capacity, and weak policy support. These constraints have hindered the effective adoption of emerging technologies and the full implementation of cooperative practices. Consequently, a noticeable gap exists between global best practices in innovative, collaborative librarianship and the operational realities of libraries in many African countries.

To bridge this gap, there is need to effectively navigate the evolving digital landscape, libraries must adopt a proactive approach (Mohammed, Alumona, & Uzomba, 2023). Being conversant with the emerging technologies will

enable leaders and managers of the 21st century libraries to maintain active awareness of the dynamic of global political environment and apply practical solutions to their different problems to achieve organizational success (Ailakhu, 2017).

Collaboration touches every facet of librarianship. Collaboration, and its benefits focuses on several aspects generally, collaboration constitutes more than one person's involvement and interpersonal relationship to achieve more goals and success (Roy & Habib, 2024). Apparently, due to the rapid changes in information, technology, and paradigm shift in library systems and services, there is a need to explore how collaboration among libraries can support innovation, optimize limited resources, and enhance service delivery within the African context. Addressing this need will not only bridge the divide between global trends and local practice but also strengthen the capacity of libraries to contribute meaningfully to education, research, and socio-economic development.

Concept of Cooperative Librarianship

Cooperative Librarianship is not a novel idea; however, what is new is its growing adoption and integration into library services, largely due to its proven positive impact on performance and innovation. The concept itself has been defined in various ways. For example, it refers to a process in which two or more individuals or organizations work jointly to address challenges that cannot be effectively resolved independently (Ocholla, 2008). Looking ahead, collaboration is expected to become an increasingly common and significant area of focus. Cooperative librarianship will involve library-to-library collaboration in terms of sharing virtual resources (Ezeani, 2012). It has been acknowledged that collaboration does not happen by chance, therefore library and information science professionals must engage in collaborative initiatives in driving innovation and creativity in libraries (Akpom, Benson, & Enem, 2020).

Cooperation between libraries facilitates improved access and more efficient use of information by patrons (Muthu, Rameshalabu, & Baskaran, 2015). Ocholla (2008) asserts that the type of collaboration is determined by its nature and level, including cooperation between individuals, groups, departments, within departments, interdepartmental, within institutes, inter-institutional, within sectors, inter-sectoral, countries national/international or regional/interregional. Additionally, it might be professional or informal.

A fundamental idea in library and information science is library cooperation. Libraries working together and pooling resources can increase information access, service quality, and resource usage. As a long-term strategy for maintaining the growth of people and organizations, collaboration is a modern phenomenon (Roy & Habib, 2024). Librarians, information scientists, and other interested parties are paying more attention to library collaboration in the current era (Udo-Anyanwu 2020). According to Ahmed, Ullah, Khan, and Siddique (2024), collaboration enables libraries to provide users with additional optional services, such as dynamic places that promote exploration and cooperation and fulfill the library's role of preserving information in the contemporary era.

Innovative Technologies

The adoption of cutting-edge tools and applications has improved academic libraries' relevance, responsiveness, visibility, and roles within their particular user groups, according to Oduwole, Adekumirisi, and Oyedokun (2023). Keeping up with technological advancements highlights the continuous difficulties libraries encounter when utilizing digital technologies. Innovative technologies have shown the ability to expand the audience they can reach and increase accessibility in Nigerian libraries (Ezeabasili & Idahalama, 2025). Innovative technologies are those technologies used to collect, store, edit and communicate information in various format. The use of innovative technologies is a boost to the library services as they now assist many librarians to reach out to library users. Utilization of innovative technologies for effective services delivery in library is paramount in this ever-changing digital age (Ogonu & West, 2024).

The emerging information technologies are increasingly being deployed to the libraries. Many libraries are using Twitter, email, Flickr, group chats, Google plus, etc., while other libraries have developed applications that enable users to search catalogue from within Facebook (Esse, 2022). During the 21st century, multiple highly innovative technological advancement prompted libraries to completely modify their central services. However, while the integration of innovative technologies in library services holds great promise for enhancing accessibility, user engagement and covering services delivery, it is imperative to acknowledge the significant challenges and barriers that can impede this progress (Omolade, Funmilola & Peter, 2025).

Innovative Practice

The most frequent definition of innovation is a shift toward renovation, adoption, or something new and practical in the field (Muthu, Ramashalabu & Baskaram, 2015). The process of filtering, evaluating, modifying, funding, developing, and detailing ideas before implementing or commercializing them is known as innovation. According to Ogunmodede and Popoola (2021), innovation is the process of bringing about a change in the way libraries operate.

Academic libraries should not be excluded since innovation has become a globally recognized strategy for developing new concepts, goods, and services (Akanbiemu, 2017). According to Atata, Ejere, and Sam (2016), innovation is the application of novel concepts to create a new good or service. Finding a better method to do something in an organization is the goal of innovation, and its actualization calls for a few sets of behaviors. Modifying or enhancing current services or goods is another aspect of innovation. More innovation is required in our quickly evolving library environment. (Abubakar & Attahir, 2018).

Innovation in libraries refers to the introduction of new ideas into service delivery processes, with an emphasis on meaningful and relevant practices that can drive positive transformation within the library system. It involves adopting fresh approaches that enhance how services are designed and delivered. In the context of library management, innovation encompasses the development and application of new concepts, methods, or technologies intended to improve service quality, increase operational efficiency, and enhance overall user satisfaction.

Innovative libraries and the use of digital tools facilitate access to services, excite and educate users, and aid in the acquisition of new skills (Kalu & Ochepa, 2021). According to Sodipe, Amalahu, Uthman, and Safiriyu (2024), innovative library services combine programs that are modified to better meet the needs of users, new programs made possible by evolving digital technology, and new services that promote change in research, teaching, and learning. Although innovative services seem to be organization-centered, innovative practices seem to be personal-centered. Innovative services and practices are channels through which transformation occurs in the library first (Emezie, 2018).

Innovation in libraries is geared towards changing existing order or protocol with the sole aim of meeting the needs of library patrons (Akpom, Benson, & Enem, 2020). Innovation is critical for libraries especially libraries in the developing countries. (Oduwole, Adekunmisi & Oyedokun, 2023).

Technological Innovation in Librarianship

Innovative technologies that improve information access, improve user experiences, and streamline operations have transformed library services globally (Ezeabasili & Idhalama, 2025). Limam and Aliyu (2023) citing African, Digitalization Maturity Report (2017) averred that today many African Countries such as South Africa, Kenya, Egypt, Nigeria, Bostswana, and Ethiopia now utilize knowledge of digital transformation and inventions to improve health, education, aviation, economy, security, industrialization, banking, and finance as well as agriculture.

Technological innovations have undeniably penetrated the field of librarianship and the impacts are enormous with higher demands on the part of library and information science practitioners. Librarians must be repositioned to become creative and innovative, not to remain in the analogue mode because that is how they started, it is not ideal in today's environment (Benson, Igbokwe & Onyam, 2020). The ongoing evaluation of technology will significantly influence library services in the coming years. As emerging technologies like artificial intelligence (AI) and big data analytics emerge, advance libraries stand to benefit in several ways, including enhanced service delivery, improved organizational efficiency, and ability to tender offerings to the changing needs of their users (Omolade, Funmilola & Peter, 2025).

Many libraries in developed countries have adopted the use of ICT in carrying out cataloguing and classification functions, and Nigerian libraries are no exception (Alabi, 2018). Some of the emerging technologies witnessed in the 21st centuries are offshoots of the advances that began in the last century. However, what we see presently is a growth of technology on a grander scale and development at a very rapid rate. (Ezeani, 2013). According to Benson, Igbokwe & Onyam (2020), the world has undergone various stages of transformation from the time of creation. Notably, the global world today is under the full control of technologies. The insatiable nature of man and the ultimate desire to improve on existing developmental trends have contributed significantly to technological development globally.

Technological improvements are reflected in socially significant events and conditions (Deja, Rak & Bell 2021). All technologies used for network-based control and monitoring functions, broadcast, media, intelligent building management systems, audiovisual, processing, and transmission systems are considered innovative technologies, according to Ogunmodede and Popoola (2021). Emerging technologies present librarians with a special chance to greatly enhance user-centered services to enthrall and promote cooperation between libraries and their clients, Kalu and Ochepa (2021). Globally, the delivery of library services has significantly improved; thanks to the use of cutting-edge technologies. The opinions of Nigerian librarians about the uptake and application of these technologies, however, are unknown (Ezeabasili & Idhalama, 2025).

Cooperative Librarianship in Digital Environment

The digital environment is characterized by the application of digital technologies to the information processing and distribution chain. More so, what is expected of the libraries in this new environment is to begin to go into the analysis of the needs of users with a view to understanding them and providing resources to satisfy them (Ugwu, 2013). The propagation of information technologies has made a major effect on libraries in the way they deliver their services and content, as well as the arrangement of that very content, especially in the advanced nations where most libraries are moving towards digital collections or at the very slightest hybrid print, and digital collections. (Ogunmodede & Popoola, 2021). It is clear that digital libraries promise an exciting new service paradigm for the library community in the digital environment (Khan, 2016).

We live in a society where most people assess information through advanced technology rather than using the library, so librarians need to dance to the tone of this present generation by adopting technological innovations in their information services delivery (Ezeabalisi & Idhalama, 2025). Libraries play a crucial role in enhancing effective services to users in the digital age and addressing the challenges it present. Thus, the digital environment has compelled libraries to shift from custodial models of information management to participatory and user-centered systems of service delivery (Olatoye & Olaninhun, 2025). They are instrumental to bridging digital divide by providing equitable access to

technology and digital resources. (Mohammmed, Alumona & Uzoegbu, 2025). And to achieve this, library collaboration becomes a necessity.

Collaboration is crucial for fostering innovation, and sharing solutions in library services. As libraries face innovation challenges, collaboration networks can create opportunities for knowledge exchange, and resource sharing. (Omolade, Funmilola & Peter 2025). Library collaboration is a crucial thing that needs to be paid attention to by libraries and other information centres and institutions (Ahmed, Ullah, Khan & Siddique, 2024).

In the 21st century, librarians need to embrace change since change is the only thing that is constant by creating new services and improve on existing ones (Abubakar & Altahir, 2018). One of such change is library cooperation. Libraries need to embrace Library Cooperation, as it will go a long way in helping them render quality library services to library patrons (Udo-Anyanwu, 2020). Collaboration is essential to the advancement of library and information science (LIS) as a science and a profession (Roy & Habib, 2024). According to Omalade, Funmilola and Peter (2025), collaborative efforts among libraries and partnerships with technology providers can facilitate invention and knowledge sharing, ensuring that libraries remain vital community hubs.

Rationale for Innovative Library Practice in Current Dispensation

The use of innovation in libraries is all about introducing new concepts, practices, and information that have the potential to influence persistence and change in libraries. Applying both creativity and innovation to library operations will aid librarians in their pursuit of knowledge creation, if innovation is the application of creativity (Ogunmodede & Popoola, 2021). They have to innovate in line with the applications of emerging technologies. Innovativeness of libraries and LIS professionals is inevitable to facilitate interactive skills, multimedia tools, rich user-driven products and services enhancement of routines, tasks, and products that meets users' needs (Oduwole, Adekunmisi & Onyedokun, 2023).

In an era characterized by developing technology, the development of innovative products and services is crucial to enabling effective and efficient service delivery. Additionally, innovation improves professional training, reference services, career advancement, mentorship, and educational development for library staff in the contemporary media environment while also enabling academic libraries to better respond to the changing needs of users (Oduwole, Adekunmisi & Oyedokun, 2023).

Library and Information Science professionals are not only having to adapt to change in library services but also require in-depth and structured education and training programmes for occupation engagements in all library spheres (Benson, Obichere, Ike & Onwuzurike, 2022). According to Osuchukwu, Otubelu, Ogbonna & Ndukwe (2015), the fact remains that every library and librarian is in a continual stage of development for sustainability. To sustain this notion, accessing opportunities for collaboration, must become critical and be embraced by proactive librarians. As noted by Benson, Obichere, Ike & Onwuzurike (2022), the level of innovative and creative skills among library and information professionals is still very low.

The advent of ICT heralded the emergence of electronic information resources and services which has become an indispensable source of information for university libraries (Mohammed, 2017). As pointed out by Ezeani (2013) in our fast-changing world, the library is often seen as a place where every form of information inevitably circulates. However, libraries do not function in isolation; there is a strong need for libraries to operate collaboratively.

Factors Driving Innovative Library Practice and Cooperative Librarianship

Several factors have been identified as driving force for innovative library practices, these include:

a. *The desire to catch up with new trends*: Libraries of all types are on the move to catch up with the trend of producing ICT-related information services (Benson, Obichere, Ike & Onwuzuruike, 2022). Mobile applications and technology have changed the way one connects and interacts with the world and mobile library services can meet people's needs for information in a fast-paced society.

b. *Innovative Leadership:* The place of innovative leaders cannot be undermined in this digital age. When libraries are managed by innovative leaders, it becomes easier for the followers to tow the parts of innovative and creative culture (Akpom, Benson & Enem, 2020). Leadership behaviour in the 21st-century academic library behoves the leader to synthesize different leadership styles to influence colleagues and subordinates to produce creative ideas, products, services, and solutions (Esse, 2022). Leadership is all about making a difference in the lives of others; it is about collaborating with others to enable them fulfill their ambition; it is about stimulating creativity, and bringing out the best in others (Ailakhu, 2017). This includes strategic planning, investment in technology, prioritization of user training and a commitment to user-centered innovation (Mohammed, Alumona & Uzoma, 2025).

c. *Emergency of technology:* The emergence of Information Technology has brought a paradigm shift for libraries, for enhancing access, research and communication, thus becoming a very useful tool in fulfilling the mission to support teaching, learning, and research (Kalu & Ochepa, 2021). Owing to this, information services are experiencing significant changes and undergo substantial transformation (Ullah, Usman & Khan, 2023).

d. *Collaborative technologies:* Collaborative technologies include social media, cloud technologies, video conferencing, and email. (Okwu & Nsirim, 2025). Collaborative technologies provide opportunities where people could

collectively engage in research by sharing rich information resources, people come to meet, find information resources, and discuss common interest. (Okwu & Nsirim, 2025).

Limitations to Sustainable Innovative Library Practices, and Cooperative Librarianship

There are several factors that limit sustainable innovative library practices and cooperative librarianship. These include:

a. *Dearth of digital infrastructure that facilitates digital oriented services:* A shortage of digital infrastructure limits a library's ability to provide effective digital-oriented services. It restricts access to online resources, automation, and modern library systems. This also weakens services delivery and reduces opportunities for cooperation and resource sharing among libraries. The technology for infrastructural challenges seems to be the major barriers to the execution of innovative library services delivery.

b. *Shortage of digitally-trained librarians:* A shortage of digitally trained librarians limits the effective use of modern library technologies. It reduces the quality of digital services delivery and innovation in library operations. It also weakens cooperation, as staff lack the skills needed for efficient resource sharing and networking. Omolade, Funmilola and Peter (2025), pointed out that a significant challenge in the integration of innovative technologies is the need for effective staff training and adaptation in libraries. New library personnel must be equipped with skills and knowledge to use new tools and system proficiently.

c. *Low level of funding:* Low funding hinders adoption of modern technologies and sustainable innovative services in libraries. It also limits participation in resource sharing and collaborative networks, weakening cooperative librarianship. When librarians depend on outdated practices due to paucity of funds, both innovation and effective inter-library collaboration become difficult to achieve and sustain.

d. *High cost of implementing digital-related services:* High costs of implementing digital services limit libraries' ability to adopt modern technologies. This restricts access to digital service delivery. It also weakens collaboration through shared platforms and networks, affecting cooperative librarianship.

e. *Operating on outdated policies:* Outdated policies limit libraries' ability to adopt modern practices and respond to changing user needs. They slow innovation by restricting flexibility and integration of new technologies. As noted by Ullah, Usman & Khan (2023), obsolete library policies pertaining to rules, regulations and guidelines no longer align completely with contemporary library practices and the expectations of library users. In Nigerian context, many academic libraries are yet to implement written or observed innovative processes when compared to their counterparts in developed countries (Akanbiemu, 2017). This also hinders collaboration, as rigid policies conflict with evolving standards for cooperative librarianship.

Strategies for Developing Cooperative Librarianship and Enhancing Innovative Practice

Librarians should develop innovative leadership in order to enhance innovative library practice. Innovative library services are actualized when librarians become proactive in providing them. Library and information science professional should think outside of the box and be problem-solvers in order to remain relevant and thereby ensuring sustainable innovative library practice. Some basic strategies for developing cooperative librarianship and enhancing innovative library practice include:

a. *Enhanced strategic leadership*: Enhanced strategic leadership drive innovative by anticipating disruptions, aligning vision and resources, and building agility, while enabling forward-thinking library policies and user-centered services that position libraries as dynamic innovation hubs. According to Ailakhu (2017), the ability for librarians to effectively lead and become innovative at the same time is more critical in today's 21st-century organizations, as the work environment is becoming much more complex and dynamic.

b. *Possession of technology-driven skills*: To keep pace with current development, librarians are expected to possess skills required at every point of technological development or knowledge advancement (Benson, Amaechi & Onuoha, 2017). In other words, as librarians move from one stage of information evolution to another, acquisition of skills and expertise to match the demands of such evolving stages becomes paramount. The acquisition of new skills is a must in this new dispensation. The advances in technology no doubt have brought about changes in the skills needed for functional operations in the new era (Benson, Igbokwe & Onyam, 2020).

c. *Good working conditions:* Provision of conducive working environment that foster self-development by heads of libraries is a necessity and should be strongly recommended (Benson, Amaechi & Onuoha, 2017).

d. *Formulation of innovative library policy:* Formulation of innovative library policy is a strategic approach that integrates emerging technologies, user-centered design and inclusive access in modern library services. A well-articulated policy is a necessity in the actualization of any goals or objectives (Benson, Igbokwe & Onyam, 2020). This borders on the premise that innovative policies are important for supporting cooperative librarianship. Effective policy formulation fosters innovation by aligning institutional goals with technological advancements that transform libraries into dynamic, future-ready information hubs.

e. *Willingness to adapt and adopt new technologies:* Willingness to adapt and adopt new technologies is a powerful strategy for developing innovative librarianship, as it enables librarians to model experimentation, foster a culture of

continuous learning, and empower teams to solve complex problems creatively while turning technological change into opportunities for growth. Librarians who embrace this approach build agile, resilient organizations that remain relevant and deliver greater value in a rapidly evolving digital era.

Conclusion

This paper has shown that cooperative librarianship, supported by technological innovation, is essential for modern library service delivery. As the digital environment continues to reshape information access and use, libraries must move from isolated operations to collaborative, technology-driven practices. Despite challenges such as inadequate funding, limited infrastructure, and skill gaps, cooperation among libraries offers a practical solution through resource sharing, capacity building, and collective innovation.

In conclusion, strengthening collaborative networks and embracing emerging technologies will enable libraries to remain relevant, resilient, and responsive to the evolving information needs of their users.

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Equipping Librarians and Information service Professionals for innovative library services in the 21st century in Nigeria

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Abstract

In the 21st Century, libraries have transformed from traditional repositories of books and information into vibrant hubs for knowledge dissemination, innovation, and community engagement. This evolution demands that librarians and information service professionals acquire the necessary skills, tools, and strategies to deliver innovative library services tailored to the complex and diverse needs of users. The shifting landscape of information user needs has led to the integration of emerging technologies such as artificial intelligence, digital repositories, and virtual reference services to enhance access to information. This paper explores the evolving role of libraries in the 21st Century, emphasizing the integration of advanced technologies such as Artificial Intelligence (AI), big data, cloud computing, and virtual reality to enhance service delivery. The study highlights the critical competencies required by Nigerian librarians to meet these changing demands, including technological proficiency, digital literacy, project management, and cultural competence. It identified key challenges faced by Nigerian libraries, such as inadequate funding, outdated infrastructure, and limited professional development opportunities. The study proposes strategies such as curriculum reforms in library science education, regular training on emerging technologies, mentorship programs, and partnerships with technology companies and academic institutions. Furthermore, the study advocates for institutional support mechanisms, including increased funding, policy advocacy, infrastructure development, and performance metrics. The study further presents innovative approaches to library services in Nigeria, such as the development of digital repositories, deployment of mobile libraries to underserved areas, virtual reference services, and community engagement programs to foster literacy and lifelong learning. The study concludes that addressing skill gaps, fostering continuous learning, and aligning training programs with individual roles will help Nigerian librarians navigate the complexities of the digital age thus, remaining relevant in the 21st century.

Keywords: Digital Transformation, Emerging Technologies, Innovative Library Services, Professional Development, Skills Development, User-Centered Services.

Introduction

The rapid advancements in technology and the ever-growing demand for innovative services are reshaping library and information services globally. Libraries, once seen as static repositories of books and documents, are now evolving into dynamic hubs for knowledge creation, digital access, and community engagement. As noted by Dongare, (2023), the rapid development of internet applications, the explosion in the quantity and quality of information resources, and the applications of information and technology (IT) in the field of information have forced libraries to accept and adopt new techniques for the organisation, retrieval, and dissemination of information. In Nigeria, this transformation is particularly significant, as libraries play a crucial role in bridging the digital divide, fostering literacy, and supporting lifelong learning. However, the ability of libraries to meet these changing demands hinges on the capacity of librarians and information service professionals to adapt, innovate, and lead. As such, equipping these professionals with the necessary skills, tools, and knowledge is imperative for ensuring the delivery of cutting-edge library services in the 21st Century.

The 21st Century has been characterized by a proliferation of digital technologies that have revolutionised how information is accessed, stored, and disseminated. From Artificial Intelligence (AI) and big data to cloud computing and virtual reality, these technologies offer immense potential for enhancing library services. For instance, AI-powered tools can assist librarians in automating routine tasks such as cataloging and indexing, while improving user experience through personalized recommendations (Smith & Johnson, 2022; Hussain, 2023). Similarly, digital platforms enable libraries to extend their reach beyond physical boundaries, providing remote access to resources for users in underserved or rural areas (Ogunniyi et al., 2022). However, leveraging these innovations requires a workforce that is not only technologically proficient but also adept at integrating these tools into library operations.

In Nigeria, the need for skilled librarians is further underscored by the country's unique socio-economic challenges. With a population of over 200 million people and significant disparities in access to education and technology, libraries serve as critical institutions for promoting equity and inclusion (Ayandokun & Okechukwu, 2022, Igbinovia, & Aiyebelehin 2023). Yet, many Nigerian libraries face persistent challenges such as inadequate funding, outdated infrastructure, and limited professional development opportunities for staff. These issues have hindered the ability of librarians to adopt innovative practices and fully embrace their evolving roles as facilitators of knowledge in a digital age.

To address these challenges, there is an urgent need for comprehensive strategies aimed at equipping librarians with the competencies required for 21st-century library services. Training programs that focus on digital literacy, data management, and user-centered service design are essential. For example, workshops on emerging technologies such as blockchain for secure information sharing or augmented reality for interactive learning experiences can empower librarians to offer cutting-edge services (Rama & Bhatt, 2023; Chukwusa, 2022; Opele, 2023). Additionally, fostering partnerships between libraries and technology companies or academic institutions can facilitate access to resources and expertise needed for innovation.

Professional associations in Nigeria, such as the Nigerian Library Association (NLA), also have a pivotal role to play in driving this transformation. By advocating for policy reforms, organizing capacity-building initiatives, and promoting research on best practices, these associations can support the development of a robust and forward-thinking library workforce (Alawiye, et al. 2026). Moreover, integrating information science curricula into higher education programs can ensure that future librarians are equipped with the theoretical knowledge and practical skills required to navigate an increasingly complex information ecosystem.

Objectives of the study

The specific objectives of this study are to:

1. explore the role of emerging technologies such as Artificial Intelligence (AI), big data, cloud computing, and virtual reality in enhancing library and information services;
2. identify critical competencies required by Nigerian librarians and information professionals to adapt to the evolving demands of the digital age;
3. propose strategies for capacity building among library professionals in enhancing library and information services;
4. suggest innovative approaches for enhancing library services in Nigeria in the 21st Century

Methodology

The study adopted a qualitative research approach focusing on a review of existing literature, expert opinions, and case studies to provide a holistic understanding of the subject matter. The study began with an extensive literature review to contextualise the transformation of libraries from traditional repositories to dynamic hubs for knowledge creation and community engagement. Scholarly articles, books, and reports were analyzed to identify trends in library services globally and regionally, with a particular emphasis on Nigeria. The study through this research methodology employed comprehensively explored the evolving role of libraries in the 21st Century and the critical competencies required by Nigerian librarians to adapt to technological advancements and socio-economic challenges.

The Evolving Role of Libraries in the 21st Century

Libraries have transitioned from being static repositories of printed materials to dynamic hubs that foster learning, collaboration, and innovation. The advent of new technologies such as artificial intelligence (AI), big data analytics, cloud computing, and virtual reality has transformed the way libraries store, organize, and disseminate information. Moreover, libraries now serve as community spaces where users can access digital resources, participate in workshops, and engage in lifelong learning activities.

In Nigeria, this transformation is particularly significant due to the country's socio-economic diversity and rapid urbanization. Libraries are increasingly expected to address challenges such as digital illiteracy, inadequate access to information resources, and the need for localized content. For instance, Nigerian libraries have begun adopting digital repositories to preserve indigenous knowledge and cultural heritage while also integrating virtual reference services to cater to remote users (Olorundare, et al. 2022). These innovations highlight the expanding role of libraries as enablers of societal development and knowledge equity.

Critical Competencies for Librarians and Information Professionals

To thrive in this dynamic environment, Nigerian librarians must possess a range of technical, managerial, and interpersonal skills. Key competencies include:

1. Technological Proficiency: Familiarity with emerging technologies such as AI, digital archives, and data analytics is essential for managing modern library systems. For example, AI-driven tools can be used to automate cataloging processes, improve search functionalities, and analyze user behavior to tailor services (Kumar & Sheshadri, 2019).

2. Digital Literacy: Librarians must be adept at using digital tools to curate content, manage online databases, and facilitate virtual learning environments Hamad, et al. 2023). Digital literacy also involves educating users on how to navigate online platforms safely and effectively.

3. Soft Skills: Interpersonal skills such as communication, empathy, and adaptability are critical for engaging diverse user groups. Librarians must be able to understand user needs, provide personalized assistance, and foster inclusive environments.

4. Project Management: Managing innovative library projects requires skills in planning, budgeting, team coordination, and evaluation. For instance, implementing a community-based literacy program or setting up a digital repository demands effective project management.

5. Cultural Competence: Given Nigeria's diverse ethnic and linguistic composition, librarians must be equipped to deliver culturally sensitive services that resonate with local communities. This can be achieved through regular training of librarians and information professionals.

Training Frameworks for Capacity Building

Equipping librarians with these competencies requires robust training frameworks that combine formal education with continuous professional development. Some of these key strategies include:

1. Curriculum Reform: Academic institutions offering library and information science programs should update their curricula to reflect current industry trends. Courses on data analytics, digital curation, cybersecurity, and user experience design should be integrated into traditional library science programs (Ogwo, 2021). Integrating courses on data analytics, digital curation, cybersecurity, and user experience design into traditional library science programs will ensure that professionals in the field are equipped with modern, interdisciplinary skills. These areas are increasingly critical as libraries evolve into hubs of digital information and technology.

2. Workshops and Seminars: Regular workshops on emerging technologies can help librarians stay updated on industry developments. For instance, training sessions on artificial intelligence (AI) tools for cataloging can significantly enhance the efficiency and accuracy of library operations. AI-powered tools are increasingly being used to automate metadata generation, improve search capabilities, and streamline resource management (Adeleke & Omotosho 2021; Smith & Johnson, 2022). By equipping librarians with the skills to utilize such technologies, libraries can improve service delivery and adapt to the changing needs of their patrons.

3. Online Learning Platforms: E-learning platforms like Coursera and LinkedIn Learning have revolutionized professional development by offering flexible, on-demand learning opportunities. For librarians, these platforms provide an accessible way to acquire new skills and stay updated with emerging trends in the field. Institutions can enhance their workforce's skillsets by collaborating with these platforms to create tailored courses that address specific organizational needs.

4. Mentorship Programs: Pairing experienced librarians with younger professionals is a strategic approach to fostering knowledge transfer and skill-building within the library profession. This intergenerational collaboration allows seasoned librarians to share their wealth of experience, institutional knowledge, and best practices, while younger professionals contribute fresh perspectives, technological expertise, and innovative ideas. Such partnerships can bridge the gap between traditional methods and modern advancements, ensuring that libraries remain relevant and adaptive in a rapidly evolving digital age

5. Professional Associations: Organizations like the Nigerian Library Association (NLA) hold significant potential to contribute meaningfully to the advancement and professional growth of individuals within their field. By organizing conferences, they create platforms for knowledge exchange, networking, and collaboration among professionals, fostering an environment where innovative ideas can be shared and explored. Through the publication of research findings, the NLA can disseminate valuable insights and discoveries, ensuring that its members and the broader community remain informed about the latest trends, challenges, and opportunities in their domain.

Institutional Support Mechanisms for Innovative library services

To sustain innovative library services in Nigeria, institutional support is paramount. Some of the key areas to be considered in order to achieve this drive include:

1. Funding: Adequate funding serves as the backbone for the growth and modernization of libraries. It enables the acquisition of cutting-edge technologies, the upgrading of infrastructure, and the implementation of comprehensive training programs for library staff. Without sufficient financial resources, libraries may struggle to meet the evolving needs of their communities in an increasingly digital world. To address this, government agencies and private sector stakeholders need to form strategic alliances to pool resources and increase investment in library development. Public-private partnerships can help bridge funding gaps, ensuring that libraries remain relevant and capable of delivering high-quality services (IFLA, 2019).

2. Policy Advocacy: Libraries play a pivotal role in fostering education, research, and community development, yet their contributions are often overlooked in national planning. Policymakers must acknowledge the critical function of libraries in driving national development and create supportive policies to sustain and expand their operations. For

example, integrating library services into Nigeria's digital transformation agenda could amplify their visibility and societal impact. Such integration would position libraries as key players in the country's efforts to build a knowledge-based economy, enabling them to contribute to goals such as digital literacy, information access, and lifelong learning (Baro et al. 2019; Okeji et al. 2019).

3. Infrastructure Development: In today's digital age, libraries must evolve beyond traditional book repositories into dynamic hubs equipped with modern facilities. This includes high-speed internet connections for seamless online access, digital workstations that support multimedia resources, and collaborative spaces that encourage group learning and innovation. Investments in such infrastructure are crucial for libraries to deliver innovative services effectively. For instance, modernized facilities could support maker-spaces, virtual reality learning environments, and other advanced offerings that align with current educational and technological trends (ALA, 2021).

4. Partnerships: Collaborations with external organizations such as tech companies, academic institutions, and non-governmental organizations can significantly enhance a library's capacity to serve its community. These partnerships provide access to additional resources, expertise, and funding opportunities that may otherwise be unavailable. For example, teaming up with technology firms could enable libraries to integrate artificial intelligence-driven tools into their systems, improving cataloging processes or providing personalized recommendations to users.

5. Performance Metrics: To ensure continuous improvement and accountability, libraries must establish clear performance metrics that evaluate their services' effectiveness. These metrics can include user satisfaction rates, digital resource utilization statistics, community engagement levels, and even the impact of library programs on literacy rates or employment outcomes. Regularly monitoring these indicators helps libraries identify strengths and areas for improvement. This will enable them adapt their strategies to better meet user needs and for the purpose of innovation.

Innovative Approaches to Library Services in the 21st Century

To meet the evolving needs of users in Nigeria, libraries must adopt innovative approaches that leverage technology while prioritizing inclusivity and accessibility. These approaches include:

1. Digital Repositories: Creating online platforms for storing indigenous knowledge can preserve Nigeria's cultural heritage while making it accessible to global audiences (Omekwu & Nwosu, 2023). Such platforms would make Nigeria's cultural heritage accessible to global audiences. This fosters cross-cultural understanding and appreciation, allowing people from around the world to learn about Nigeria's unique traditions, values, and history. It also provides an opportunity for Nigerians in the diaspora to reconnect with their roots and heritage.

2. Mobile Libraries: Deploying mobile libraries equipped with digital resources can serve as a transformative solution to address the lack of access to information and educational materials in underserved rural communities. Traditional brick-and-mortar libraries are often limited in such areas due to logistical, financial, and infrastructural constraints. Mobile libraries, on the other hand, provide a flexible and cost-effective alternative by bringing books, digital tools, and internet access directly to these communities. Mobile libraries can foster a culture of reading and learning in areas where educational opportunities may be limited. By reaching remote locations, libraries can support students, educators, and lifelong learners who otherwise lack access to adequate learning materials. The mobility of these libraries ensures that even the most isolated communities are not left behind in the pursuit of knowledge.

3. Virtual Reference Services: The integration of online chatbots or video conferencing options into digital platforms has revolutionized the way businesses and organizations provide assistance to users. These tools enable real-time support, ensuring that users can access help regardless of their geographical location or time zone. Chatbots, powered by artificial intelligence (AI), are particularly effective in handling routine queries, providing instant responses, and operating 24/7. For instance, companies like Amazon and Microsoft have deployed AI-driven chatbots to enhance customer service and improve user satisfaction. This initiative can simulate human conversation, offering users a seamless and efficient experience (Adamopoulou & Moussiades, 2020).

On the other hand, video conferencing options take user support a step further by introducing a personal touch. Unlike chatbots, video conferencing allows for face-to-face interaction, which can be crucial in addressing complex issues or building trust with users. This method has become increasingly popular in industries like telemedicine, online education, and remote work environments. According to a study by Wang et al. (2021), video conferencing fosters a sense of connection and engagement, making it an invaluable tool for providing personalized support.

4. Community Engagement Programs: Libraries can host workshops on topics such as entrepreneurship, digital literacy, or environmental sustainability to foster community development. Entrepreneurship workshops can help aspiring business owners learn how to develop business plans, secure funding, and market their products or services. These sessions can also foster networking opportunities, enabling participants to connect with mentors and peers who share similar goals. Digital literacy workshops are equally essential in today's technology-driven world. They can teach individuals how to use computers, navigate the internet safely, or utilize software applications for personal and professional purposes (Emiri, 2017; Panda & Kaur 2024). This is particularly beneficial for bridging the digital divide and ensuring that all members of the community have access to critical technological skills.

5. Gamification: Incorporating gamification elements into library services can significantly enhance the learning experience, especially for younger users, by making it more interactive, enjoyable, and rewarding. Gamification

involves the use of game-like features such as points, badges, challenges, leaderboards, and rewards to motivate and engage participants. Libraries can integrate educational games focused on topics for instance, like Nigerian history or science into their programs. Such initiatives not only make learning fun but also foster curiosity and a sense of achievement in young learners. Additionally, these programs can serve as a bridge to introduce kids to other library resources, such as books, e-learning platforms, and workshops. Gamification can help libraries remain relevant and appealing to younger generations while supporting their intellectual growth and development. Librarian and information science professionals therefore need to adapt strategies for up-skilling in the 21st Century.

Strategies for Up-skilling the 21st -Century Library and Information Science Professionals

From time immemorial, acquiring a skill has been considered one of the most valuable traits of the human species because it elevates the skilled individual in the eyes of others. Due to the fact that processes are continually evolving and being improved, it is imperative to take proactive steps to better understand the abilities that will give us the competitive edge in providing excellent services. The measures listed below should therefore be taken into account as Library and Information Science professionals work to upgrade their skills:

a) **Identify a needed skill gap:** This strategy entails a careful assessment of the required skill gap that a library professional may require before ensuring that he/ she attains such knowledge/ skill. Once these gaps are identified, the next step is to ensure that the individual receives the necessary training, education, or resources to bridge those gaps. This approach is systematic and ensures that the professional is adequately equipped to meet the demands of their responsibilities and contribute effectively to the library's goals (Adair, et al. 2023; El-Kalash, et al. 2023).
b) **Plan carefully:** This requires mapping out a realistic plan on how best to achieve the desired success after a skill gap has been identified. Some important elements that should be considered include but are not limited to the budget, the quality of the trainer, the content of the training to be offered and the nature or kind of training to be offered (practical, theoretical, online etc.).
c) **Identify measurable outcomes:** Conducting regular assessments of workforce skills and production levels is essential, with a focus on achieving significant improvements in employee performance. By conducting regular assessments, management can identify areas where employees excel and areas that require improvement. This process ensures that workforce capabilities align with organizational goals and industry standards. The ultimate aim is to enhance employee performance significantly, which can lead to increased efficiency, higher-quality output, and overall organizational success.
d) **Attend regular training programmes:** The library and information science professionals of the 21st century need to engage themselves in a variety of training programs i.e. workshops, seminars or conferences. By so doing, it would enable them to learn new skills from experts.
e) **Acquire quality training materials:** Library and information science professionals need to lay their hands on quality training materials. Such materials would make them understand more at their convenience.
f) **Assess the skills and capabilities of a particular workforce:** Library management should forecast and ensure that they train their professional staff on what they believe would be of value to their libraries in the future.
g) **Embracing Continuous Learning:** The smart library and information science professionals of the 21st century need to develop a continuous learning mindset. In other words, such kinds of professionals don't rely on their employers to finance their up-skilling-related activities.
h) **Promote collaboration:** Facilitating collaboration among professionals fosters the exchange and integration of diverse ideas, enabling the sharing of knowledge and best practices. This approach can significantly contribute to the advancement of the library profession by encouraging innovative solutions and collective growth (Hamad et al. 2017).
i) **Align training to individuals:** To enhance the effectiveness of professional development within the library and information science profession, it is important to align training programs with the specific needs and roles of individual staff members. Tailoring the content of training sessions to address the unique responsibilities and skill requirements of different employee categories ensures a more focused and impactful learning experience. Avoid adopting a one-size-fits-all approach by delivering the same training to all employees, as this may not address the diverse needs of your team.

Conclusion

The transformation of libraries from traditional repositories to dynamic centers of knowledge, innovation, and community engagement is essential in the 21st century. The integration of advanced technologies such as AI, big data, and digital platforms offers immense opportunities to enhance library services, particularly in addressing the challenges of digital literacy and equitable access to information in Nigeria. However, the success of this transformation hinges on equipping librarians with critical competencies, including technological proficiency, digital literacy, and project management skills. To achieve this, a multi-faceted approach is necessary. This includes curriculum reforms in library science programs, regular workshops on emerging technologies, online learning opportunities, and mentorship programs. Institutional support through adequate funding, policy advocacy, infrastructure development, and strategic partnerships is also vital to sustain these advancements. Innovative approaches like digital repositories, mobile libraries,

virtual reference services, community engagement programs, and gamification can further enhance the relevance and accessibility of library services. Addressing skill gaps, fostering continuous learning, and aligning training to individual roles will position librarians to effectively adapt to the evolving demands of the digital age.

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EQUIPPING LIBRARIANS AND INFORMATION SERVICE PROFESSIONALS WITH DIGITAL TECHNOLOGY SKILLS FOR INNOVATIVE LIBRARY SERVICES ACADEMIC LIBRARIES IN NIGERIA

By

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Abstract

The paper examines equipping librarians and information service professionals with digital technology skills for innovative library services in academic libraries in Nigeria. The paper is a reflective piece that focused on developing digital technology skills by librarians to deliver quality information services in academic libraries. The paper used literature review to identified various digital technology skills that would equip librarians such as social media skills, Internet skills, computer skills, digital advocacy skills, critical thinking skills, mobile technology skills and digital resources skills. The paper established that librarians and information professionals now developed skills on the use Internet of Things, social media big data to give access to the patrons and general users quality library services through cutting-edge technology. The paper concluded that training has become imperative considering the changes in digital technology which has become a cornerstone of development in modern libraries. The paper recommended that there is a need for constant, consistent and continuous training and professional development to keep the academic library achieved its mandate of teaching, learning and research development.

Keynotes: *Digital Technology, Digital Age, Librarians, Information Service, Innovation*

Introduction

The 21st century is making a remarkable strives with advancement in digital technologies which contribute significantly in all sectors of life; be it social, political, governance and economic development. Digital technologies such as robotic technology, artificial intelligence, cloud computing, big data, social media, smart phones, digital cameras, sensors and Internet of Things are contributing significantly in global information visibility and dissemination (Adamu, Muhammed, & Usman, 2021). The 21st century has equally opened opportunities for individuals, organizations, corporate bodies and nations to develop knowledge, education and research to advance globalization. The globalization and transformation of the academic libraries in the 21st century in the age of digital-modernism can be viewed through the digital turn. This means a shift from the traditional role of the library towards a role as a supplier of networked services for digital information and innovations. The mainstream strategy and activities of libraries are related to the word "digital", which comprises both digital collections and digital services (Acharya & Vagdal, 2023).

Academic libraries are related to the movement into the information society based on the profound influence of modern digital technologies and prevalence of the Internet of Things (Hussaini, 2019). In contemporary societies, progress is often measured by visible infrastructure-roads, bridges, skyscrapers and technology hubs. Yet, the 21st century recognized digital technologies as one of the most powerful engines that drives development which academic libraries, librarians and information professionals depends for professional output. Academic libraries are not just storage spaces for books; they are intellectual powerhouses that fuel education, innovation, research and social inclusion. This is because academic libraries play a critical role in preserving intellectual assets and ensuring access to information for citizens across generations and in meeting the 21st century expectations. According to Adamu, Muhammed and Usman (2021), the 21st century also value libraries as a systematic institution of collecting, organizing, and safeguarding digital technologies in various dimensions for enriching historical, valuable research, cultural records and documentations. Digital technologies in the 21st century also assist academic libraries to contribute directly to academic and research advancement. Academic libraries provide access to scholarly databases, journals, textbooks, and digital repositories. Academic libraries promote information equity. In a community where access to books, Internet and information resources are limited, the library becomes a gateway to opportunity. It reduces the knowledge gap between socioeconomic groups and ensures that learning is not restricted to those who can afford it. This equal access to information strengthens democratic participation as informed citizens are better equipped to make responsible decision. In today's digital age, libraries and librarians are evolving beyond physical collections. Many libraries now provide digital resources, online databases, data management and innovation spaces. Librarians guide users in navigating information overload, combating misinformation and applying critical thinking skills to ensure information resources are provided at the right time.

It is important for librarians to understand that the 21st century societies and users are transforming. It is needed to react flexibly to the changes in the society and to go with them, to create the library mission and role in today's information society. Librarians and information professionals need courage to stand for their values. The mission of today librarians

is to provides a barrier-free access to quality information in support of reading, research, learning, teaching, and service to the society. The notion of becoming a cultural centre is also an expansive role for the future academic libraries. It would not only serve as an information resource, but much more, with the exact mission and goals evolving and changing over time. According to Singh, (2018), the dominant factor in the development of libraries is the ongoing move towards digital distribution of information through the global network infrastructure. This paper became necessary to reflects on various ways to equipped librarians to rethink and re-strategize on use of ever-increasing technological changes to opened opportunities for librarians to deliver quality and friendly services for sustainable development that embraces advancement in digital technologies in promoting global digital services. Digital technologies in academic libraries are meant to assist librarians in bridging the prevailing information provision gaps in the teaching, learning and research needs of the users. However, gaps still exist amongst some librarians to use knowledge of electronic resources, artificial intelligence, Internet of Things, big data, and computer application software's to give access to the patrons and general users' quality library services through cutting-edge technology

Librarians and Information Professionals in the 21st Century Academic Libraries

21st century academic libraries are driven by information and communication technology, digital inclusion, the Internet of Things, big data, artificial intelligence (AI), electronic environment and digital transformation. The 21st century has transformed every aspect of library activities. The changes in digital technology are not only reflected in the activities of the library alone, but the role of academic librarians in transforming the social and technological landscape in the digital era (Einasto, 2017).

A study conducted by American Library Association (2023) highlights that 21st century enhances academic libraries to respond to the fast-changing future of libraries through creative thinking and innovation in response to the digital world. Adeleke (2023) states that 21st century digital transformation is more than the ability of librarians to acquire digital competence to use computer and other digital devices, but the ability to be creative and innovative to communicate digital resources effectively. Akinade and Akinola (2022) highlights that with the digital transformation and Web 4.0 technologies, librarians have a new, more dynamic role in the knowledge- driven society. Kumar and Rao (2014) recognize that the presence of web experience and other digital devices has created a new environment for librarians to interact with digital technology. 21st century served as a tool for collaborative, creative and recordable communicative techniques essential for librarians to communicate, collaborate and to protect digital resources. Liman (2024) states that digital transformation goes beyond the digital competence of academic librarians needed to use or operate digital technological devices, but also the ability to use digital resources effectively. Digital transformation offers potentials for academic librarians to seek for new thinking and innovations to provide library services. Thus, the importance of digital transformation cannot be over emphasized as it equips academic librarians with critical thinking and ability to evaluate, understand and interpret digital resources for effective use.

Digital transformation enables librarians to make informed use of digital technology and media as it offers an opportunity to participate in new kinds of social activities (Daniels, Wiche & Nsirim 2023). Despite digital transformation which is rapidly evolving in information explosion on changing the digital resources such as e-journals, e-books, mobile based services, institutional repositories, tutorials, multimedia content and the Internet, gaps still exist as many academic librarians still find it difficult to identify and manage digital resources to transform digital library environment.

The 21st Century Academic Librarians are requiring to be familiar with library collections for creating, searching, storage and retrieval of digital data in any medium such as text, image, sound and dynamic images Adamou (2017) argues that digital transformation has revolutionized new thinking through professional skills and knowledge in transformation of not only conventional information service delivery but transformation and innovation in hypertext links for navigation; support multimedia content along with text and network accessibility.

21st Century Academic Librarians has led librarians to develop new thinking toward transforming library automation, digital and virtual libraries, virtual conference, web-cast, pod-cast, community and online learning, Web 2.0 and library 2.0 technologies (Hamza &Makama, 2021). However, many librarians in developing countries still find it difficult to digitally transforms library collections in Purchasing/subscription of e-resources, set up the new digital services on the place of traditional print services, advocate for digital collection and services, setup the 24x7 pattern library services in networking environment, design and development of digital data repositories, implement the open educational resources platforms, develop mobile apps and mobile library websites and enhances research advocacy for effective library collections (Singh, 2019). 21st Century Academic Librarians has created innovative idea for librarians to locate, manage, organize, understand, and evaluate library services (Hussain & Ahmad, 2021). The ability to access and manage various digital technologies especially electronic databases, online reference enquiries, interlibrary loans, digitisation, and electronic publishing requires digital transformation and innovations of librarians (Abdul- Kareem, 2018).

Anyim (2018) emphasizes that one of the vital components of digital transformation is the ability of academic librarians to create, manage, search, use, store and preserve local publications and information of national and international interest accessible on a subscription or pay-per-view basis. In this sense, it is an extension and enhancement of information storage and retrieval mechanisms that manipulate digital information in any medium (i.e. text, image, sound, static or dynamic images) and exist in digital networks. However, gaps still exist as not all academic librarians has the skills and

competence to manage, search, use, store and preserve electronic version of information resources to transform the frontier of library services.

The 21st Century Academic Librarians has transforms librarians to gain digital literacy platform in digital technology, communication tools or networks to locate, evaluate and create requires creativity in multiple digital formats from a wide range of sources via Internet and other digital technologies (Singh, 2017). Presently, the impact of digital literacy on academic librarians depends digital innovation and creativity offered to access the electronic resources from anyplace at any time. Academic librarians' ability to acquire digital literacy competencies to access, communicate and use digital resources such as computers, smartphones, Internet and web tools, multi-media platforms require digital creativity. Digital literacy of librarians to make use of the OPAC catalog of the library, the e-journals, e-book and other digital material require digital creativity that facilitate searching, evaluation and retrieval of the electronic material (Ilesanmi, 2023). However, gaps still exist as not all academic librarians in Nigeria are creative and innovative to transform library services to enhance digital technology services as new digital platforms in information management and disseminations. 21st Century Academic Librarians provides robust interaction between librarians and users thereby democratizing the global dissemination of information. The United Nations Educational, Scientific and Cultural Organization's (UNESCO) (2017) "Information for All Programme" (IFAP) embodies the importance of digital transformation to access on-line connections and interaction among librarians to a worldwide network of users. The rapid development of technology has transformed the way librarians work and interact with library users. Various researches have been conducted on the ability to of librarians to transformed academic libraries with network of users across the globe through interaction (Adamou, 2017). Despite the importance of digital transformation which allows for flow of information for interaction with the use of digital resources, it appears that not all academic librarians in developing countries have the skills and competence to use digital technologies to interact for information sharing, information usage and information dissemination (Singh, 2019). Even though, digital transformation is important strategic information for librarians to interact and network the activities of the library, gaps still exist among librarians in Nigeria to digitally transform library services through interaction with the digital technologies.

Equipping Librarians and Information Service Professionals with Digital Technology Skills for Innovative Library Services in the 21st Century in Academic Libraries in Nigeria

Libraries are essential to learning, research, generation and preservation of knowledge as well as dissemination of information. Librarians are the custodian of information and knowledge in the new digital age. The 21st century librarians is an information warehouse with critical thinking abilities to impact positively on the society. Librarians as professionals are critical stakeholders in ensuring that libraries achieve their mandate. The 21st century is considered as opportunity offered by ICTs and other digital technologies that foster librarians to assume new thinking towards information service delivery. Librarians now use robots in combination with RFID technology and data of bibliographic record to give access to the patrons and general users quality library services through cutting-edge technology (Bernard, 2017). Such kind of newest technology is considered to be the part of new industrial revolutions. However, evidence from literature indicates that many librarians in Nigeria are still lagging behind in acquiring digital knowledge to advance information search, information retrieval and quality information service delivery ((Hussain & Ahmad, 2021).). In repositioning the academic libraries for effective information service delivery, there is the need for the librarians to be equipped through the following:

1. **Digital Advocacy Skills:** in the current dispensation, users no longer seek information in the libraries. The opposite has become the case where the librarians go out to render information services to users. to achieve this, the librarians have to look out for opportunities to connect and interact with various technologies. The librarians' needs be well equipped with skills to download and search online resources, use web technologies, access online information, locate and navigate uniform resource locators (URLs) and perform basic Internet search. Librarians' needs to also be equipped with basic tasks of online searching, web technology, understand and use computer hardware and software and perform basic Internet search activities due to poor digital literacy.
2. **Digital Information Resources Skills:** The21st century has opened up opportunities for librarians to develop skills in information sharing, media literacy, digital technology, learning ability, communication, digital content creation, digital identification and information and communication technology (ICT) services Horsfall, (2020) maintains that librarians require digital literacy in operating computers, ICTs and other digital facilities for personal and professional development. The American Library Association (2023) also maintains that the ability to access and successfully use digital information is central to nearly all professionals working in libraries and information centers in closing the gaps in digital access and skills. The 21st century librarians are no longer just the guardians of books; they are information providers in an environment that is constantly changing and driven by digital technology. Huynh and Do (2017) observe that many academic libraries in developed countries employ librarians who are well versed, equipped and grounded in the use of digital technology to perform their duties and participate in the digital information services.
3. **Critical Thinking Skills:** The 21st century is considered as a phenomenon offer by digital technology revolutions that foster librarians to assume new thinking towards information service delivery. Librarians and libraries now use Internet of Things (IoT), artificial intelligence, smart phones, social media, cloud computing,

robots in combination with RFID technology and data of bibliographic record to give access to the patrons and general users quality library services through cutting-edge technology (Bernard, 2017). Such kind of newest technology is considered to be the part of the 21st century revolutions. The 21st century revolution is a fusion of digital technologies that is blurring the lines between physical, virtual and digital space thereby producing smart technologies where robotic technology, artificial intelligence, big data, social media, smart phones, digital cameras, sensors and Internet of Things are contributing significantly in global information provision and dissemination.

4. **Mobile Technologies Skills:** Mobile technology is a cellular telephone with an integrated computer and other features such as Internet access, web browsing, software application, and operating system capable of downloading applications. Academic librarians require skills in mobile devices like cell phones to communicate, create, access and share information with the general public on the activities of the library. Librarians offer library services through mobile telephones with the use of Global Systems for Mobile Communication (Raju, 2014). Skills in mobile phones assists librarians to support teaching and research through the use of short message services.
5. **Social Media Skills:** Social media platforms in libraries have become an indispensable phenomenon in global information provision and dissemination. This is because in a world driven by technological advancement, there is need for academic librarians to equip themselves with the skills needed to meet the need of library users especially in the area of marketing and promotion of information products and services (Raju, 2017). Social media has become a platform that everybody, organizations and institutions cannot do without. Before the advent of social media platforms, library holdings were predominantly in print, but, the evolution in ICTs, digital technologies, digital resources in electronic formats where library collections have changed from local contents to global networks (Davis, 2016). The emergence of social media platforms has affected virtually every sphere of human endeavor as it revolutionized information communication. Social media has become an increasing familiar tool employed by librarians in academic libraries in marketing services and resources to current and prospective patrons. Social media applications offer boundless opportunities for librarians to learn while also contributing to the knowledge of others.

Challenges to Innovative Library Services in the 21st Century in Academic Libraries in Nigeria

The following are the notable challenges librarians and information service professionals encounter in delivering innovative library services:

1. **Poor knowledge of Digital Resources**: Poor knowledge of ICT infrastructure and affordable online access, absence of in- depth digital skills and information searching behaviour are challenges facing academic librarians in the 21st century. Atram (2018) identified problems facing academic librarians in Nigeria to include lack of adequate digital skills among staff and users, low information literacy levels, media and computer literacy. Poor knowledge of digital resources especially prohibitive costs in developing countries to gain access to the Internet is still frequent among academic librarians as identified by Hussain and Ahmad (2023) are invaluable research tools that complement the print-based resources in a traditional library setting.
2. **Poor Digital Literacy Skills**: the 21st century provides a platform for librarians to make use of digital resources to participate in new social and intellectual order (Hussain, 2019). However, librarians with poor digital literacy will not be able to access computers and databases which can lead to serious resentment in the delivery of information services. Being digitally literate has become a requirement for deriving maximum benefit from digitized resources without which librarians will be confronted with a wide gap in meeting with the changes of modern society in information delivery (Anunobi & Emezie, 2016). The benefit of digital literacy is to enable librarians to demonstrate ability to evaluate and use information critically from relevant and authoritative sources online (Coldwell-Nelson, 2017). Failure of academic librarians to develop digital competence poses a big challenge in achieving the goals of digital literacy in meeting contemporary society's digital revolution and information delivery.
3. **Inadequate Digital Literacy Training:** Inadequate digital training and re-training have become a huge problem affecting academic librarians in developing countries to carryout library functions in a digital environment (Raju, 2017). According to Alhassan, A. (2022)., poor digital literacy of librarians as a result of inadequate training has hindered the effective use of digital resources in academic libraries. Many academic librarians in African countries and particularly Nigeria still find it difficult to integrate digital literacy skills with the traditional method of information service delivery due to poor training (Rose, Eldridge and Chapin, 2015). Digital literacy training is important for academic librarians to understand new technologies as they emerge, to identify the opportunities in them and manage the risks (Waller, 2016). Training in digital intelligence will grow over time as the new technology evolves. Gallardo-Echenique (2015) rightly maintained that new Information and Communication Technologies such as the Internet, online gaming worlds, artificial intelligence, robotics and 3D printing are evolving through digital literacy that require the adequate training of librarians. Without adequate training in using these digital resources and services, academic librarians will be left behind in the digital age.

4. **Lack of Digital Technology Awareness:** Lack of awareness and understanding of new digital technologies such as mobile Internet access, cloud-based computing, the 'Internet of Things', digital data, artificial intelligence and an increase in computer-driven decision-making and other forms of automation have become a big challenge for librarians in recent times (UNESCO, 2017) Digital literacy evolved as a result of change that has continually taken place in a technology-driven environment. Librarians require awareness and understanding of digital technologies as well as interaction with these technologies for decision-making (Baharuddin, Izhar, Mohamad and Hasnol, 2016). Amid these changes in digital technology, academic librarians are expected to continually participate fully in digital technologies and processes. According to UNESCO (2027)), lack of digital technology awareness is still observable among librarians in developing countries in transforming digital content and technology for proper use.

Strategies for Equipping Librarians and Information Service Professionals Digital Technology Skills for Innovative Library Services in the 21st Century in Academic Libraries in Nigeria

Digital Awareness provides wider skills for academic librarians and information professionals to develop the knowledge of electronic resources, computer, database, electronic books, electronic journals, electronic dictionaries, electronic encyclopedias and other digital resources for effective library services. The academic librarians and information professionals should facilitate search for online information services, retrieve digital technologies from a variety of sources, sufficiency of digital technologies for a specific purpose, organize digital resources for information retrieval, synthesize digital technologies from a variety of sources, build digital technologies to express and support information service delivery, connect and interconnect digital technologies for delivery via a different medium (e.g., email, presentation software, word documents, and spreadsheets), understand the power of digital technologies for library operations and services, understand and being able to manage digital identities appropriately and locate, organize, understand, evaluate, analyze and present digital information.

ICT skills and competencies have become imperative that focuses on the ability of academic librarians and information professionals to develop knowledge to search for information, interpret it and evaluate its credibility and suitability, as well as the skills of using a computer and other digital devices. Handling of the ICTs requires skills and competencies in electronic resources, software applications and creating digital content. Skills in ICT Devices: ICT facilitates access to electronic information that has become invaluable and complementing traditional library services. This means that the academic librarians and information professionals' ability to use ICT and its components such as managing files, word processing, spreadsheets and databases, in bridging the gap by stating the required knowledge, skills and competencies that has not only brought a change in the working style of librarians, is also essential for them to survive

1. Operating System: This refers to academic librarians' abilities to store files, use operating systems and the desktop environment; managing and organizing files and directories/folders, simple editing tools; and print management facilities
2. Understanding digital technology and other digital devices: This means the academic librarians' ability to switch on computer and other digital technologies, such smartphones.
3. Application of ICT Hardware and Software: This signifies the abilities of academic librarians to install appropriate applications and software. The basic competences include the creation of content (example, creating files with the use of relevant options of programs, saving files), organization of the content (ordering files in folders) and browsing for content.

Conclusion

The developments in 4th industrial revolution and specifically the paradigm shift in library services with the advent of Information and Communication Technologies (ICTs), Internet services, electronic resources, digital collections and other digital technology services have led to advancement in digital revolution in libraries and among librarians (Atram, 2017). The role and position of librarians have dramatically changed (Anyim, 2018). The rapid pace of development in the field of digital technology and the advent of networked information services have prompted librarians to acquire knowledge of digital technologies to advance digital information delivery. Academic librarians now experience global trend, which is characterize with a fundamental shift from traditional information environment to an electronic environment where emphasis is placed more on digital technologies in acquisition, organization, processing and communication with the use of digital resources such as electronic books, electronic journals as well as online databases. The contemporary practice among librarians in library services in the 21st century is being propelled with an information explosion and the inclusion of digital technologies in all aspects of library services.

Way Forward

1. There is a need for constant, consistent and continuous training and professional development to keep the library alive for optimal productivity and effective utilization of the resources.
2. There is the need to equip Librarians with modern techniques and approach to enhance effective library services especially that the library is growing in both human and materials resources.

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EQUIPPING LIBRARIANS AND INFORMATION SERVICES PROFESSIONALS FOR INNOVATIVE LIBRARY SERVICES IN THE 21ST CENTURY AT BAZE UNIVERSITY AND THE NATIONAL OPEN UNIVERSITY OF NIGERIA

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Abstract

This study investigates the equipping of librarians and information services professionals for innovative library services in the 21st century at Baze University and the National Open University of Nigeria. The specific objectives are to determine methods for equipping librarians and information services professionals to deliver innovative library services, identify innovations in library services, assess the extent to which such services are provided, and identify the challenges associated with their delivery. A survey research design was adopted for the study. The study population comprised 13 academic librarians at Baze University and 64 librarians from the National Open University of Nigeria. The census sampling technique was used. Data was collected through a structured questionnaire administered to librarians. Descriptive statistics, including mean and standard deviation, were used to analyse the research questions. Regression analysis was used to test the hypothesis. The findings revealed that innovative library services are available and that librarians employ various methods to equip themselves to deliver them. Findings indicate that librarians offer innovative services in libraries and face numerous challenges in equipping and delivering them in the 21st century. Methods of equipping significantly predict the provision of innovative library services by librarians (P = .000). The research concluded that librarians are aware of innovative library services and are preparing for them. The study recommended, among other measures, that libraries adapt and expand their innovative services to address changing user needs and remain relevant in the 21st century, and that institutions standardise training programmes and provide continuous professional development for all librarians to ensure they are well equipped.

Keywords: Librarians, information professionals, and innovative library services

Introduction

Globally, there is a shift in the provision of library and information services as a result of technological innovations. Traditional library services are giving way to digital library services. The 21st century is the millennium of emerging technologies. It is also seen as an era of an explosion in information output and sources. According to Magbadelo (2020), it marks the beginning of the knowledge age. As a result, new patterns of work and business practices have emerged, and new forms of work with distinct skill requirements are required. In this century, the meaning of knowledge has changed. Knowledge is no longer what is stored in the minds of experts, represented in books, and classified in disciplines. This is the century in which librarians operate, and to remain relevant, they must acquire the necessary skills to function effectively.

In the 21st-century library, the advent of ICT has redefined the library's role. Print materials are no longer sufficient to store information. CD-ROM databases, artificial intelligence, electronic document delivery, automated cataloguing, circulation systems, and online information retrieval (OPAC) have become the norm in librarianship, requiring skills for their use (Okoro & Shittu, 2025). Furthermore, the advent of the internet, digitisation, and remote access to library and research materials have dramatically changed how libraries provide services, thereby increasing the need for skills to deliver effective services.

Librarians are at the forefront of providing information services to respective individuals to support their teaching, learning, and research needs. Alabi and Sani (2021) argued that effective delivery of information services that meet the needs and aspirations of citizens, decision-makers, and lifelong learners is a long-standing goal of the library and information profession. Notwithstanding this, the integration of ICTs into information service delivery has transformed the way librarians provide their services. Librarians are now facilitators of round-the-clock access to information resources both within and beyond the library. Equipping librarians with the necessary skills in the current age is paramount, as without them, they cannot provide innovative library and information services.

Innovative service consists of the virtual reference services relating to chat and email service, collaborative service provision, digital common information services, digital instructional programmes for users, and staff training in

university libraries, which was reported by Okoro and Shittu (2025); they revealed that emails are increasingly supported by a Frequently Asked Questions (FAQ) database and are the preferred cost-effective means for providing university VR services. However, Etebu and Zacchaeus (2020) viewed it differently. They stated the following services: blogging services, podcasting services, electronic publishing services, online information search services, short message alert services, online training and workshops, digital reference services, database production/distribution services, online entertainment services, mobile application services, and digital marketing services. They also established attendance at conferences, seminars, and workshops as the primary strategy for promoting innovation and creativity in the library.

The advent of information and communication technologies is bringing lasting change to the library and information profession, and this change must be supported by ensuring that librarians are well-equipped with digital skills to sustain librarianship in the 21st century. Drawing on this background, this study seeks to investigate the preparation of librarians and information services professionals for innovative library services in the 21st century.

Statement of Problem

Ideally, librarians in academic libraries in Nigeria are supposed to be provided with adequate skills that will prepare them for the provision of innovative library and information services in the 21st century, such as blogging service; podcasting service; electronic publishing services; online information search service; short message alerts services; online current awareness services; online orientation services; online training and workshops; digital references services; database production/distribution services; online entertainment services; mobile application services and digital marketing service.

However, the researcher has observed that most librarians and information professionals are not well equipped to provide innovative library and information services. In the 21st century, librarians and information professionals are still providing traditional library services, which Madukoma (2021) noted is a result of a lack of support from the administration and a lack of installation of modern technologies in the library, which are the major barriers to the practice of innovative services among librarians in Nigeria. It is against this backdrop that this study seeks to investigate the equipping of librarians and information services professionals for innovative library services in the 21st century, so as to inform library management, policymakers, and stakeholders on strategies to equip librarians and information professionals for effective innovative library service delivery in Nigeria.

Objectives of the Study

The main objective of the study is to examine the equipping of librarians and information services professionals for innovative library services in the 21st century at Baze University and National Open University of Nigeria. The specific objectives are to:

1. Identify the innovative library services in the 21st century known by librarians at Baze University and the National Open University of Nigeria.
2. Determine methods of equipping librarians and information services professionals for innovative library services in the 21st century
3. Assess the extent of provision of innovative library services in the 21st century by librarians
4. Identify the challenges of innovative library services in the 21st century in the institutions under study
5. Methods of equipping librarians and information services professionals do not predict the provision of innovative library services in the 21st century

Research Questions

The study answered the following questions:

1. What are the innovative library services in the 21st century known by librarians in Baze University and the National Open University of Nigeria?
2. What are the methods of equipping librarians and information services professionals for innovative library services in the 21st century?
3. What is the extent of provision of innovative library services in the 21st century?
4. What are the challenges of innovative library services in the 21st century?
5. Do methods of equipping librarians and information services professionals predict the provision of innovative library services in the 21st century?

Hypotheses

The following hypothesis was tested at a 0.05 level of significance.

$H0_1$: Methods of equipping librarians and information services professionals do not predict the provision of innovative library services by librarians in the 21st century

Literature Review

Studies have discussed ways in which librarians can be equipped for innovative services. In this regard, Okeji et al. (2020) assessed the digital literacy skills of 21st-century librarians in private university libraries in Anambra State. A

descriptive survey design was adopted for the study. The area of the study was Anambra State, located in the South-East Geopolitical Region of Nigeria. The population of the study comprised all 23 practising librarians in the three private university libraries in Anambra State. The data collected was analysed using mean scores. 2.50 was used as the benchmark. The major findings of the study show that academic librarians sponsor themselves for training on digital literacy, they attend training twice a year, and power failure and poor internet are the challenges librarians in private universities in Anambra State face. The study was conducted in a different location, while the present study will be done in Abuja; both of the studies use the same methodology.

A lot of innovative services have been discussed in the literature, such as online current awareness services and virtual argumentative services, among others. Thus, the study of Etebu and Zacchaeus (2020) looked at innovative library services (ILS) in the Nigerian context through different ways, such as online business support service for start-ups; web design services; blogging service; podcasting service; electronic publishing services; online information search service; short message alerts services; online training and workshops; digital reference services; database production/distribution services; online entertainment services; mobile application services and digital marketing service. Data analysis was done using frequency count, percentages, the Likert scale presented in tabular format, mean, and standard deviation. Using the four-point Likert-type scale, a midpoint mean (criterion mean) of 2.5 was established and accepted as a positive response point. Inadequate funding, inadequate deployment of ICT infrastructure, and resistance to change were some of the challenges identified as hindrances to ILS. Even though the study was on innovative library services, it was limited to Bayelsa State, South-South Nigeria. While the current study is limited to two universities in Abuja.

In another study, Madukoma (2021) investigated the innovation and creativity practices among librarians in Nigeria. A survey research design was used in this study. The population comprised 165 practising librarians who attended the 2018 Nigerian Library Association Annual General Meeting held at the Olusegun Obasanjo Presidential Library, Abeokuta, Nigeria. A self-structured questionnaire was used to collect data, and a hundred per cent return rate was achieved from the participants. Descriptive statistics such as frequency count, percentage, mean, and standard deviation were used for data analysis. Major findings from the study showed that the provision of research tools and the provision of online search tools were the major types of innovation/creativity practised among librarians in Nigeria. The result also revealed that librarians always use their experience to invent new things that add value to library service. However, the study further revealed that lack of support from the administration and lack of installation of modern technologies in the library were the major hindrances to the practice of innovation/creativity among librarians in Nigeria. While both studies focus on innovation in library services, the previous study was done in Abeokuta, while the current study will be done in Abuja.

The benefits of Innovative Service Delivery (ISD) in the libraries include enhanced user experience, increased efficiency in information retrieval, and access to resources by users. Okoro and Shittu (2025) examined digital Literacy Skills and Innovative Service Delivery in University Libraries in North-West, Nigeria. A survey research design was adopted for the study. The population comprised 454 academic librarians in Federal, State, and private universities in Northwest Nigeria, with a sample size of 210. Data were analysed using descriptive and inferential statistics. Findings revealed innovative services provided include digital tutorials, library resources through social media, a digital instructional programme, online user education, and Ask a Librarian services training. The previous study was conducted in North-West, Nigeria, focusing on digital skills and innovative services, while the present study focused on innovative library services in Abuja.

Ukwuoma, Dim, and Chigbu (2021) ascertained how the incorporation of information and communication technology-driven innovation services could improve information delivery in academic libraries in Nigeria. Descriptive survey research was adopted for the study, using a structured questionnaire as the instrument of data collection. Five research questions guided the study. Of 150 questionnaires distributed, 112 were filled out correctly and returned, and used for analysis. Results show that innovative services effectively provide information literacy skills to students, fill institutional repositories, and provide e-reference services. The contribution of innovative services to improved learning relies on the positive reports from faculty on the improvement of student performances. The major challenges to innovative services are inadequate funding, lack of infrastructural facilities, inadequately trained personnel, and management indifference.

Different scholars examined different aspects of innovative library services among librarians in Nigeria, all arriving at different conclusions. However, those studies differ in terms of findings, setting, population, and subject focus. The present study is distinguished from the past studies, as it focuses solely on how to equip library and information professionals towards the provision of innovative library services.

Methodology

Quantitative research method was used. A survey research design was adopted for the study. Data was collected through a structured questionnaire titled 'Innovation for Library Service Provision Questionnaire' (ILSPQ). The instrument was on a four-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The questionnaire was administered to librarians working in academic libraries at Baze University and the National Open University of Nigeria, online using Google form without research assistants. The population of the study consisted of academic librarians in Baze University (13) and the National Open University of Nigeria (64), study centres across the country

while purposive sampling was used to select the study sample size from the population. Descriptive statistics, including mean and standard deviation, were used to analyse the research questions, while Regression analysis was used to test the hypothesis. The mean of 1.0-2.4 was considered low, while 2.5 or above was considered for decision-making.

Presentation of Result

This section deals with presentation of result and discussion of findings. The result is presented in tables according to the objectives of the study.

Table 1: Innovative library services in the 21st century

S/N	Statements	Mean	STD
1	Short message library services	3.12	.748
2	Online information search services	3.36	.582
3	Digital reference library services	3.36	.647
4	Digital marketing library services	3.32	.716
5	Database library services	3.51	.503
6	Social media library services	3.54	.502
7	Online library support services	3.47	.503
8	Online current awareness services	3.34	.722
9	Online Public Access Catalogue (OPAC)	3.43	.660
	Cluster mean	**3.38**	**.620**

Source: field survey, 2026

The findings in table 1indicate that the respondents were in agreement that several innovative services are being applied in libraries. The services of a social media library achieved the greatest mean score (M = 3.54, SD =.502). This was then closely followed by database library services (M = 3.51, SD =.503) and online library support services (M = 3.47, SD =.503), which indicated that the digital information systems and online assistance have become an important part of the contemporary library operation. Online Public Access Catalogue (OPAC) (M = 3.43, SD =.660) in terms of its value in the provision of access to the library collections. More so, the online information search services and online reference library services have the same mean value (M = 3.36) with a standard deviation of 582 and 647, respectively. Respondents also recognized online current awareness services (M = 3.34, SD =.722) and online marketing library services (M = 3.32, SD =.716). SMS library services had the lowest mean score (M = 3.12, SD =.748). The cluster mean of 3.38 and standard deviation of .620 indicate that innovative library services are popular in libraries in the 21st century.

Table 2: Methods of equipping librarians and information services professionals

S/N	Statements	Mean	SD
1	My institution provides adequate funds for staff training and sponsorship of innovative library services.	2.88	.979
2	My office organises computer training for staff over time on innovative library services.	2.89	.842
3	My institution organises seminars and workshops on innovative library services.	3.08	.707
4	I engaged in personal virtue training on innovative library services.	3.25	.695
5	I sponsor myself to digital training workshops on innovative library services.	3.41	.570
6	I enrolled in private computer and internet training workshops on innovative library services.	3.13	.772
	Cluster mean	**3.10**	**.760**

Source: field survey, 2026

The findings in table 2 indicate different degrees of consensus amongst the respondents with respect to the capacity-building methodology. Digital training workshops on innovative library services were the best in terms of the highest mean score (M = 3.41, SD = .570). It was then succeeded by the participation in personal training regarding the innovative library services (M = 3.25, SD = .695). The attendance at private computer and internet training workshops also obtained a fairly high mean (M=3.13, SD=.772). Moreover, the involvement in seminars and workshops that the institutions conducted about the innovative library services had M=3.08, SD .707. Mean scores, however, were lower in the case of institutional support like arranging computer training for staff (M = 2.89, SD = .842) and availing of sufficient funds to train and sponsor staff (M = 2.88, SD = .979), implying that respondents do not have a positive view in terms of institutional financial support to develop professional services in innovative library services. The mean of the cluster is 3.10, and the standard deviation is .760, which shows librarians have different methods of equipping them for innovative library services.

Table 3: Innovative library services provided in the 21st century

S/N	Statements	SD	STD
1	I provide short message library services.	3.00	.766
2	I provide online information search services.	3.36	.687
3	I provide Digital reference library services	3.33	.719
4	I provide Digital marketing library services	3.11	.918
5	I provide Database library services	3.34	.579
6	I provide **S**ocial media library services	3.11	.759
7	I provide Online library support services	3.04	.871
8	I provide Online current awareness services	3.16	.784
9	I provide an Online Public Access Catalogue (OPAC	3.39	.694
	Cluster mean	**3.20**	**.753**

Source: field survey, 2026

The findings in Table 3 show that most of the respondents reported that they offer different innovative services in libraries. The highest mean score (M = 3.39, SD =.694) was recorded in the Online Public Access Catalogue (OPAC). This was then closely trailed by the online information search services (M = 3.36, SD =.687) and database library services (M = 3.34, SD =.579), implying that online information search and accessing a database are very common in library service delivery. The mean (M = 3.33, SD =.719) recorded by digital reference library services was relatively high. The online current awareness services showed a mean score of (3.16, SD= 784). The mean value (M = 3.11) of social media library services and digital marketing library services was equal (.759 and.918) in value, respectively, which means that these services are provided moderately. Online library support services had a mean of 3.04 (SD =.871), and this indicates that the respondents partially offer online support to library users. The lowest mean score (M = 3.00, SD =.766) was obtained by short message library services, yet it still indicates the agreement of the respondents that the service is offered. The mean of the cluster of 3.20 and 0.753 shows that librarians offer innovative services in the library.

Table 4: Challenges of equipping librarians for innovative library services in the 21st century

S/N	Statements	Mean	STD
1	There is a power failure always	3.49	.792
2	The network does not always work	3.33	.737
3	Most of the clientele are computer illiterate	2.92	1.004
4	I am not computer-literate	2.01	1,000
5	I do not possess digital skills	1.99	.902
6	I lack management support	2.39	1.096
7	There is a lack of training and retraining	2.86	.934
8	Lack of available ICT infrastructure in the library	2.76	1.057
	Cluster mean	**2.71**	**0.940**

Source: field survey, 2026

The findings in table 4 reveal that the respondents have pointed out a number of limitations that impact the successful provision of innovative library service. The largest mean score (M = 3.49, SD =.792) was obtained in power failure. This was then succeeded by low network connectivity (M = 3.33, SD =.737), which implies that volatile internet services limit innovative services. The majority of patrons of the library who are computer illiterate had a mean score of 2.92 with a standard deviation of 1.004. Absence of training and retraining of personnel also scored a similar moderate mean value (M = 2.86, SD = .934), indicating that the inadequacy of opportunities for staff to develop professionally influences the capacity of the librarian to offer innovative services. Unavailability of ICT infrastructure in the library had a mean of 2.76 (SD = 1.057). Lack of management support had a mean value of 2.39 (SD = 1.096), which shows that some of the respondents do not feel that the management is supportive of new library projects. Nonetheless, the respondents mostly did not agree with the statements that they are not computer literate (M = 2.01, SD = 1.000) and that they lack digital skills (M = 1.99, SD =.902), which means that the librarians tend to believe that they are competent in using the digital technologies. The mean of 2.71 and a standard deviation of 0.940 imply that a lot of challenges to equipment and provision of innovative library services in the 21st century.

Hypotheses

$H0_1$: Methods of equipping librarians and information services professionals do not predict the provision of innovative library services by librarians in the 21st century

Table 5: Regression Analysis

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.785	1	19.785	106.819	.000[b]
	Residual	13.706	74	.185		
	Total	33.491	75			
a. Dependent Variable: P						
b. Predictors: (Constant), M						

The F-statistic is 106.819 with a significance value (Sig.) of <.001, which is well below the conventional alpha level of 0.05. This indicates that the regression model is statistically significant, meaning that the predictor variable (Methods of equipping) significantly explains variance in the dependent variable (Provision of innovative library services). This suggests that changes in Methods of equipping are associated with meaningful changes in the provision of innovative library services, and the model provides a good fit for the data.

Discussion of Findings

The study indicated that the 21st century has different innovative library services. This is in line with Etebu and Zacchaeus (2020), who found that there were various innovative services available in the Nigerian libraries, such as online current awareness services, web design, digital references, mobile application services, and online workshops. Their research, which was done in Bayelsa State, also indicated that innovative services enhance information access and satisfaction of the needs of users.

The findings also revealed that librarians have various ways of equipping for innovation in library services. A similar result is observed in the study by Okeji et al. (2020), who evaluated digital literacy among librarians in privately based university libraries in the state of Anambra. Their results revealed that librarians usually pay themselves to train and participate in workshops despite the problems of power interruptions and the weak internet connection. Equally, Madukoma (2021) expressed that Nigerian librarians apply their experience and self-initiative to create new solutions within the libraries.

The research also found that the librarians provide innovative services to their libraries, which shows that their skills are practically applied. This is supported by the results of Ukwuoma, Dim, and Chigbu (2021), who found that innovative services that are driven by ICT enhance information delivery, such as e-reference services, the development of an institutional repository, and training of information literacy. Besides that, provision of digital twilights, online user education, and social media-based library resources, as was found in North-West Nigeria, demonstrates that involvement of librarians with innovative service provision improves user experience and academic performance.

Although these positive developments were made, the research found that there were serious challenges in equipment, as well as in the delivery of innovative library services. Contrary to Etebu and Zacchaeus (2020) and Ukwuoma et al. (2021), such problems as a lack of funds, poor ICT infrastructure, power failure, and shortage of skilled staff were identified to hinder the smooth provision of innovative services. This observation shows that there is an ongoing obstacle in all sorts of academic libraries in Nigeria, and this indicates that innovative services are increasingly becoming more available, but there are problems in the system that tend to restrict the extent of their application.

Summary of Findings

The summary of findings are:

1. Findings revealed that libraries have different innovative library services
2. Librarians have different methods of equipping themselves for innovative library services.
3. Findings show that librarians offer diverse innovative services in the library.
4. Librarians faced a lot of challenges in equipping and providing innovative library services in the 21st century.
5. Methods of equipping significantly predict the provision of innovative library services by librarians

Conclusion

The study examined how librarians are prepared for innovative library services, which are on the rise in the 21st century, with librarians using different strategies to prepare themselves to deliver quality services. Results show that librarians are actively offering such new services, but resources and equipment continue to be a challenge. Notably, the research has revealed that the approaches employed to prepare librarians have a major impact on their capacity to provide innovative library services, and therefore, there is a need to provide librarians with specific training, resources, and support to improve the delivery of innovative library services in the present era.

Recommendations

Based on the findings, the following recommendations are made:

1. Libraries should adapt and increase their innovative services to address the changing needs of the users and remain relevant in the 21st century.
2. Training programs should be standardized by the institutions, and continuous training should be provided on the professional development of all librarians to make them well-equipped.
3. Management ought to reward the efforts of the librarians by offering incentives, mentoring, and providing resources to maintain the provision of innovative service in the library.
4. Libraries should invest in new infrastructure, information and communications technology, and maintenance policies.

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Equipping Librarians for Innovative Library Services in the 21st Century: Implications for Academic Libraries in Nigeria

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Abstract

The transformation of the global information environment has significantly redefined the roles of librarians in academic institutions, shifting emphasis from traditional custodial functions to technology-driven and user-centred service delivery. This paper examines the competencies required to equip librarians for innovative library service delivery in the 21st century, with particular reference to academic libraries in Nigeria. Using a descriptive and analytical approach, the study explores emerging roles such as digital facilitation, research support, and data management, alongside key competency areas including ICT skills, data literacy, and instructional capabilities. The paper identifies persistent challenges limiting librarians' capacity for innovation, including inadequate professional training, weak technological infrastructure, skills mismatch, and limited institutional support. It argues that these constraints hinder librarians' ability to effectively respond to evolving demands in higher education. To address these gaps, the study proposes targeted strategies such as continuous professional development, curriculum reform in library and information science education, improved ICT support systems, and strengthened collaboration among stakeholders. The paper concludes that equipping librarians with relevant digital and pedagogical competencies is essential for sustaining innovative library services and enhancing teaching, learning, and research in Nigerian academic institutions.

Keywords: Librarians, innovation, library services, professional development, academic libraries, Nigeria.

1. INTRODUCTION

1.1 Background

Libraries have undergone a profound transformation over the past few decades, evolving from traditional, print-based repositories into dynamic, technology-driven digital knowledge hubs. Historically, libraries were primarily concerned with the acquisition, organisation and preservation of physical materials such as books and journals. However, the rapid advancement of information and communication technologies (ICTs) has redefined their core functions, enabling access to vast collections of digital resources, including e-books, online databases, institutional repositories and multimedia content (Asemi et al., 2021; Tenopir et al., 2023). This transition from traditional to digital libraries has not only expanded access to information but also reshaped how users interact with knowledge systems.

The emergence of the knowledge economy has significantly transformed the roles and responsibilities of librarians in academic libraries. As information professionals, librarians are increasingly expected to support research, teaching, learning and informed decision-making in a knowledge-driven society. The rapid growth of digital information, often described as the "information explosion," requires librarians to develop advanced competencies in information organisation, retrieval, evaluation and digital service delivery. Consequently, equipping librarians with innovative skills and technological expertise has become essential for enhancing the quality, accessibility and relevance of library services in Nigerian academic libraries (Bawden & Robinson, 2022; World Bank, 2023).

Concurrently, user expectations have evolved significantly in response to technological advancements and changing information-seeking behaviors. Modern library users demand seamless, remote and real-time access to information resources across multiple platforms. They increasingly prefer personalized, user-centered services, including intelligent search systems, mobile access and interactive digital environments. The rise of artificial intelligence, data analytics and cloud computing has further influenced these expectations, pushing libraries to adopt innovative service models and enhance user experience (Cox et al., 2023; Joo & Choi, 2022). Consequently, libraries must continuously adapt their services, infrastructure and professional competencies to remain relevant in a rapidly changing information landscape.

In summary, the evolution of libraries, the rise of the knowledge economy and changing user expectations have increased the demand for innovative library services. While academic libraries are expected to provide technology-driven and user-centred services, many librarians in Nigeria still face challenges related to inadequate digital competencies, limited professional development opportunities and insufficient capacity for innovation. This gap between emerging service expectations and the preparedness of librarians highlights the need to examine how librarians can be effectively equipped to deliver innovative services in contemporary academic library environments.

1.2 Problem Statement

Despite the rapid evolution of libraries into digitally driven knowledge systems, major challenges persist in developing countries such as Nigeria. A key issue is the widening skills gap among librarians, as many lack the advanced technical and managerial competencies required for digital services, data-driven decision-making and emerging technologies like artificial intelligence and digital curation. This mismatch limits their ability to manage digital resources effectively and deliver innovative services (Adeleke & Olorunsola, 2022; Cox et al., 2023).

In addition, inadequate technological infrastructure continues to limit librarians' capacity to provide innovative library services. Many academic libraries in Nigeria operate with unreliable internet connectivity, unstable power supply and insufficient access to modern ICT facilities due to inadequate funding. These constraints hinder librarians' effective use of emerging technologies, restrict the delivery of digital and user-centred services and reduce opportunities for professional skill development and innovation (Okiy, 2021; World Bank, 2023).

Furthermore, limited innovation capacity among librarians constrains their ability to respond effectively to the evolving information landscape. Factors such as inadequate training opportunities, insufficient funding for professional development, organizational rigidity and lack of strategic support hinder librarians' adoption of emerging technologies and innovative service models. Consequently, many librarians struggle to design and deliver user-centred services that meet the changing needs of academic library users (Iwhiwhu & Okorodudu, 2022; Asemi et al., 2021).

Overall, these interconnected challenges skills gaps in digital librarianship, inadequate technological infrastructure and limited professional innovation capacity among librarians significantly constrain librarians' ability to design and deliver effective, technology-driven library services in academic institutions in Nigeria. As a result, many librarians are not fully prepared to meet the demands of the evolving digital information environment, creating a gap between expected service delivery standards and actual professional practice. This underscores the need for targeted interventions to strengthen librarians' digital competencies and innovative capacity for improved service delivery in the 21st century.

1.3 Aim and Objectives

The main aim of this study is to examine the need for innovation in library systems in Nigeria within the context of a rapidly evolving digital and knowledge-driven environment.

The specific objectives of the study are as follows:

1. To examine the need to equipped librarians for innovation in library services and operations.
2. To identify the major challenges hindering librarians innovation in Nigerian libraries.
3. To propose strategies for equipping librarians in enhancing innovation capacity in libraries.

1.4 Significance of the Study

This study is important for improving Library and Information Science practice, higher education and policy development in Nigeria. It highlights how libraries can adopt innovative, user-centered and technology-driven services to enhance performance (Cox et al., 2023). It also supports higher education by strengthening libraries' roles in research, learning and digital access, addressing gaps in skills and infrastructure (Tenopir et al., 2023). Additionally, the study provides guidance for policymakers to improve funding, infrastructure and professional development, aligning library growth with national development goals (World Bank, 2023).

2. LITERATURE REVIEW

2.1 Concept of Innovative Library Services

Innovation in Library and Information Science (LIS) refers to the introduction and application of new ideas, technologies, processes, or service models aimed at improving the efficiency, effectiveness and user experience of library services. It encompasses both incremental improvements to existing systems and transformative changes that redefine how libraries operate and deliver value to users. In the contemporary information environment, innovation is increasingly driven by rapid technological advancements and the need to remain relevant in a competitive, knowledge-based society (Bawden & Robinson, 2022; Asemi et al., 2021).

Within the LIS context, innovation extends beyond the adoption of new technologies to include the redesign of services to meet evolving user needs. This includes user-centered approaches, collaborative knowledge creation and the integration of digital tools that enhance information access and engagement. As libraries transition from traditional repositories to interactive learning environments, innovation has become a critical factor in sustaining their relevance and impact (Cox et al., 2023). A major dimension of innovative library services is the deployment of **technology-driven solutions**. These include digital libraries, institutional repositories, cloud-based systems, artificial intelligence (AI)-powered search tools and data analytics for personalised services. Technologies such as machine learning and natural language processing are increasingly being used to improve information retrieval, automate cataloguing processes and provide intelligent user support systems (Joo & Choi, 2022). Additionally, mobile technologies and remote access platforms enable users to interact with library resources anytime and anywhere, reflecting the shift toward ubiquitous information access.

Furthermore, innovative services in libraries often involve the creation of virtual learning spaces, makerspaces and digital scholarship centers that support interdisciplinary research and creativity. These developments highlight the evolving role of libraries as active facilitators of knowledge production rather than passive information providers. However, the successful implementation of such innovations depends on the availability of technological infrastructure, skilled personnel and institutional support (Adeleke & Olorunsola, 2022). In fact, innovative library services are characterised by the strategic integration of technology, user-centered design and adaptive service models. As the

information landscape continues to evolve, libraries must embrace innovation to effectively meet the changing expectations of their users and to maintain their role as essential components of the knowledge ecosystem.

2.2 Emerging Trends in Academic Libraries

Academic libraries are undergoing rapid transformation driven by technological advancements, evolving research practices and changing user expectations. These developments are redefining librarians' roles, requiring them to move beyond traditional custodial functions to more dynamic, technology-driven and user-centred service delivery. Consequently, librarians must be adequately equipped with relevant competencies to remain effective in the 21st-century academic environment.

2.2.1 Digital Scholarship: Digital scholarship represents a major shift in how knowledge is created, analysed and disseminated through the use of digital tools such as text mining, data visualisation and digital humanities platforms. This trend is redefining librarians' roles as active partners in research and scholarly communication rather than passive information providers.

To support digital scholarship effectively, librarians must be equipped with competencies in data literacy, digital research tools, metadata management and collaborative research support. However, many librarians in Nigerian academic libraries still lack adequate training and exposure in these areas, limiting their ability to fully participate in digital scholarship initiatives (Cox et al., 2023).

2.2.2 Research Data Management (RDM): Research Data Management (RDM) has become a critical service in academic libraries due to the rise of data-intensive research and open science practices. This development requires librarians to support researchers in organising, documenting, preserving and sharing research data throughout the research lifecycle.

To function effectively in this role, librarians must be equipped with skills in data curation, metadata standards, data repositories, data ethics and research support services. Despite this growing demand, many librarians in Nigeria lack sufficient RDM training and competencies, which constrains their ability to support data-driven research effectively (Tenopir et al., 2023).

2.2.3 Virtual Reference Services: Virtual reference services have expanded significantly, enabling librarians to provide real-time assistance through digital platforms such as live chat, email, video conferencing and AI-enabled tools. This shift has extended librarians' service delivery beyond physical library spaces to remote and hybrid environments.

To deliver effective virtual reference services, librarians must be equipped with digital communication skills, online user engagement strategies and proficiency in information retrieval technologies. However, limited digital skills and inadequate training among librarians in Nigerian academic libraries often reduce the effectiveness of these services (Joo & Choi, 2022).

2.2.4 Information Literacy Instruction: Information literacy instruction remains a core function of academic librarians but has evolved to address challenges such as information overload and misinformation. Librarians are now expected to design and deliver structured programmes that develop users' critical thinking and information evaluation skills.

To achieve this, librarians must be equipped with instructional design skills, digital pedagogy competencies and the ability to integrate information literacy into academic curricula. However, many librarians in Nigeria lack adequate pedagogical preparation, which limits the effectiveness of information literacy instruction in academic institutions (Bawden & Robinson, 2022).

2.2.5 Social Media Engagement: Social media has become an important platform for academic librarians to promote services, communicate with users and enhance library visibility. Platforms such as X (Twitter), Facebook, Instagram and LinkedIn are now widely used for outreach and engagement.

To leverage social media effectively, librarians must be equipped with digital communication, content creation, audience engagement and digital branding skills. However, limited expertise in social media management among librarians in Nigeria reduces its effectiveness as a strategic library service tool (Asemi et al., 2021).

Overall, these emerging trends highlight a fundamental shift in academic librarianship, where librarians are expected to possess advanced digital, instructional and research support competencies. However, persistent skills gaps among librarians in Nigerian academic libraries create a mismatch between expected service delivery standards and actual professional capacity. This underscores the need for targeted capacity-building interventions to equip librarians for innovative library service delivery in the 21st century.

2.3 Competency Framework for Librarians

The transformation of academic libraries into digitally driven and user-centered knowledge hubs has significantly redefined the competencies required of librarians. Contemporary library professionals are expected to possess a diverse set of skills that extend beyond traditional cataloguing and reference services. A comprehensive competency framework typically encompasses digital, pedagogical and managerial/leadership skills, all of which are essential for effective service delivery and institutional relevance in the modern information landscape.

2.3.1 Digital Skills

Digital competencies are foundational to modern librarianship, given the increasing reliance on technology in information creation, organisation and dissemination. Librarians are expected to demonstrate proficiency in the use of digital library systems, institutional repositories, data management tools and online databases. Additionally, skills in areas such as metadata standards, digital preservation and information retrieval systems are critical. Emerging technologies including artificial intelligence, data analytics and cloud computing further require librarians to continuously update their technical expertise to remain effective in supporting digital scholarship and research activities (Cox et al., 2023; Joo & Choi, 2022).

Beyond technical proficiency, digital literacy also involves the ability to critically evaluate digital resources, ensure information security and support users in navigating complex digital environments. As such, ongoing professional development and training are essential to bridge existing skills gaps, particularly in developing contexts where access to advanced ICT infrastructure may be limited (Adeleke & Olorunsola, 2022).

2.3.2 Pedagogical Skills

As academic libraries increasingly take on instructional roles, pedagogical competencies have become a vital component of librarianship. Librarians are now actively involved in teaching information literacy, guiding users in research methodologies and supporting academic writing and critical thinking. Effective instruction requires an understanding of learning theories, curriculum design and assessment strategies. Modern approaches to information literacy emphasise learner-centered and collaborative teaching methods, including embedded librarianship, flipped classrooms and online learning modules. Librarians must also be adept at using digital teaching tools such as learning management systems and multimedia resources to deliver engaging and accessible instruction. These pedagogical skills enable librarians to contribute meaningfully to student learning outcomes and academic success (Bawden & Robinson, 2022).

2.3.3 Managerial and Leadership Skills

Managerial and leadership competencies are essential for navigating the complexities of modern library environments. Librarians are increasingly required to lead innovation initiatives, manage digital transformation projects and oversee multidisciplinary teams. Key skills in this domain include strategic planning, project management, change management and effective communication.

Leadership in libraries also involves fostering a culture of innovation, advocating for institutional support and building partnerships within and beyond the academic community. In resource-constrained environments such as Nigeria, strong leadership is particularly important for optimising available resources, securing funding and driving sustainable development. Librarians who possess these competencies are better positioned to influence policy decisions and guide their institutions through ongoing technological and organisational changes (Iwhiwhu & Okorodudu, 2022; Cox et al., 2023).

2.4 Challenges Facing Librarians in the Adoption of Innovation in Academic Libraries

Despite the increasing demand for innovative library services, librarians in academic libraries in Nigeria continue to face several interrelated challenges that limit their capacity to effectively adopt and implement innovation. These challenges are largely structural and professional, affecting librarians' ability to respond to the demands of the 21st-century digital information environment.

2.4.1 Infrastructural Constraints Affecting Librarians' Practice: Inadequate technological infrastructure significantly limits librarians' ability to deliver innovative, technology-driven services. Effective performance in modern librarianship depends on access to reliable internet connectivity, functional ICT facilities, stable power supply and up-to-date digital tools. However, many librarians in Nigerian academic institutions operate under conditions of frequent power outages, poor internet access and obsolete technological systems. These constraints hinder librarians' use of emerging technologies such as institutional repositories, cloud-based platforms and artificial intelligence tools, thereby restricting their capacity to innovate in service delivery (World Bank, 2023; Okiy, 2021).

2.4.2 Funding Limitations and Professional Development Opportunities for Librarians: Limited funding continues to restrict librarians' ability to engage in innovation-related activities. Adequate financial support is required for librarians' continuous professional development, acquisition of digital competencies, participation in training programmes and exposure to emerging technologies. However, many librarians in Nigerian academic institutions experience limited access to such opportunities due to insufficient institutional funding. This reduces their capacity to update their skills and adopt innovative practices, thereby slowing down service transformation in academic libraries (Adeleke & Olorunsola, 2022; Iwhiwhu & Okorodudu, 2022).

2.4.3 Skills Gaps and Resistance to Innovation among Librarians: A major barrier to innovation in academic libraries is the persistent skills gap among librarians. The rapid evolution of digital librarianship requires competencies in data management, digital curation, information systems and emerging technologies such as artificial intelligence and automation. However, many librarians lack continuous professional development opportunities, resulting in a mismatch between required and existing competencies.

In addition, resistance to change among some librarian's further limits innovation adoption. Factors such as low motivation, limited exposure to global best practices and organisational inertia reduce willingness to embrace new service models and technologies. These challenges collectively weaken librarians' ability to implement and sustain innovative library services in academic environments (Cox et al., 2023; Joo & Choi, 2022).

2.5 Theoretical Framework

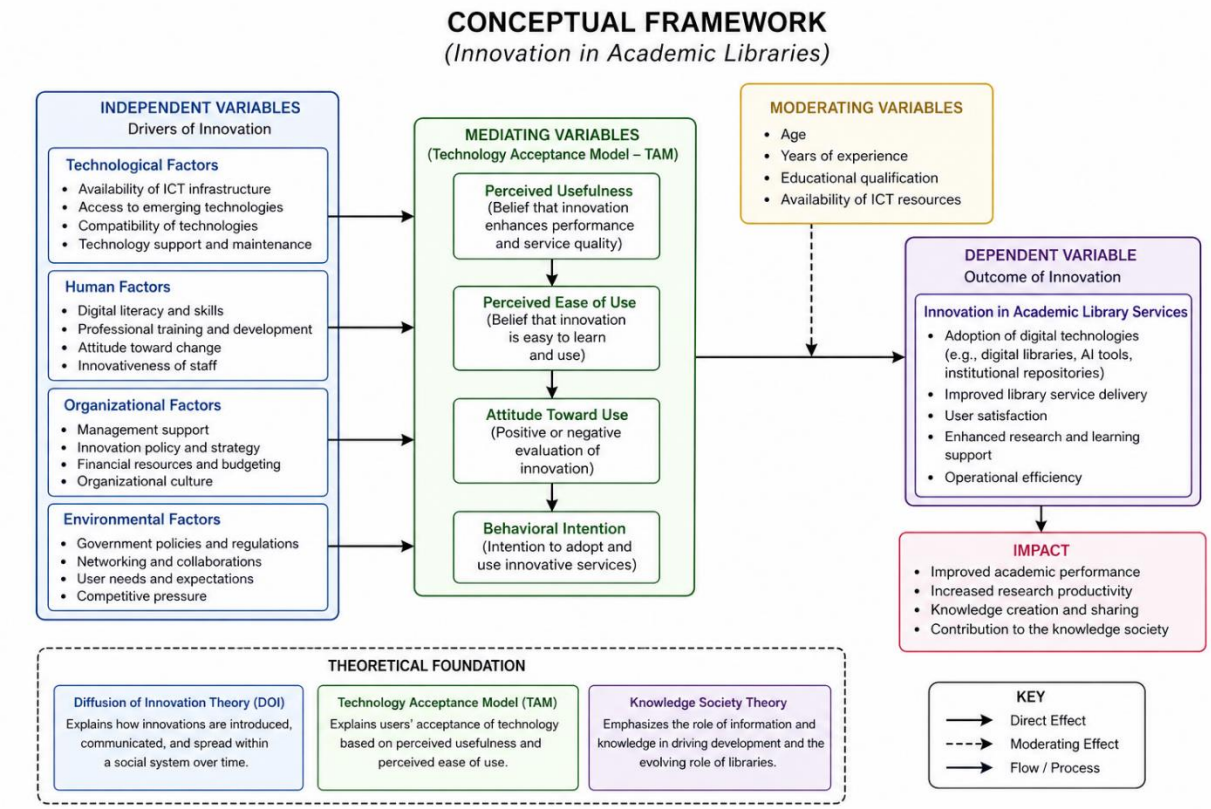
This study was grounded in three key theories that explain how innovation is introduced, accepted and sustained in academic libraries: Diffusion of Innovation (DOI) Theory, Technology Acceptance Model (TAM) and Knowledge Society Theory.

The Diffusion of Innovation Theory explains how new technologies and practices spread within organisations, highlighting stages of adoption and categories of adopters. It shows that factors such as perceived benefits, compatibility and complexity influence how innovations like digital libraries and AI tools are adopted, while challenges such as poor infrastructure and resistance to change slow adoption in developing contexts (Rogers, 2003; Iwhiwhu & Okorodudu, 2022).

The Technology Acceptance Model focuses on users' willingness to adopt technology based on perceived usefulness and ease of use. In academic libraries, it explains how librarians and users accept digital tools, noting that limited digital skills and inadequate training can hinder effective utilization (Davis, 1989; Joo & Choi, 2022).

Knowledge Society Theory emphasizes the role of knowledge and information in development, positioning libraries as active contributors to knowledge creation and dissemination. It highlights the need for libraries to adopt digital technologies and innovative services, while stressing the importance of infrastructure, skilled personnel and supportive policies (UNESCO, 2021; World Bank, 2023).

Together, these theories provide a comprehensive framework in figure 1 for understanding innovation in academic libraries by addressing adoption processes, user acceptance and the broader role of libraries in a knowledge-driven society.



The conceptual framework figure 1 explains that innovation in academic libraries results from the interaction of technological, human, organizational and environmental factors. These independent variables determine the capacity for innovation through elements such as ICT infrastructure, staff competencies, institutional support and external pressures.

User perceptions drawn from the Technology Acceptance Model serve as mediating variables, where perceived usefulness and ease of use influence attitudes and intention to adopt new technologies. Moderating factors such as age, experience and access to ICT further shape these relationships.

The outcome (dependent variable) is innovation in library services, reflected in improved service delivery, technology adoption, user satisfaction and operational efficiency. Ultimately, this leads to broader impacts such as enhanced research productivity and contribution to a knowledge-based society.

3. METHODOLOGY

This study adopts a descriptive and analytical research design based on a literature review, relying on existing scholarly works rather than primary data. The descriptive aspect outlines key concepts and trends in academic library innovation, while the analytical component evaluates literature to identify patterns, gaps and relationships. A narrative review approach is used, drawing from credible sources such as Scopus, Web of Science and Google Scholar to ensure rigor and relevance.

The study uses secondary data from peer-reviewed journal articles, books, policy documents, institutional reports (e.g., UNESCO and World Bank) and conference proceedings. These sources provide both theoretical foundations and current insights into digital transformation, innovation and challenges in academic libraries.

For analysis, the study employs thematic and comparative methods. Thematic analysis organizes findings into key areas such as services, technologies, competencies and challenges, while comparative analysis examines differences across regions, especially between developed and developing contexts like Nigeria. Together, these approaches ensure a comprehensive and evidence-based understanding of innovation in academic libraries.

The study applies clear inclusion and exclusion criteria to ensure quality and relevance. Included sources consist of peer-reviewed articles, scholarly books and credible institutional reports (e.g., UNESCO, World Bank), mainly published between 2010 and 2025, with a focus on recent studies addressing library innovation, digital transformation and related themes. Excluded materials include non-peer-reviewed works, irrelevant studies, outdated sources, duplicates and those lacking academic rigor.

Some limitations are acknowledged. The study relies only on secondary data, limiting empirical validation and includes only English-language sources, which may reduce global coverage. It is also subject to publication bias and the challenge of rapidly evolving technologies that may outdate findings over time.

To ensure transparency, a PRISMA-style process was used for literature selection. This involved identifying relevant studies, removing duplicates, screening titles and abstracts, assessing full-text eligibility and finally selecting high-quality studies for analysis. This systematic approach strengthens the credibility and reliability of the review.

RESULTS / ANALYSIS (THEMATIC ANALYSIS)

Emerging Roles of Librarians

The analysis shows that librarians' roles have significantly evolved due to digital transformation and changing user needs. Three key roles emerged: digital facilitators, research support specialists and data managers.

Digital facilitators: Librarians now support users in navigating digital platforms, online databases and virtual learning systems. They enable access to digital resources and bridge the digital divide. This role requires strong ICT competence and user support skills (Cox et al., 2023; Joo & Choi, 2022).

Research support specialists: Librarians increasingly assist researchers with literature searches, systematic reviews, citation management and scholarly publishing. This positions them as active partners in research rather than passive information providers (Tenopir et al., 2023).

Data managers: Librarians also manage research data through collection, organisation, preservation and sharing. This role demands advanced skills in data curation, metadata and research data management systems, which are still developing in many contexts.

Overall, these roles reflect a shift toward technology-driven and research-oriented librarianship, requiring continuous capacity development.

Required Competencies for Librarians in the Digital Age

The findings indicate that evolving roles require librarians to develop new competencies in three main areas: ICT skills, data literacy and teaching skills.

ICT skills: Librarians must be proficient in digital systems, databases, metadata management and emerging technologies. However, ICT skill gaps remain a major challenge in many developing contexts, including Nigeria (Adeleke & Olorunsola, 2022).

Data literacy: Librarians are expected to support research data management, including data curation, ethics and preservation. This competency is essential in modern research environments (Tenopir et al., 2023).

Teaching skills: Librarians now deliver information literacy instruction and support curriculum integration. This requires pedagogical and instructional design skills (Bawden & Robinson, 2022).

These competencies collectively define modern librarianship and are critical for effective service delivery in digital academic environments.

Gaps Identified in the Literature

Two major gaps emerge from the literature: skills mismatch and institutional weaknesses.

Skills mismatch: There is a clear gap between librarians' existing skills and the competencies required for modern digital services such as AI tools, data management and digital scholarship support (Cox et al., 2023).

Institutional weaknesses: Poor funding, weak policy support and limited strategic investment hinder innovation in academic libraries. These conditions restrict infrastructure development and staff capacity building (World Bank, 2023).

Overall, the literature shows that limited human capacity and weak institutional support jointly constrain innovation in academic libraries.

DISCUSSION

Theoretical Interpretation

Diffusion of Innovation Theory: The study findings show slow adoption of innovation due to infrastructure deficits, limited funding and weak skills. These barriers increase the perceived complexity of new technologies, slowing diffusion in academic libraries (Rogers, 2003).

Technology Acceptance Model (TAM): Even where technologies exist, low perceived ease of use and usefulness driven by skills gaps and limited training reduce adoption among librarians (Davis, 1989).

Together, both theories explain that innovation depends on both institutional readiness and individual acceptance.

Global Comparison (Developed vs Developing Contexts)

In developed countries, academic libraries operate advanced digital systems, including AI tools, strong data infrastructure and well-funded digital scholarship services. Innovation is systematic and well-supported.

In contrast, libraries in developing countries like Nigeria face infrastructural deficits, funding limitations and skills shortages. Innovation is slower and often fragmented.

However, global initiatives in open access and capacity building are gradually narrowing this gap (World Bank, 2023).

Nigerian Context: Structural and Policy Barriers

In Nigeria, innovation in academic libraries is constrained by poor ICT infrastructure, unstable power supply and inadequate funding. These structural issues limit digital service delivery and innovation sustainability.

Policy-related challenges, including weak implementation of library development policies and low institutional prioritisation, further hinder progress. As a result, there is a gap between policy intentions and actual practice.

Despite these challenges, emerging digital initiatives and international support provide opportunities for improvement, but sustained investment in infrastructure and librarian capacity is essential.

STRATEGIES FOR ENHANCING INNOVATIVE SERVICE DELIVERY AMONG LIBRARIANS

This section presents key strategies for strengthening librarians' capacity for innovative service delivery in academic libraries. The strategies are derived from the literature and address identified skills and institutional gaps affecting librarians in the digital knowledge economy.

Continuous Professional Development for Librarians

Continuous professional development is essential for equipping librarians with the digital and research competencies required in modern academic libraries. Regular training programmes, workshops and certifications in areas such as digital librarianship, data management, artificial intelligence and information systems are critical. Participation in conferences and professional networks further enhances librarians' exposure to global best practices and emerging technologies.

Reform of Library and Information Science (LIS) Education

LIS curricula should be updated to equip future librarians with relevant 21st-century competencies. This includes training in digital libraries, data science, research data management, digital scholarship and information analytics. Practical, technology-based learning is necessary to bridge the gap between academic preparation and professional demands in innovative library environments.

Strengthening ICT Competence through Institutional Support

Librarians require sustained institutional support to effectively apply ICT in service delivery. This includes access to modern digital tools, integrated library systems and stable internet services. Strengthening ICT competence enables librarians to manage digital collections, support virtual services and adopt emerging technologies effectively.

Collaboration and Knowledge Sharing among Librarians

Professional collaboration enhances librarians' innovation capacity through shared learning and exposure to new practices. Partnerships with other librarians, academic institutions and professional networks provide opportunities for skill development, mentoring and technology transfer. Such collaborations strengthen librarians' ability to adopt innovative service models.

Policy Support for Librarian Capacity Development

Strong institutional and national policies are required to support continuous capacity building for librarians. Policies should prioritise training, innovation funding and structured professional development pathways. Effective implementation ensures that librarians are adequately prepared to respond to evolving service demands.

Collectively, these strategies emphasise strengthening librarians' competencies as the foundation for innovative library service delivery. Addressing skills gaps, improving training systems and enhancing institutional support are essential for enabling librarians to function effectively in the 21st-century academic environment.

CONCLUSION

This study set out to examine the need for innovation in academic libraries, identify key challenges and propose strategies for improving innovative service delivery, particularly within the Nigerian context. The review of literature demonstrates a clear shift in the role of academic libraries from traditional information custodians to dynamic,

technology-driven knowledge service providers. This transformation is driven by rapid technological advancement, the growth of the knowledge economy and increasing user expectations for fast, seamless and digital access to information.

A core argument emerging from the study is that innovation in academic libraries is no longer optional but essential for relevance and sustainability. However, despite this necessity, libraries especially in developing countries continue to face persistent challenges such as inadequate infrastructure, limited funding, skills gaps and weak institutional and policy support. These constraints significantly slow down the adoption and effective implementation of innovative library services. The study also emphasises the urgency of addressing these challenges, as delays in innovation deepen the digital divide between developed and developing library systems. In an era defined by data-intensive research, artificial intelligence and digital scholarship, academic libraries that fail to innovate risk marginalisation within the broader knowledge production ecosystem.

Importantly, the findings reaffirm the continued relevance and strategic importance of librarians in the digital age. Far from becoming obsolete, librarians are increasingly central to research support, data management, digital literacy training and knowledge facilitation. Their evolving roles position them as key actors in enabling access to information, supporting academic success and advancing institutional research output.

In conclusion, sustainable innovation in academic libraries requires coordinated efforts in professional development, infrastructure investment, curriculum reform, collaboration and strong policy frameworks. Strengthening these areas will ensure that libraries remain vital, responsive and impactful institutions within the global knowledge economy.

Recommendations

Based on the findings of this study, it is recommended that academic institutions strengthen continuous professional development programmes for librarians, particularly in emerging areas such as digital librarianship, data management and artificial intelligence applications. Library and Information Science curricula should be updated to reflect current digital realities. Furthermore, institutions should improve ICT infrastructure and promote collaborative learning opportunities among librarians. Finally, strong policy support is required to ensure sustained capacity development and innovation in library service delivery.

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ETHICAL USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES FOR REFERENCE SERVICE PROVISION IN ACADEMIC LIBRARIES

By

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Abstract

This paper examines ethical use of AI in academic reference services, with particular attention to how such technologies are redefining the traditional librarian–user interaction. AI tools such as chatbots, virtual assistants and automated knowledge retrieval systems are increasingly being deployed to enhance service efficiency, provide 24/7 support and manage high volumes of user inquiries. However, their implementation raises important ethical concerns, including issues related to data privacy, algorithmic transparency, bias and the potential erosion of the human element in library services. The study draws upon existing literature, professional guidelines (e.g., ALA, IFLA) and theoretical frameworks from information ethics and human-centered design to explore the implications of AI for academic librarianship. It emphasizes the need to balance automation with core library values such as equity, empathy, intellectual freedom and trust. Moreover, the paper interrogates the shifting professional roles of academic librarians in AI-enhanced environments, highlighting the competencies required to supervise, evaluate and ethically manage AI-based systems. By synthesizing conceptual and narrative insights, the paper identifies emerging challenges and delineates strategic recommendations for the ethical deployment of AI in reference services. These include developing institutional AI policies, enhancing librarian training in digital ethics and promoting hybrid models that integrate AI under librarian oversight. Ultimately, the paper advocates for an ethical, user-centered approach to AI adoption that strengthens the integrity and relevance of academic reference services in the digital age.

Keywords: Artificial Intelligence (AI); Academic Libraries; Reference Services; Ethics and Librarianship

1. Introduction

In recent years, academic libraries have witnessed a paradigm shift driven by the rapid advancement of emerging technologies, particularly artificial intelligence (AI). The application of AI has the potential to revolutionize library operations, improve user access to information and enhance the quality-of-service delivery across a range of functions. From collection development and discovery systems to information retrieval and user engagement, AI is being embedded into the infrastructure and workflows of academic libraries around the world (Cox, Pinfield, & Rutter, 2019).

One of the most notable developments is the integration of **AI-enabled reference services**, such as **chatbots, virtual assistants** and **machine learning algorithms**, which aim to support users in finding information quickly, 24/7 and with minimal human intervention. These tools are designed to simulate human reference interactions by responding to user queries, guiding them to relevant databases or catalogues and providing curated resources (Wang, Fang, & Ye, 2022). Such innovations are particularly useful in institutions with high user traffic or limited staffing, offering the promise of efficiency, scalability and real-time assistance.

However, the integration of AI into reference services introduces a set of **ethical and professional concerns** that challenge the foundational principles of academic librarianship. Issues such as **algorithmic bias, lack of transparency, data privacy violations** and **reduced human oversight** threaten to compromise the values of trust, confidentiality and equity that are central to the librarian–user relationship (Ryan & Stahl, 2021). Moreover, there is an increasing risk that reference services may become **depersonalized**, with users interacting more frequently with impersonal systems than with trained professionals capable of providing context-aware and empathetic support (Bodle, 2011). Such a shift not only impacts the quality of reference interactions but may also erode user confidence in the library as a trusted academic space.

In addition to ethical concerns, the deployment of AI in academic reference services also raises **questions about professional responsibility and the evolving role of librarians**. As intermediaries between information systems and end-users, academic librarians must now develop new competencies to manage, supervise and ethically evaluate AI tools. They must also advocate for inclusive, transparent and accountable AI design that reflects the diverse needs of their user communities (Farnel, 2021). The shift from traditional human-mediated services to AI-supported models thus

requires a reimagining of the librarian's role not as a passive operator of technology, but as an **active ethical steward and digital facilitator**.

Against this backdrop, this paper seeks to examine the **responsible use of AI in academic reference services**, with a particular focus on **how it reshapes the librarian–user interaction.** By exploring the ethical implications, service transformation and professional demands associated with AI deployment, the paper aims to provide academic librarians and stakeholders with strategic insights and practical guidelines. As academic institutions increasingly embrace digital transformation, it becomes imperative that such transitions are underpinned by ethical considerations, user-centered values and a strong commitment to professional integrity. This paper aims to explore how artificial intelligence (AI) can be ethically and responsibly integrated into academic reference services, with particular emphasis on preserving the quality of librarian–user engagement and upholding professional standards of academic librarianship.

Objectives:

The objectives of the study are to:

1. examine the ethical concerns associated with the adoption of AI technologies in academic reference services,
2. analyze the evolving roles of academic librarians within AI-enhanced service environments
3. identify strategies for the responsible and context-sensitive integration of AI in reference services.

2.0 Conceptual Review

2.1 Concept of Artificial Intelligence

Artificial Intelligence (AI) refers to the capability of computer systems to perform tasks that normally require human intelligence, including learning, reasoning, problem-solving, perception, and language understanding. AI has emerged as one of the most transformative technologies of the twenty-first century, significantly influencing various sectors, including education, healthcare, finance, and information services.

Definitions of Artificial Intelligence

Artificial Intelligence has been defined by various scholars from different perspectives. According to Russell and Norvig (2021), AI is the study of intelligent agents capable of perceiving their environment and taking actions that maximize their chances of achieving specific goals. Similarly, Kaplan and Haenlein (2019) describe AI as a system's ability to correctly interpret external data, learn from such data, and use the acquired knowledge to achieve predetermined objectives through flexible adaptation.

McCarthy (2007), who coined the term "Artificial Intelligence," defined it as the science and engineering of making intelligent machines capable of performing functions associated with human intelligence. Furthermore, the Organisation for Economic Co-operation and Development (OECD, 2019) defines AI systems as machine-based systems that can make predictions, recommendations, or decisions influencing real or virtual environments based on human-defined objectives.

These definitions collectively highlight AI as a technology that enables machines to simulate cognitive functions traditionally associated with human beings.

Types of Artificial Intelligence

Artificial Intelligence is commonly classified into three major categories based on capability:

Narrow Artificial Intelligence (Weak AI)

Narrow AI refers to systems designed to perform specific tasks within a limited domain. These systems cannot operate beyond their programmed functions. Examples include chatbots, recommendation systems, voice assistants, and search engines (Russell & Norvig, 2021).

General Artificial Intelligence (Strong AI)

General AI describes a hypothetical form of intelligence capable of understanding, learning, and applying knowledge across a broad range of tasks at a level comparable to human intelligence. Although significant progress has been made in AI development, true General AI has not yet been achieved (Kaplan & Haenlein, 2019).

Super Artificial Intelligence

Super AI represents a theoretical stage where machine intelligence surpasses human intelligence in all aspects, including creativity, reasoning, and problem-solving. While currently speculative, discussions surrounding Super AI raise significant ethical and governance concerns (Bostrom, 2014).

AI Applications in Information Services

AI has become increasingly integrated into information services, particularly in libraries and academic institutions. Applications include automated cataloguing, information retrieval, recommendation systems, user behavior analysis, digital preservation, and virtual reference assistance (Cox et al., 2019).

Chatbots and virtual assistants are widely used to provide instant responses to frequently asked questions, while machine learning algorithms support personalized resource recommendations. Natural Language Processing (NLP) enables systems to understand user queries and retrieve relevant information efficiently. Additionally, generative AI tools are

being utilized to assist users in literature searching, research support, and academic writing guidance (Asemi & Asemi, 2018).

The integration of AI technologies has enhanced service efficiency, improved user satisfaction, and expanded access to information resources within academic environments.

2.2 Concept of Reference Services

Reference services constitute a fundamental function of libraries and information centers. They involve assisting users in locating, evaluating, and utilizing information resources to meet their information needs.

Traditional Reference Services

Traditional reference services involve face-to-face interactions between librarians and users within a physical library environment. These services include answering reference questions, guiding users in information retrieval, providing bibliographic instruction, and assisting with the use of library resources (Bopp & Smith, 2011).

Traditional reference services rely heavily on the professional expertise of librarians, who interpret users' information needs and direct them to appropriate information sources. Although effective, these services are constrained by operating hours and physical accessibility.

Digital Reference Services

Digital reference services emerged with advancements in information and communication technologies. These services allow users to obtain information support through electronic channels such as email, web forms, and online databases (Lankes, Gross, & McClure, 2003).

Digital reference services provide greater flexibility and accessibility compared to traditional methods. Users can submit inquiries remotely and receive responses without physically visiting the library. The adoption of digital technologies has expanded the reach of academic libraries and improved service delivery.

Virtual Reference Services

Virtual reference services represent an advanced form of digital reference service that enables real-time communication between librarians and users through live chat, videoconferencing, social media platforms, and AI-powered systems (Chow & Croxton, 2014).

Virtual reference services facilitate immediate assistance and support users regardless of geographical location. The integration of AI technologies has further enhanced virtual reference services by enabling automated responses, personalized recommendations, and continuous service availability. Consequently, virtual reference services have become increasingly important in supporting distance learning and online education.

2.3 AI Technologies Used in Academic Reference Services

The growing adoption of AI technologies in academic libraries has transformed the nature of reference services. Various AI tools are now employed to improve information access, enhance user experience, and support decision-making processes.

Mapping of AI Technologies in Academic Reference Services

AI Technology	Application in Reference Services	Ethical Concern
Chatbots	Answer routine queries and provide instant support	Accuracy, bias
Virtual Assistants	Personalized user assistance and guidance	Privacy and data security
Machine Learning Systems	Resource recommendation and predictive services	Algorithmic bias
Natural Language Processing (NLP)	Query interpretation and information retrieval	Misrepresentation of user intent
Knowledge Retrieval Systems	Intelligent searching and information discovery	Transparency and accountability
Recommendation Engines	Personalized resource suggestions	Filter bubbles and information narrowing
Generative AI Tools	Research assistance, content generation, and academic support	Hallucinations, misinformation, plagiarism concerns

Chatbots

Chatbots are AI-powered conversational systems designed to interact with users through text or voice interfaces. In academic libraries, chatbots provide immediate responses to frequently asked questions, guide users to library resources, and offer basic reference assistance (Okonkwo & Ade-Ibijola, 2021). However, concerns remain regarding response accuracy and the potential for biased information.

Virtual Assistants

Virtual assistants use AI technologies to deliver personalized support to users. They can help users locate resources, schedule appointments, and provide tailored recommendations. While these systems improve user experience, they also raise concerns related to privacy, data collection, and surveillance (Floridi et al., 2018).

Machine Learning Systems

Machine learning systems analyze large datasets to identify patterns and make predictions. In academic reference services, these systems support recommendation services, user behavior analysis, and collection development. Nevertheless, machine learning models may perpetuate existing biases present in training data, leading to unfair outcomes (O'Neil, 2016).

Natural Language Processing (NLP)

Natural Language Processing enables computers to understand and process human language. NLP applications in reference services include query interpretation, semantic searching, and automated question answering. Although NLP enhances information retrieval accuracy, incorrect interpretation of user queries may result in misinformation or reduced service effectiveness (Jurafsky & Martin, 2024).

Knowledge Retrieval Systems

Knowledge retrieval systems employ AI techniques to identify and retrieve relevant information from extensive databases and repositories. These systems improve search efficiency and support evidence-based information access. However, concerns regarding transparency and explainability remain significant (Russell & Norvig, 2021).

Recommendation Engines

Recommendation engines use user preferences and behavioral data to suggest relevant books, journals, databases, and other resources. These systems improve information discovery but may create filter bubbles that limit exposure to diverse perspectives (Pariser, 2011).

Generative AI Tools

Generative AI technologies, such as large language models, are increasingly being used to support academic research, literature reviews, and information synthesis. These tools can generate summaries, answer research questions, and assist users in navigating scholarly resources. However, issues such as hallucinations, misinformation, plagiarism, and lack of source transparency necessitate careful human oversight (Dwivedi et al., 2023).

Overall, AI technologies have enhanced the efficiency and accessibility of academic reference services. Nevertheless, ethical considerations including privacy, bias, transparency, accountability, and information accuracy must be addressed to ensure responsible implementation.

3. Methodology

This study adopts a **conceptual and narrative review approach** aimed at exploring the ethical, professional and technological implications of integrating artificial intelligence (AI) into academic reference services. The purpose of this methodology is to synthesize existing knowledge and frameworks to inform responsible AI adoption in academic libraries without engaging in empirical data collection.

The research methodology is structured around three core components:

- **Review of Scholarly Literature**: A critical review of peer-reviewed literature was conducted to gather insights on AI applications in libraries, ethical concerns in automated services and the evolving functions of academic librarians. Sources were selected from leading databases including Scopus, Web of Science and EBSCOhost, focusing on journals such as *Library Hi Tech*, *The Journal of Academic Librarianship* and *Information, Communication & Society* (Cox, Pinfield, & Rutter, 2019; Wang, Fang, & Ye, 2022).
- **Professional Guidelines and Policy Frameworks**: The study integrates recommendations and ethical codes from globally recognized library associations, such as the **International Federation of Library Associations and Institutions (IFLA)** and the **American Library Association (ALA)**. These bodies provide essential normative guidelines concerning intellectual freedom, data ethics and responsible technology use in library environments (IFLA, 2020; ALA, 2019).
- **Theoretical and Conceptual Analysis**: Ethical concerns are interpreted using key theoretical frameworks from **information ethics, responsible innovation** and **human-centered AI design**. Concepts such as algorithmic fairness, digital trust and professional accountability are central to this analysis (Floridi & Cowls, 2019; Ryan & Stahl, 2021). The role of the librarian is also examined through the lens of professional identity theories, emphasizing the need for ethical stewardship and digital literacy in AI-enhanced settings (Farnel, 2021).

By drawing from diverse sources academic literature, professional standards and conceptual models this methodology enables a multidimensional analysis of how AI is reshaping reference services and the librarian–user dynamic. It also supports the formulation of actionable, ethically grounded recommendations for sustainable AI deployment in academic libraries.

Table 1: Methodology Chart: Conceptual and Narrative Review Approach

Component	Description	Key Sources / Frameworks
1. Scholarly Literature Review	Critical synthesis of peer-reviewed literature on AI in libraries, ethics and librarian roles.	• **Journals**: *Library Hi Tech*, *The Journal of Academic Librarianship*, *Information, Communication & Society* • **Databases**: Scopus, Web of Science, EBSCOhost • **Examples**: Cox et al., 2019; Wang et al., 2022
2. Professional Guidelines & Policies	Integration of global library ethics and standards to evaluate responsible AI practices.	• **IFLA** (2020) • **ALA** (2019) • **Topics**: intellectual freedom, data ethics, technology use
3. Theoretical & Conceptual Analysis	Application of ethical frameworks and identity theories to interpret AI's role and librarian responsibilities.	• **Theories**: Information ethics, Responsible innovation, Human-centered AI • **Key Concepts**: Algorithmic fairness, Digital trust, Professional accountability • **Authors**: Floridi & Cowls (2019); Ryan & Stahl (2021); Farnel (2021)

4. Findings / Results

The conceptual and literature-based analysis yielded several key findings concerning the ethical integration of artificial intelligence (AI) into academic reference services.

Ethical Challenges in AI-Enhanced Library Services

A number of **ethical concerns** consistently surface across the literature regarding the integration of AI in academic reference services. One of the most pressing issues is **algorithmic bias**, which occurs when AI systems trained on incomplete, skewed, or historically biased datasets inadvertently reproduce or reinforce social inequalities (Bevan, 2009; Noble, 2018). For instance, search or recommendation engines embedded in library systems may disproportionately favor dominant cultural perspectives or marginalize alternative viewpoints, thereby undermining the library's mission to support inclusive and equitable access to information.

Closely related is the issue of **data privacy**, particularly with regard to how AI systems collect, store and process user data during reference interactions. Many AI-driven tools rely on extensive data harvesting to improve their predictive accuracy and personalization capabilities. However, without clear data governance frameworks, this reliance can expose users to surveillance risks, violate confidentiality expectations and conflict with ethical norms around informed consent and intellectual freedom (Ryan & Stahl, 2021). This concern is especially critical in academic environments, where users may engage with sensitive topics that require assurance of discretion and privacy.

Furthermore, **lack of transparency** in AI decision-making processes often referred to as the "black box" problem makes it difficult for users and librarians to understand how outputs are generated. When users receive recommendations or reference responses without knowing the basis for those decisions, trust in the system can erode. This is compounded by **accountability gaps**, wherein it becomes unclear who is responsible when AI tools provide inaccurate information, exhibit biased behavior, or fail to meet user needs (Floridi & Cowls, 2019). Without explicit human oversight and institutional accountability measures, errors or harms caused by AI systems may go unaddressed.

Collectively, these challenges strike at the core values of academic librarianship, particularly **trust, fairness, intellectual freedom and professional responsibility**. As such, the deployment of AI in academic libraries must be accompanied by robust ethical safeguards that ensure transparency, minimize harm and reinforce the human-centered values upon which the profession is founded.

The Evolving Role of Academic Librarians in the AI Era

Second, the **role of academic librarians is undergoing significant transformation** in response to the integration of artificial intelligence (AI) and other emerging technologies within higher education institutions. Traditionally viewed as custodians and gatekeepers of knowledge resources, librarians are increasingly taking on the roles of **digital mediators, technology facilitators and ethical stewards** in a complex information ecosystem. This shift is not merely operational but strategic, positioning librarians at the intersection of information ethics, technological innovation and user empowerment (Cox, Pinfield, & Rutter, 2019).

As AI tools are embedded into library systems for tasks ranging from automated reference chatbots to machine-assisted metadata generation librarians are called upon to **supervise, evaluate and ethically guide** their implementation. Their responsibilities now include ensuring that AI applications align with professional values such as intellectual freedom, equity of access, user privacy and non-discrimination. Librarians also play a crucial role in promoting **transparency**

and accountability by demystifying algorithmic processes for users and advocating for explainable and fair AI systems (Farnel, 2021).

This expanded role requires librarians to acquire new **competencies in digital literacy,** particularly in understanding how AI algorithm's function, recognizing biases in data-driven systems and interpreting predictive analytics in decision-making contexts. Moreover, librarians must cultivate skills in **critical technology appraisal**, enabling them to question the assumptions, limitations and ethical implications of the tools they deploy. Leadership in this new landscape demands not only technical knowledge but also **ethical foresight and instructional ability**, as librarians increasingly take on the role of educating faculty, students and institutional leaders about responsible technology engagement (Parry, 2022).

Consequently, the professional identity of academic librarians is being reshaped. Their evolving role situates them as central agents in navigating the ethical tensions of digital transformation, ensuring that the adoption of AI enhances rather than undermines the human-centered mission of academic libraries.

2.3 Strategies for Integrating Artificial Intelligence in Reference Services in Academic Libraries

The successful integration of Artificial Intelligence (AI) into academic library reference services requires a strategic approach that balances technological innovation with the professional values and ethical responsibilities of librarianship. While AI offers significant opportunities to improve service delivery, enhance user experiences, and increase operational efficiency, its implementation must be guided by principles that preserve the fundamental mission of academic libraries.

Staff Training and Capacity Building

One of the most important strategies for integrating AI into reference services is the continuous training and development of library personnel. Librarians must acquire competencies in AI technologies, data literacy, digital ethics, and algorithmic decision-making to effectively manage and evaluate AI-enabled systems. Professional development programs, workshops, and collaborative learning initiatives can equip librarians with the necessary skills to work alongside AI tools while maintaining the quality and integrity of reference services (Cox et al., 2019).

Adoption of Hybrid Reference Service Models

Academic libraries should adopt hybrid service models that combine AI capabilities with human expertise. AI-powered chatbots and virtual assistants can efficiently handle routine and repetitive inquiries, while librarians focus on complex research consultations, information literacy instruction, and specialized reference support. This complementary approach ensures that users benefit from both the speed of AI systems and the critical thinking, empathy, and contextual understanding provided by human librarians (Asemi & Asemi, 2018).

Development of Ethical AI Policies and Governance Frameworks

The integration of AI should be supported by comprehensive institutional policies that address ethical, legal, and operational concerns. Libraries need clear guidelines regarding data privacy, algorithmic accountability, transparency, intellectual freedom, and user rights. Governance frameworks should define how AI systems are selected, monitored, evaluated, and updated to ensure compliance with professional standards and ethical principles (Floridi & Cowls, 2019).

Ensuring Transparency and Explainability

Transparency is essential in maintaining users' trust in AI-powered reference services. Libraries should inform users when they are interacting with AI systems and provide explanations regarding how recommendations, search results, or responses are generated. Explainable AI practices enable users to understand the reasoning behind automated decisions, thereby promoting accountability and reducing concerns about algorithmic bias (European Commission, 2020).

Promoting User Privacy and Data Protection

Academic libraries have a long-standing commitment to protecting user confidentiality and intellectual freedom. Therefore, AI systems deployed in reference services must incorporate strong privacy safeguards, including data minimization, secure storage, anonymization techniques, and compliance with relevant data protection regulations. Libraries should also obtain informed consent from users regarding the collection and use of personal data (IFLA, 2020).

Enhancing Equity and Inclusive Access

AI technologies should be designed and implemented in ways that promote equitable access to information services. Academic libraries must ensure that AI-powered reference services are accessible to users with disabilities, individuals from diverse linguistic backgrounds, and those with varying levels of digital literacy. Inclusive design practices can help prevent digital exclusion and ensure that all users benefit from technological innovations (ALA, 2019).

Continuous Assessment and Quality Evaluation

Regular evaluation of AI systems is necessary to ensure effectiveness, accuracy, and fairness. Libraries should establish assessment mechanisms that monitor system performance, user satisfaction, response quality, and ethical compliance. Feedback from users and librarians should be incorporated into ongoing improvements to enhance service quality and mitigate emerging risks (Hervieux & Wheatley, 2021).

Collaboration with Technology Developers and Stakeholders

Successful AI integration requires collaboration between librarians, information technology specialists, software developers, faculty members, and library users. Such partnerships can facilitate the development of AI solutions that

align with academic needs, institutional objectives, and professional library values. Collaborative approaches also promote greater transparency and accountability in AI system design and implementation (Cox et al., 2019).

Balancing Innovation with Core Library Values

Academic libraries find themselves at a pivotal crossroads where they must carefully balance the promise of technological innovation with the enduring values that define the profession. As Artificial Intelligence becomes increasingly integrated into reference services, libraries must exercise ethical vigilance to ensure that these technologies enhance rather than undermine their core institutional principles. These principles include user autonomy, which safeguards individuals' right to control their informational interactions; equity of access, which ensures that all users regardless of socioeconomic status, ability, or digital literacy can benefit from AI-enhanced services; human dignity, which demands that users be treated with respect and consideration; and informed consent, which emphasizes transparency in how user data are collected, stored, and utilized (ALA, 2019; IFLA, 2020).

The appeal of AI lies largely in its efficiency, scalability, and ability to provide instant access to information. However, these advantages should not overshadow the human-centered mission of academic libraries. Without a deliberate and ethically grounded approach to design, implementation, and governance, AI systems may introduce algorithmic opacity, reinforce societal biases, limit intellectual diversity, or reduce complex human information needs to automated interactions. Such outcomes have the potential to erode user trust and compromise the inclusive and intellectually supportive environment that libraries traditionally provide (Floridi & Cowls, 2019).

Consequently, the challenge facing academic libraries is not merely the adoption of AI technologies but their responsible integration into existing service frameworks. This requires embedding ethical safeguards, promoting transparency, ensuring human oversight, and maintaining professional accountability throughout the lifecycle of AI systems. By adopting a reflective and values-driven approach, academic libraries can harness the benefits of AI while preserving the foundational principles of librarianship. In doing so, innovation becomes a means of strengthening rather than replacing the core mission of libraries in supporting learning, research, intellectual freedom, and equitable access to information.

Table 2: Summary of Key Findings on Ethical AI Integration in Academic Reference Services

Key Theme	Core Issues Identified	Implications for Libraries	Relevant Sources
1. Ethical Challenges in AI Deployment	- Algorithmic bias - Privacy risks due to data harvesting - Lack of transparency ("black box") - Accountability gaps	- Risk of reinforcing social inequalities - User distrust in AI systems - Ethical dilemmas in managing sensitive data - Need for clear accountability frameworks	Bevan, 2009; Noble, 2018; Ryan & Stahl, 2021; Floridi & Cowls, 2019
2. Evolving Role of Librarians	- Shift from custodians to ethical stewards and digital facilitators - Need for AI literacy and ethical foresight	- Professional development in AI evaluation - Active role in AI governance - Educating users and stakeholders on responsible tech use	Cox et al., 2019; Farnel, 2021; Parry, 2022
3. Strategies for Integrating Artificial Intelligence	- Staff training and AI literacy- Ethical AI policies and governance - Human–AI collaboration- Transparency and privacy protection - Continuous evaluation of AI systems	- Improved service delivery and efficiency - Increased user trust and accountability - Reduced ethical risks and bias - Preservation of core library values	Asemi & Asemi (2018); Cox et al. (2019); Floridi & Cowls (2019); Hervieux & Wheatley (2021); IFLA (2020)

5. Discussion

5.1 Ethical Concerns Associated with the Adoption of AI Technologies in Academic Reference Services

The findings revealed that the adoption of AI technologies in academic reference services is accompanied by significant ethical concerns, particularly regarding algorithmic bias, privacy, transparency, and accountability. Participants acknowledged the potential of AI tools such as chatbots, recommendation systems, and virtual assistants to improve service efficiency; however, concerns were raised about the possibility of biased outputs, misuse of user data, and the opaque nature of many AI algorithms. These concerns support the arguments of Ryan and Stahl (2021) and Noble (2018), who contend that AI systems may reproduce existing social inequalities when trained on biased datasets.

The findings further suggest that transparency and user consent are essential for maintaining trust in AI-enhanced reference services. Libraries must therefore ensure that users are informed about how AI systems operate, how their data are collected and used, and the limitations of automated recommendations. This aligns with the ethical principles of explicability, responsibility, and fairness proposed by Floridi and Cowls (2019). Consequently, the responsible adoption of AI requires robust governance frameworks that prioritize privacy protection, accountability, and ethical oversight.

5.2 Evolving Roles of Academic Librarians within AI-Enhanced Service Environments

The study found that the integration of AI is reshaping the professional responsibilities of academic librarians. Rather than replacing librarians, AI is transforming their roles from traditional information custodians to digital facilitators, technology mediators, and ethical stewards. While AI systems can efficiently manage routine inquiries and information retrieval tasks, they lack the contextual understanding, empathy, and critical judgment required for complex academic interactions.

These findings support the view of Cox et al. (2019) and Farnel (2021), who argue that librarians must develop competencies in AI literacy, data ethics, and algorithmic evaluation to remain effective in technologically advanced service environments. The results suggest that librarians will increasingly be responsible for monitoring AI systems, identifying potential biases, guiding users in the responsible use of AI tools, and ensuring that automated services align with professional and institutional values.

Importantly, the findings reinforce the continued relevance of the librarian–user relationship. Human expertise remains essential for interpreting complex information needs, supporting research activities, and maintaining the values of intellectual freedom, inclusivity, and user-centered service that define academic librarianship.

5.3 Strategies for the Responsible and Context-Sensitive Integration of AI in Reference Services

The findings identified several strategies for the responsible integration of AI in academic reference services. These include staff training and capacity building, the development of ethical AI policies, adoption of hybrid human–AI service models, transparency in AI operations, and continuous assessment of AI systems. Participants emphasized that AI should function as a complementary tool rather than a substitute for professional librarians.

The findings indicate that successful integration requires balancing technological innovation with core library values such as equity of access, user autonomy, privacy, and intellectual freedom. This supports recommendations by the American Library Association (2019) and the International Federation of Library Associations and Institutions (2020), which advocate for human-centered approaches to AI implementation in libraries.

Furthermore, the study highlights the importance of inclusive and context-sensitive deployment strategies. Libraries should ensure that AI-powered services are accessible to users with diverse technological skills and backgrounds through inclusive design, multilingual support, and the availability of human assistance when needed. Such measures can help mitigate the risk of widening the digital divide and ensure equitable access to information services.

Overall, the findings suggest that the responsible integration of AI requires a balanced approach that combines technological innovation with ethical safeguards, professional oversight, and continuous evaluation. By positioning AI as a tool that enhances rather than replaces human expertise, academic libraries can improve service delivery while preserving the fundamental values that underpin the profession.

This structure directly mirrors your three objectives and makes the discussion chapter more defensible academically because each subsection explicitly interprets findings in relation to a specific research objective and relevant literature.

Proposed Conceptual Framework: Ethical AI Integration in Academic Reference Services

The framework illustrates a cyclical relationship between AI technologies, ethical concerns, evolving librarian roles, and integration strategies, culminating in ethical AI-driven reference service delivery. It further incorporates a continuous feedback loop for evaluation and improvement to ensure sustainability, accountability, and alignment with library values.

Figure 1. Conceptual Process Model Conceptual framework showing the relationship between ethical concerns, evolving librarian roles, and integration strategies in achieving responsible and context-sensitive adoption of artificial intelligence in academic reference services. *Source: Researcher's Conceptualization (2025).*

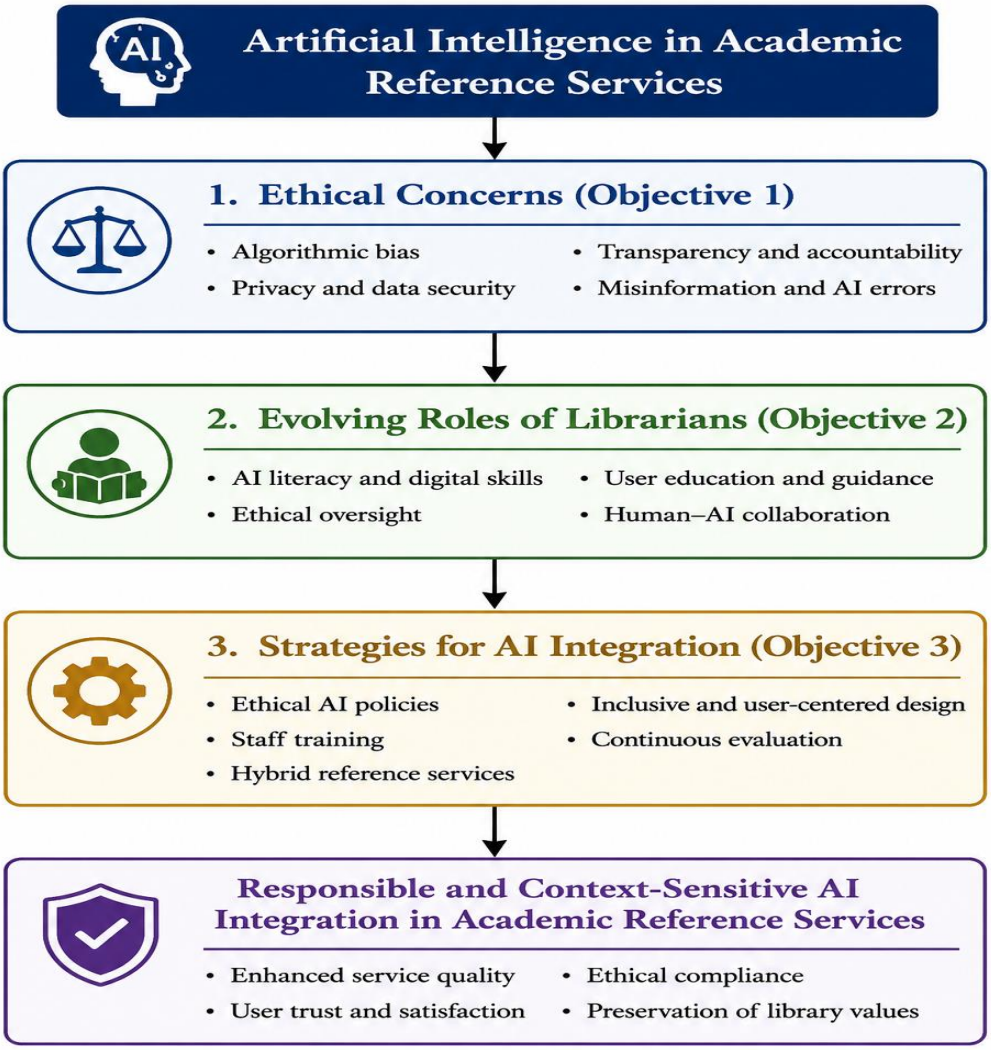


Figure 1. *Conceptual framework showing the relationship between ethical concerns, evolving librarian roles, and integration strategies in achieving responsible and context-sensitive adoption of artificial intelligence in academic reference services.*

Source: Researcher's Conceptualization (2025).

The proposed conceptual framework demonstrates how artificial intelligence (AI) technologies such as chatbots, natural language processing (NLP), virtual assistants, recommendation systems, and generative AI form the foundation of modern academic reference services. These technologies introduce significant operational efficiency but simultaneously generate ethical concerns relating to privacy, algorithmic bias, transparency, accountability, and data security.

These ethical concerns necessitate a redefinition of the role of academic librarians, who increasingly function as digital mediators, ethical stewards, and AI supervisors. Librarians are responsible for interpreting AI outputs, ensuring fairness, guiding users, and maintaining the integrity of information services within academic environments.

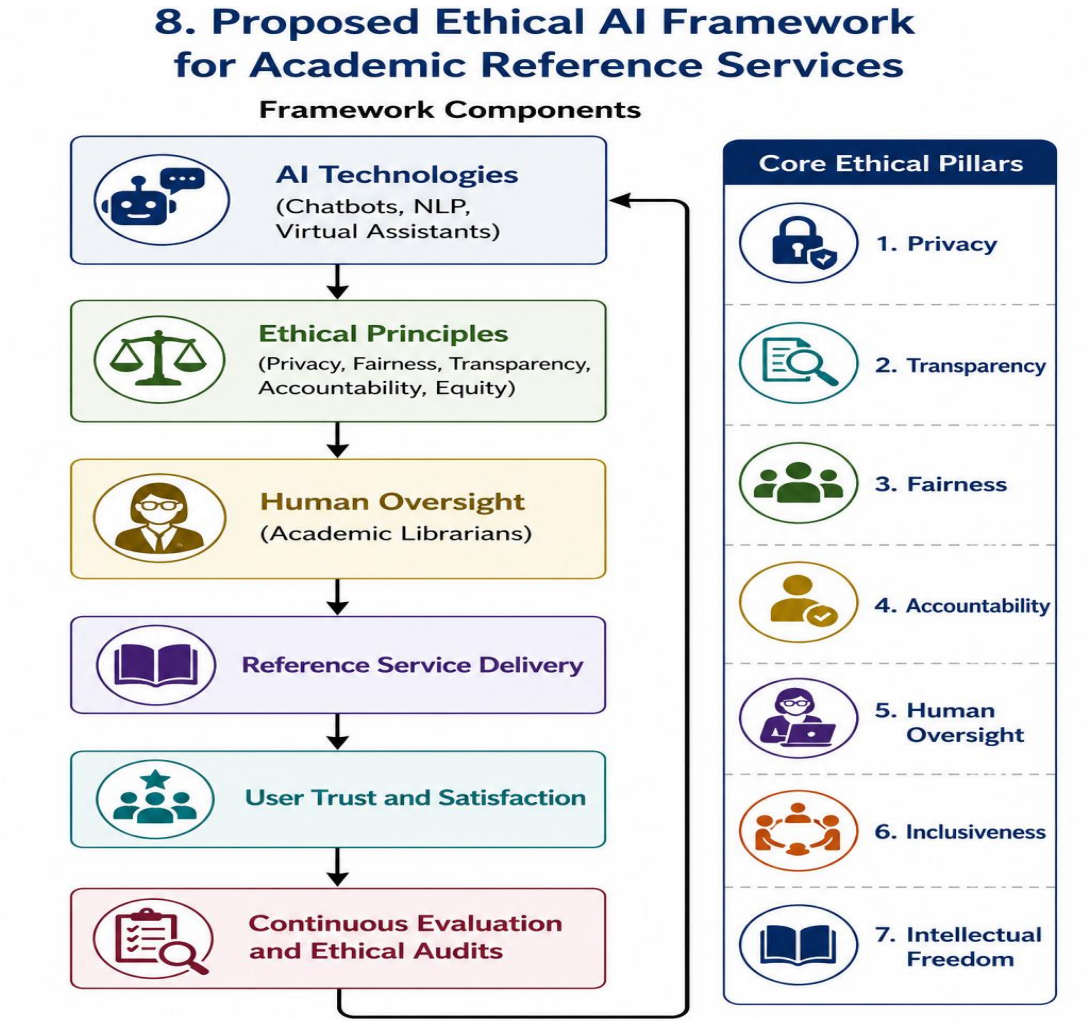
To address these challenges, institutions must adopt structured integration strategies, including ethical governance frameworks, staff training in AI literacy, hybrid human–AI service models, inclusive design principles, and transparent system operations. These strategies ensure that AI technologies complement rather than replace human expertise.

The outcome of this process is the delivery of ethical AI-driven reference services characterized by efficiency, fairness, transparency, user-centeredness, and trustworthiness. Importantly, the framework includes a continuous feedback loop involving evaluation, monitoring, auditing, and user feedback. This loop ensures ongoing system improvement, ethical compliance, and responsiveness to emerging technological and user needs.

Overall, the framework positions AI not as a replacement for librarianship but as a tool that must be ethically governed and continuously refined under human oversight to preserve the core values of academic libraries.

Figure 2: Ethical Governance Framework

Proposed Ethical AI Framework for Academic Reference Services



The proposed Ethical AI Framework for Academic Reference Services positions AI technologies such as chatbots, natural language processing tools, virtual assistants, recommendation systems, and generative AI applications as the foundational technological layer supporting modern reference services. The deployment of these technologies is guided by ethical principles including privacy, fairness, transparency, accountability, and equity to ensure responsible and trustworthy use.

At the center of the framework is **human oversight,** where academic librarians serve as ethical stewards responsible for monitoring AI outputs, validating information, mitigating bias, and ensuring compliance with professional values. This oversight informs the delivery of reference services, enabling AI to complement rather than replace human expertise.

Effective implementation of the framework is expected to enhance user trust and satisfaction through reliable, accessible, and user-centered services. To maintain ethical integrity and service quality, continuous evaluation and ethical audits provide a feedback mechanism for identifying emerging risks, assessing system performance, and informing ongoing improvements.

The framework is underpinned by seven core ethical pillars privacy, transparency, fairness, accountability, human oversight, inclusiveness, and intellectual freedom which collectively ensure that AI integration aligns with the traditional values and mission of academic libraries.

Source: Adapted from Floridi and Cowls (2019), IFLA (2020), American Library Association (2019), and the Researcher's Conceptualization (2025).

Conclusion

Artificial intelligence (AI) offers significant opportunities for strengthening academic reference services by improving efficiency, responsiveness, and access to information. Technologies such as chatbots and virtual assistants enhance service delivery by handling routine enquiries, supporting user self-service, and extending availability beyond traditional library operating hours. However, these benefits are accompanied by critical ethical and professional challenges. Without careful governance, AI systems may undermine core library values such as user privacy, intellectual freedom, equity of access, and the human-centered nature of reference interactions.

This paper emphasizes that the integration of AI in academic libraries should be understood not merely as a technological enhancement, but as a fundamental transformation of reference service delivery that requires ethical reflection, institutional preparedness, and sustained professional engagement. In this context, academic librarians remain indispensable, not as passive adopters of technology, but as active ethical stewards responsible for overseeing AI deployment, ensuring accountability, and preserving the integrity of the librarian–user relationship.

Ultimately, the responsible adoption of AI in academic reference services depends on a deliberate balance between technological innovation and human-centered librarianship. Academic libraries must embed transparency, inclusivity, and ethical accountability into all stages of AI implementation to ensure that these tools complement rather than replace professional expertise. Through such a balanced and value-driven approach, AI can serve as a transformative force that strengthens, rather than diminishes, the mission of academic libraries in supporting knowledge access, learning, and research.

7. Recommendations

Based on the findings and discussions of this study, the following recommendations are proposed in line with the study objectives.

7.1 Recommendations on Ethical Concerns Associated with the Adoption of AI Technologies in Academic Reference Services

1. **Develop Institutional AI Ethics Policies:** Academic libraries should establish clear policies and ethical guidelines governing the adoption and use of AI technologies. Such policies should address algorithmic transparency, user privacy, data security, accountability, and fairness to ensure responsible AI deployment.
2. **Strengthen Privacy and Data Protection Measures:** Libraries should implement robust data governance practices, including informed consent mechanisms, data minimization, and secure data management procedures, to safeguard users' personal information and maintain trust in AI-enabled services.
3. **Promote Transparency and Accountability:** AI systems used in reference services should be transparent and explainable. Libraries should provide users with clear information about how AI tools operate, their limitations, and how decisions or recommendations are generated.

7.2 Recommendations on the Evolving Roles of Academic Librarians within AI-Enhanced Service Environments

4. **Invest in Continuous Professional Development:** Academic institutions should provide regular training programs that equip librarians with competencies in AI literacy, data ethics, algorithmic evaluation, and digital technologies. This will enable librarians to effectively supervise and manage AI-powered services.
5. **Redefine Librarians' Roles as Digital and Ethical Stewards:** Librarians should be empowered to serve as mediators between users and AI systems by monitoring algorithmic outputs, identifying potential biases, promoting ethical technology use, and guiding users in the effective utilization of AI tools.
6. **Strengthen User Education and Information Literacy:** Libraries should expand information literacy programs to include AI literacy, enabling users to critically evaluate AI-generated information and understand both the opportunities and limitations of AI technologies.

7.3 Recommendations on Strategies for the Responsible and Context-Sensitive Integration of AI in Reference Services

7. **Adopt Hybrid Human–AI Reference Service Models:** Academic libraries should implement service models that combine the efficiency of AI systems with the expertise, empathy, and critical judgment of professional librarians. AI should support rather than replace human-mediated reference services.
8. **Promote Inclusive and User-Centered AI Implementation:** Libraries should ensure that AI technologies are designed and deployed in ways that accommodate users with diverse backgrounds, abilities, and levels of digital literacy. Inclusive design and accessible service delivery should remain central considerations.
9. **Encourage Participatory and Context-Sensitive AI Development:** Librarians, faculty, students, and other stakeholders should be involved in the selection, design, implementation, and evaluation of AI systems to ensure that such technologies align with institutional needs, user expectations, and professional values.
10. **Establish Continuous Monitoring and Evaluation Mechanisms:** Libraries should regularly assess the performance, effectiveness, and ethical implications of AI tools to ensure that they remain accurate, equitable, transparent, and responsive to changing user needs.

These recommendations provide a framework for integrating AI into academic reference services in a manner that addresses ethical concerns, supports the evolving roles of librarians, and promotes responsible, human-centered innovation. By adopting these measures, academic libraries can leverage the benefits of AI while preserving the core values of librarianship, including equity, intellectual freedom, accessibility, and user-centered service.

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Evaluation of the Nigerian Library School Curricula for Workforce Readiness

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Abstract

This study examined the effectiveness of Nigerian Library School curricula in preparing graduates for workforce readiness in the Library and Information Science (LIS) profession. Specifically, it investigated the provision of foundational knowledge, professional skills, digital competencies, and practical learning opportunities. A mixed-methods research approach was adopted to study 1,103 LIS lecturers across Nigerian universities, of whom 874 participated. Data were collected via structured online questionnaires and analysed using descriptive statistics, while qualitative responses were thematically examined. Findings revealed that the curricula provide strong foundational knowledge, communication, and teamwork skills, but inadequately develop higher-order competencies such as leadership, critical thinking, and strategic problem-solving. Digital competency training focused mainly on basic literacy and online information retrieval, with gaps in emerging technologies, digital preservation, and cybersecurity. Practical learning components, including internships and project-based exercises, were moderately implemented and constrained by insufficient supervision and professional engagement. The study concludes that Nigerian LIS curricula only partially prepare graduates for workforce demands. It recommends that policymakers and educators enhance curriculum design to strengthen advanced digital skills, expand practical training opportunities, incorporate emerging LIS roles, and promote collaboration with industry to improve graduates' employability.

Keywords: Library and Information Science; workforce readiness; curriculum evaluation; digital competencies; Nigeria; policy implications.

Introduction

In an era of rapid technological change, the ability of graduates to transition from academic training to professional competence is critical, particularly in Library and Information Science (LIS), where evolving information needs require both theoretical knowledge and practical skills. Workforce readiness refers to the extent to which graduates possess the cognitive, technological, and professional competencies required to function effectively in contemporary work environments (Okechukwu et al., 2025). In LIS, this includes foundational theoretical knowledge, digital literacy, practical skills, information resource management, and the capacity to adapt to emerging technologies (Sibiya & Ngulube, 2023). Workforce-ready graduates demonstrate professional competence and adaptability, enhancing employability and sustaining the relevance of library professionals in a rapidly changing information landscape. In Nigeria, the integration of information and communication technologies (ICTs) into library operations has expanded the competencies expected of LIS graduates, making digital literacy and technological proficiency essential for effective use of electronic resources, delivery of digital services, and competitiveness in a digitised environment (Bello & Hammed, 2024).

However, evidence suggests that Nigerian LIS programmes do not consistently align curricula with these requirements. Challenges such as uneven integration of digital and practical components, limited ICT infrastructure, and inadequate

pedagogical support hinder graduate preparedness for professional roles (Ezema et al., 2023). Curriculum content, particularly digital literacy, ICT courses, and experiential learning opportunities, plays a central role in shaping workforce readiness. Variations in curriculum effectiveness significantly influence students' ability to engage with electronic resources and develop practical competencies (Bello & Hammed, 2024). Although courses such as Digital Libraries are commonly offered, their effectiveness is constrained by inadequate laboratories, limited access to modern computing facilities, and a shortage of qualified ICT instructors (Okeji & Mayowa-Adebara, 2021). These limitations highlight the interaction between curriculum design, instructional approaches, and institutional capacity in determining workforce readiness outcomes. Pedagogical approaches such as hands-on training, collaborative learning, and real-world project integration strengthen the link between curriculum and graduate competence.

Studies show that innovative teaching strategies enhance digital skills and better prepare students for professional challenges; however, their application remains uneven across Nigerian LIS programmes (Okechukwu et al., 2025). Additional constraints, including limited funding, outdated teaching materials, and inconsistent curriculum implementation, further weaken the translation of educational objectives into workforce-relevant competencies (Ezema et al., 2023). Collectively, these factors contribute to a persistent gap between employer expectations and graduate competencies, affecting employability and adaptability in the LIS profession. Despite the recognition of workforce readiness as essential in LIS education, concerns remain regarding the ability of Nigerian library schools to adequately prepare graduates for professional practice. Rapid technological advancement, increasing reliance on digital resources, and evolving information needs require graduates to possess both theoretical and practical competencies, particularly in digital literacy, ICT proficiency, and adaptability.

Nonetheless, studies indicate that LIS curricula in Nigerian universities often show inconsistencies in integrating digital and practical components, limited ICT infrastructure, and uneven application of innovative pedagogical approaches (Abubakar, 2021; Adebayo & Nmecha, 2019; Ezema et al., 2023; Okeji & Mayowa-Adebara, 2021; Olubiyo, 2022). Accordingly, there is a need for a systematic evaluation of Nigerian library school curricula to assess their effectiveness in meeting contemporary workforce demands. While previous studies have examined related curriculum issues, few have provided a comprehensive assessment of curriculum effectiveness in relation to current labour market expectations. This study, therefore, examines key curriculum elements, including digital literacy integration, technology competencies, practical training, and pedagogical strategies, to evaluate their impact on workforce readiness. By identifying strengths, weaknesses, and areas for improvement, the study seeks to provide evidence-based recommendations for policymakers, curriculum developers, and stakeholders to enhance the relevance and effectiveness of LIS education in Nigeria.

Objectives of the Study

The main objective of the study is to evaluate Nigerian Library School curricula in terms of their effectiveness in preparing graduates for workforce readiness. The specific objectives are to:

1. Assess how well Nigerian Library School curricula prepare graduates for workforce readiness;
2. Examine the extent to which current LIS curricula align with labour market and professional skill requirements;
3. Determine how digital competencies are embedded within Nigerian LIS curricula;
4. Evaluate the adequacy of practical learning components in LIS programmes;
5. Identify curriculum gaps that limit the employability and adaptability of LIS graduates.

Literature Review

Workforce readiness has emerged as a critical focus in LIS education, extending beyond the acquisition of theoretical knowledge to include the practical, digital, and professional skills required for effective transition into the workplace. Workforce readiness is conceptualised as a multidimensional construct comprising cognitive skills, technological competence, and adaptability to dynamic professional backgrounds. Okechukwu *et al.* (2025) aver that graduates' ability to apply theoretical knowledge in practical settings is a core component of workforce readiness, highlighting the need for curricula that integrate both foundational principles and skills relevant to the contemporary information landscape. Curriculum evaluation serves as a fundamental framework for assessing the effectiveness of educational programmes in preparing students for professional practice. Olubiyo (2022) contends that evaluation should consider the adequacy of course content, integration of practical exercises, and responsiveness to industry trends, providing insights into whether educational programmes sufficiently equip graduates with the competencies required for professional roles.

Effective curriculum evaluation extends beyond course coverage to examine the alignment between programme content and labour market expectations. Complementing this perspective, Malik *et al*. (2023) emphasise that Nigerian LIS curricula should go beyond theory to include practical experiences and career awareness, ensuring graduates are well-prepared for diverse professional opportunities. Digital competencies signify a key dimension of workforce readiness in LIS education, particularly in contexts where information services are increasingly technology-mediated. Digital competencies are defined as the ability to effectively manage electronic resources, operate digital library systems, and utilise emerging technologies to support information service delivery. Salau, Chuks-Ibe, Adamu, and Abdulkadir (2025) note that while the inclusion of digital literacy components in curricula is essential, workforce preparation depends on the operationalisation of these competencies through practical engagement and skill-based learning. The embedding of

digital competencies within curricula is therefore crucial to ensuring that graduates acquire skills that are both relevant and transferable to professional practice.

Practical learning components, including industrial training, internships, and laboratory-based exercises, are closely linked to workforce readiness. Such components facilitate the application of theoretical knowledge and contribute to the development of technical and professional skills. Vera Ngozi *et al.* (2023) assert that practical experiences enhance not only technical proficiency but also critical soft skills, such as problem-solving, teamwork, and professional communication. The presence and quality of practical learning opportunities are therefore significant indicators of the extent to which LIS curricula prepare graduates to meet contemporary professional demands. Furthermore, curriculum gaps are identified as deficiencies or omissions in programme content, pedagogical approaches, or practical engagement that limit graduates' ability to acquire essential competencies. Usman (2025) highlights that gaps in digital skills, experiential learning, and alignment with professional expectations directly impact employability and adaptability, particularly in environments characterised by rapid technological and organisational variation. Systematic identification of curriculum gaps is therefore essential for informing policy interventions and curricular reforms aimed at enhancing workforce readiness.

Empirically, the effectiveness of Nigerian Library School curricula in preparing graduates for workforce readiness has attracted growing scholarly attention. Okeji and Mayowa-Adebara (2021) conducted a descriptive survey across ten Nigerian universities offering LIS programmes to evaluate the integration of digital library education within the curricula. Using structured questionnaires distributed to lecturers and students, the study examined course content, laboratory access, and ICT infrastructure. Findings revealed that although digital library courses were widely offered, practical engagement was severely limited due to inadequate laboratory facilities and insufficient ICT support, constraining students' ability to develop workforce-relevant digital competencies. The researchers argued that without hands-on digital exercises, graduates may remain underprepared for the technological demands of modern library roles. Based on this, it is evident that curriculum reform must go beyond course provisions to include strategic investment in infrastructure and experiential learning, ensuring that theoretical knowledge translates into practical competence in LIS graduates.

Additionally, Suleiman and Ekeh (2023) investigated the digital literacy competencies of LIS educators in federal universities in North-Eastern Nigeria. Employing a mixed-methods approach with 87 faculty members, the study assessed educators' ability to create digital content, utilise electronic resources, and integrate technology into classroom instruction. Results indicated that while educators could perform basic digital tasks, many lacked advanced ICT skills necessary for promoting student competencies aligned with workforce demands. The study concluded that educators' limited digital proficiency indirectly constrains curriculum effectiveness, highlighting the need for continuous professional development programmes. From a policy perspective, these findings highlight that workforce readiness is not solely a student issue; rather, curriculum delivery depends significantly on educator capacity, necessitating systemic interventions to strengthen teaching competencies. Okonoko and Eruvwe (2024) examined the impact of Industrial Training (SIWES) on LIS students' employability in southern Nigeria. Through surveys of 216 undergraduates and interviews with library supervisors, the study identified critical gaps in practical skill acquisition, including limited placement opportunities, inadequate supervision, and a disconnect between training activities and actual library operations.

The study emphasised that enhancing the structure, monitoring, and alignment of industrial training with curriculum objectives is pivotal for workforce readiness. This aligns with the view that curriculum alone cannot guarantee preparedness; coordinated partnerships with libraries and organisations offering professional placements are essential to translate classroom knowledge into employable skills. Also, Chukwusa (2021) conducted a cross-sectional survey of 142 undergraduates across three federal universities to examine information literacy skills among Nigerian LIS students. The study found that while students demonstrated basic familiarity with electronic resources, deficiencies in evaluating, synthesising, and applying information persisted, reflecting significant gaps in curriculum design. The study recommended targeted interventions, such as assessment-based digital exercises, to reinforce practical competencies. From an evaluative perspective, these findings suggest that without structured, skill-oriented instruction embedded within the curriculum, graduates' ability to meet workplace expectations remains constrained.

Buraimo *et al.* (2025) explored the level of digital literacy among LIS doctoral students in South-West Nigeria. Utilising a survey of 64 participants, the research assessed advanced ICT skills, including digital library systems, database management, and emerging information technologies. Results indicated that foundational digital skills were generally adequate, but advanced competencies were inconsistent. The study concluded that both undergraduate and postgraduate curricula require enhancements to fully prepare graduates for technology-intensive roles. This highlights a critical oversight in LIS education, as curriculum progression should ensure continuity and depth, so that advanced students acquire mastery beyond basic digital literacy. Adebayo and Alex-Nmecha (2019) surveyed curriculum design and practical components in two Nigerian LIS schools. The descriptive survey involved 98 students and 12 faculty members, focusing on alignment of coursework with professional skills demanded by employers. Findings revealed significant variability in practical content, digital literacy integration, and responsiveness to labour market needs, emphasising the urgent requirement for standardised curriculum frameworks. These results underscore that curriculum inconsistency

across institutions contributes directly to uneven workforce preparedness, reinforcing the need for national-level policy and curricular standardisation.

Abubakar (2021) conducted a mixed-methods study examining emerging trends and challenges in Nigerian LIS education. Surveys of 133 students and interviews with 28 faculty members revealed structural constraints, such as outdated teaching materials and limited ICT infrastructure, which hindered the acquisition of workforce-relevant competencies. The study advocated policy reforms and the modernisation of curricula to integrate practical and digital skills effectively. From an analytical viewpoint, this evidence confirms that curriculum evaluation must be holistic, addressing both content and delivery mechanisms to ensure alignment with evolving professional demands. Finally, Ezema et al. (2023) analysed operational challenges facing Nigerian LIS programmes through surveys of 76 faculty members across seven universities. Findings highlighted inadequate funding, inconsistent curriculum implementation, and insufficient practical learning opportunities as major barriers to graduate workforce readiness. The researchers recommended targeted curriculum reforms, increased institutional support, and systematic programme evaluation. This study reinforces the perspective that curriculum effectiveness is intertwined with institutional capacity, and sustainable workforce preparation requires coordinated investment in both human and material resources.

Methodology

This study adopted a mixed-methods approach to evaluate Nigerian Library School curricula for workforce readiness. This approach enabled the integration of quantitative and qualitative data, providing a comprehensive understanding of how Nigerian LIS curricula prepare graduates with the knowledge, skills, and competencies required for professional practice. A survey research design was employed to collect self-reported data from Nigerian Library and Information Science educators, allowing the researchers to reach a wide range of participants across Library Schools in Nigeria. The target population comprised all lecturers involved in curriculum delivery and design, totalling 1,103 according to the Directory of NALISE Members and List of Library and Information Science Schools in Nigeria (Ochogwu *et al.,* 2020). To ensure comprehensive coverage, a total enumeration technique was employed, targeting all eligible lecturers. This process yielded 874 valid responses, representing a response rate of approximately 79.2% and providing a reliable basis for analysis. Data were collected using a semi-structured questionnaire digitised through Google Forms. The questionnaire consisted of two sections, with the first section gathering demographic information about participants and the second section, further subdivided into subsections, collecting data aligned with the study's five objectives. Quantitative items assessed perceptions of curriculum effectiveness, alignment with professional requirements, integration of digital competencies, and adequacy of practical learning opportunities, while qualitative items elicited detailed insights into curriculum gaps and areas requiring improvement. The questionnaire was administered over twelve weeks, providing respondents sufficient time to respond. Quantitative data were analysed using descriptive statistics and presented in tables, while the qualitative responses from open-ended items were analysed thematically and reported through narrative discussion. Ethical considerations were strictly observed throughout the study. Informed consent was obtained from all participants, with explanations of the study's purpose, the voluntary nature of participation, and assurances of confidentiality and anonymity. All data were anonymised and securely stored to protect participants' privacy in accordance with best research practices.

Results

This section presents the findings of the study in line with the five research objectives using a mixed-methods approach. Quantitative data were analysed using descriptive statistics and presented in tables, while qualitative data were analysed thematically and presented in narrative form to complement the findings.

Table 1: Demographic Profile of Respondents (n = 874)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	524	60
	Female	350	40
Age	25–34	218	25
	35–44	366	42
	45–54	218	25
	55+	72	8
Academic Rank	Assistant Lecturer	131	15
	Lecturer II	174	20
	Lecturer I	218	25
	Senior Lecturer	218	25
	Associate Professor	87	10
	Professor	46	5
Years of Experience	0–5	131	15

6–10	218	25
11–15	218	25
16–20	174	20
21+	133	15

Table 1 shows that the study involved 874 LIS educators from Nigerian institutions, representing a response rate of approximately 79.2% of the target population. The gender distribution indicates 60% male and 40% female respondents, reflecting a relatively balanced sample with a slight male predominance among LIS academics. In terms of age, most respondents were between 35 and 44 years (42%), followed by the 25–34 and 45–54 age groups (25% each), while 8% were aged 55 years and above. This suggests that the majority of participants were mid-career professionals with substantial academic and practical experience relevant to curriculum evaluation and workforce readiness assessment. Regarding academic rank, respondents were distributed across Lecturer I (25%), Senior Lecturer (25%), Lecturer II (20%), Assistant Lecturer (15%), Associate Professor (10%), and Professor (5%), indicating representation across different levels of academic seniority, particularly those actively engaged in curriculum delivery and development. With respect to professional experience, 25% of respondents had 6–10 years, and another 25% had 11–15 years, followed by 20% with 16–20 years, 15% with 0–5 years, and 15% with 21 years and above. This mix of early-career, mid-career, and senior academics ensures that the findings reflect a broad range of professional perspectives on curriculum effectiveness and workforce readiness.

Objective one: Assess how well Nigerian Library School curricula prepare graduates for workforce readiness

This section presents findings on the extent to which Nigerian Library School curricula prepare graduates for workforce demands. Results are presented using descriptive statistics (means and standard deviations) to summarise respondents' perceptions of curriculum effectiveness in developing professional competencies.

Table 2: Evaluation of Curricula for Workforce Readiness (n = 874)

S/N	Statement	M	SD	Remark
1	The curriculum adequately prepares graduates with core LIS knowledge.	3.20	0.65	High
2	Graduates are equipped with the necessary professional skills to enter the workforce.	3.05	0.70	High
3	The curriculum fosters critical thinking and problem-solving skills relevant to LIS.	2.80	0.75	Moderate
4	Students are trained in communication and interpersonal skills essential for practice.	3.15	0.68	High
5	Graduates demonstrate ethical awareness and professional responsibility in LIS practice.	2.95	0.60	Moderate
6	The curriculum equips students with leadership and managerial skills necessary for administration.	2.60	0.80	Low
7	Students are prepared to handle challenges in diverse workplace environments.	2.85	0.72	Moderate
8	The curriculum promotes lifelong learning and adaptability to changing LIS trends.	2.90	0.70	Moderate
9	Graduates possess sufficient research and analytical skills for evidence-based decision-making.	2.75	0.78	Moderate
10	Students are trained to work effectively in teams and on collaborative projects.	3.10	0.65	High

Scale: High = 3.10–4.00, Moderate = 2.75–3.09, Low = 1.00–2.74

Table 2 shows that the evaluation of Nigerian LIS curricula for workforce readiness is generally moderate to high. High mean ratings were recorded for core LIS knowledge (M = 3.20), communication and interpersonal skills (M = 3.15), teamwork and collaboration (M = 3.10), and general professional skills for workforce entry (M = 3.05), indicating that the curricula provide a solid theoretical and interpersonal foundation for graduates. Moderate ratings were observed for critical thinking and problem-solving (M = 2.80), ethical awareness and professional responsibility (M = 2.95), adaptability to diverse workplaces (M = 2.85), lifelong learning and responsiveness to LIS trends (M = 2.90), and research and analytical skills (M = 2.75), suggesting that these competencies are present but not sufficiently strengthened. The lowest mean score was recorded for leadership and managerial skills (M = 2.60), highlighting a clear gap in preparing graduates for administrative and leadership roles in library and information settings.

Objective two: Examine the extent to which current LIS curricula align with labour market and professional skill requirements

This section presents findings on the extent to which current LIS curricula align with labour market and professional skill requirements. Results are presented using descriptive statistics to summarise respondents' perceptions of the degree of alignment between curriculum content and employer expectations.

Table 3: Alignment of LIS Curriculum with Labour Market and Professional Skill Requirements (n = 874)

S/N	Statement	M	SD	Remark
1	The curriculum reflects current industry trends and demands in the LIS sector.	2.85	0.72	Moderate
2	Skills taught in the program match the competencies expected by employers.	2.80	0.70	Moderate
3	The curriculum incorporates emerging roles in LIS, such as digital curation, data management, and information governance.	2.60	0.78	Low
4	Collaboration with industry professionals is integrated into the curriculum design.	2.50	0.75	Low
5	Graduates are employable immediately upon completing the program.	2.75	0.68	Moderate
6	The curriculum provides knowledge relevant to both public and private sector LIS employment.	2.78	0.70	Moderate
7	Graduates are equipped to meet international professional standards in LIS.	2.70	0.73	Moderate
8	Opportunities for professional certification or accreditation are incorporated into the curriculum.	2.78	0.72	Moderate
9	The curriculum addresses soft skills, such as communication, time management, and problem-solving, that are relevant to the workplace.	2.82	0.65	Moderate
10	Alumni feedback and labour market trends inform curriculum updates.	2.55	0.77	Low

Scale: High = 3.10–4.00, Moderate = 2.75–3.09, Low = 1.00–2.74

Table 3 illustrates that the alignment of Nigerian LIS curricula with labour market demands and professional skill requirements is generally moderate, with notable weaknesses in key areas. Moderate mean ratings were recorded for reflecting current industry trends (M = 2.85), matching employer-expected competencies (M = 2.80), graduate employability (M = 2.75), relevance to public and private sector employment (M = 2.78), alignment with international standards (M = 2.70), incorporation of professional certification opportunities (M = 2.78), and coverage of workplace-relevant soft skills (M = 2.82). These results suggest partial but inconsistent responsiveness to labour market expectations. Low mean ratings were observed for the incorporation of emerging LIS roles such as digital curation, data management, and information governance (M = 2.60), collaboration with industry professionals in curriculum design (M = 2.50), and the use of alumni feedback and labour market trends in curriculum updates (M = 2.55), indicating clear gaps in industry engagement and curriculum responsiveness.

Objective three: Determine how digital competencies are embedded within Nigerian LIS curricula

This section presents findings on how digital competencies are embedded within Nigerian LIS curricula. Results are presented using descriptive statistics to summarise respondents' perceptions of the extent to which digital skills are integrated into the curriculum.

Table 4: Digital Competencies in LIS Curricula (n = 874)

S/N	Statement	M	SD	Remark
1.	Digital literacy for research and knowledge management	3.05	0.65	High
2.	Data management and analysis skills	2.80	0.72	Moderate
3.	Digital preservation and curation skills	2.65	0.75	Low
4.	Familiarity with emerging technologies in LIS (e.g., AI, IoT, digital repositories)	2.50	0.78	Low
5.	Skills in online information retrieval and database management	3.00	0.68	Moderate
6.	Training in digital content creation and multimedia resources	2.75	0.70	Moderate
7.	Competency in digital library systems and automation tools	2.85	0.72	Moderate
8.	Knowledge of cybersecurity, data privacy, and ethical issues in digital information management	2.60	0.77	Low
9.	Ability to adapt to new technologies and software relevant to LIS practice	2.78	0.70	Moderate

Scale: High = 3.10–4.00, Moderate = 2.75–3.09, Low = 1.00–2.74

Table 4 shows that the integration of digital competencies in Nigerian LIS curricula is generally moderate, with strengths in basic digital skills but gaps in advanced and emerging areas. A relatively high mean rating for digital literacy for research and knowledge management (M = 3.05) indicates adequate exposure to foundational digital skills for academic and professional information work. Moderate ratings were recorded for online information retrieval and database management (M = 3.00), digital library systems and automation tools (M = 2.85), data management and analysis (M = 2.80), digital content creation and multimedia resources (M = 2.75), and adaptability to new technologies (M = 2.78), suggesting a reasonable level of digital preparation, though not sufficiently advanced for evolving professional demands.

Low mean ratings were observed for digital preservation and curation skills (M = 2.65), emerging technologies such as artificial intelligence, the Internet of Things, and digital repositories (M = 2.50), and cybersecurity, data privacy, and ethical issues in digital information management (M = 2.60), highlighting significant gaps in contemporary LIS practice and limited curricular emphasis on emerging technologies and digital risk management.

Objective four: Evaluate the adequacy of practical learning components in LIS programmes

This section presents findings on the adequacy of practical learning components in LIS programmes. Results are analysed using descriptive statistics to summarise respondents' views on the extent and quality of experiential and hands-on training within the curriculum.

Table 5: Practical Learning Components in LIS Curricula (n = 874)

S/N	Statement	M	SD	Remark
1	The curriculum provides adequate practical training through internships, fieldwork, or laboratory exercises.	2.90	0.70	Moderate
2	Practical exercises are relevant to real-world LIS work environments.	2.75	0.72	Moderate
3	Students have sufficient opportunities to apply theoretical knowledge in practice.	2.80	0.68	Moderate
4	Students are adequately supervised during practical training to ensure meaningful learning.	2.60	0.75	Low
5	The curriculum includes hands-on experience with library management systems and technology tools.	2.85	0.70	Moderate
6	Opportunities exist for students to engage in community-based or outreach library projects.	2.65	0.78	Low
7	Practical experiences are regularly evaluated and integrated into the curriculum to improve learning outcomes.	2.70	0.72	Low
8	Students gain exposure to professional LIS organisations, conferences, or workshops as part of practical training.	2.55	0.77	Low
9	The curriculum prepares students to solve practical problems independently in a work setting.	2.75	0.70	Moderate
10	Practical components contribute significantly to developing students' confidence and employability.	2.80	0.68	Moderate

Scale: High = 3.10–4.00, Moderate = 2.75–3.09, Low = 1.00–2.74

Table 5 shows that the inclusion of practical learning components in Nigerian LIS curricula is generally moderate, with some weaknesses in supervision and experiential exposure. Moderate mean ratings were recorded for internships, fieldwork, or laboratory exercises (M = 2.90), application of theoretical knowledge (M = 2.80), hands-on experience with library management systems and tools (M = 2.85), relevance of practical exercises to real-world LIS environments (M = 2.75), problem-solving in practice (M = 2.75), and contribution of practical components to employability and confidence (M = 2.80). These findings indicate that experiential learning opportunities exist but are not consistently comprehensive or fully integrated. Low mean ratings were observed for supervision during practical training (M = 2.60), community-based or outreach engagement (M = 2.65), integration of practical experiences into curriculum evaluation and review (M = 2.70), and exposure to professional LIS organisations, conferences, or workshops (M = 2.55), highlighting gaps in oversight, depth, and professional contextualisation of experiential learning.

Objective Five: To identify curriculum gaps and areas for improvement in Nigerian LIS education

This section examines the gaps and areas for improvement in Nigerian LIS curricula, focusing on how effectively these programmes prepare graduates for the dynamic demands of the modern workforce. Drawing on the perspectives of 874 LIS educators across Nigeria, the study identifies critical deficiencies across multiple dimensions, including practical and professional skills, digital competencies, alignment with industry needs, ethical and professional training, and variability in resources and programme quality across institutions. Understanding these gaps is essential for informing curriculum reforms that can enhance graduates' employability, adaptability, and readiness to navigate the evolving challenges of the LIS profession in Nigeria.

Limited Practical and Professional Skills Training

A recurring theme among participants was the lack of sufficient hands-on experience for students. Many lecturers observed that graduates often excel theoretically but struggle to apply knowledge in real-world library or information management settings. One participant stated, "Students leave school knowing the theory, but when faced with actual library operations, they are unsure how to respond." Another highlighted, "Industrial attachments and project-based learning are minimal, and this makes students less adaptable to evolving workplace demands." This gap was particularly noted in smaller or under-resourced LIS programmes in Nigeria, where opportunities for internships and practical exposure are limited. Participants emphasised that expanding structured experiential learning,

such as internships, live projects, and supervised practical assignments, would significantly enhance employability and workforce readiness.

Inadequate Integration of Digital Competencies

The majority of lecturers indicated that current curricula include only basic digital literacy training, insufficient for the rapidly growing technological landscape of libraries in Nigeria. Skills such as digital repository management, data analytics, web content curation, and emerging technologies, including artificial intelligence, machine learning, and digital preservation, were frequently cited as necessary additions. One participant noted, "We teach basic ICT, but graduates need advanced digital skills to compete in modern library and information environments." Another added, "Many schools lack access to the infrastructure required for advanced digital training, which limits students' exposure to real tools and platforms." Addressing this gap is crucial given the increasing adoption of digital systems, electronic resources, and online service delivery in Nigerian libraries.

Misalignment with Industry Needs

Several participants highlighted a disconnect between curriculum content and the competencies demanded by contemporary Nigerian libraries. While traditional skills, such as cataloguing, classification, and reference services, are well-covered, emerging roles in user experience design, research data management, digital archiving, and community outreach remain underrepresented. One lecturer remarked, "Graduates are well-versed in theory, but they lack the specific skills libraries now need, especially in digital and community-oriented services." Participants recommended closer collaboration between LIS schools, professional associations, and library employers to ensure curricula are responsive to evolving professional expectations.

Need for Enhanced Ethical and Professional Training

Ethics, accountability, and professionalism were consistently cited as areas requiring stronger emphasis. While theoretical coverage exists, participants noted the absence of practical exercises, case studies, and scenario-based learning reflecting real Nigerian library challenges. One respondent explained, "Graduates may understand ethical principles in theory, but when faced with real-world dilemmas like data privacy issues or intellectual property disputes, they are often unprepared to act responsibly." Integrating situational training and professional development exercises was recommended to better equip graduates for practical challenges.

Variability Across LIS Schools and Resource Constraints

Participants also noted that the quality and scope of LIS curricula vary widely across federal, state, and private institutions. Some schools lack access to modern ICT infrastructure, experienced lecturers, or up-to-date learning resources, which limits graduates' exposure to best practices. One participant commented, "Students from smaller schools often graduate with gaps that their peers from larger institutions do not have, creating inequities in workforce readiness." Addressing this requires coordinated efforts to standardise key competencies while allowing for local contextual adaptations.

Implication and Discussion of the Findings

Recent literature corroborates the findings of this study, indicating that workforce readiness in Nigerian LIS education extends beyond theoretical knowledge to include practical, digital, and professional competencies. Okechukwu *et al*. (2025) emphasise that graduates' ability to apply classroom knowledge in real-world settings is central to workforce readiness, highlighting the importance of curricula that integrate both foundational principles and skill development. This aligns with the current study's findings, which reveal that Nigerian LIS curricula provide a solid foundation in core LIS knowledge, communication, and teamwork skills, but are less effective in cultivating higher-order competencies such as leadership, advanced research, and strategic problem-solving. Similarly, the study identifies digital competencies as an area of moderate emphasis within Nigerian LIS curricula. Graduates demonstrate adequate proficiency in basic digital literacy and online information retrieval, reflecting partial alignment with workforce expectations. This observation resonates with the conclusions of Okeji and Mayowa-Adebara (2021) and Buraimo *et al.* (2025), who note that while digital literacy components are commonly included in Nigerian LIS programmes, practical engagement with emerging technologies, digital preservation, and cybersecurity remains limited. These findings imply that LIS educators and curriculum designers must prioritise skill-based learning that enables graduates to operate effectively in increasingly technology-mediated professional settings.

The study also highlights practical learning components as moderately implemented, with weaknesses in supervision, professional engagement, and the systematic evaluation of experiential activities. This aligns with Okonoko and Eruvwe (2024), who emphasise that insufficient industrial training, limited placements, and inadequate alignment with curriculum objectives hinder students' ability to apply theoretical knowledge in professional settings. Participants in the current study observed that practical training is often inconsistent across institutions, reinforcing the view of Vera Ngozi *et al*. (2023) that hands-on experiences, including internships and project-based exercises, are essential for developing both technical proficiency and soft skills such as problem-solving, teamwork, and professional communication. Furthermore, the study reveals a moderate alignment between Nigerian LIS curricula and labour market needs, with notable gaps in the incorporation of emerging LIS roles, industry collaboration, and feedback-driven curriculum updates. This supports the findings of Adebayo and Alex-Nmecha (2019) and Usman (2025), who argue that curriculum

responsiveness to evolving professional demands is significant for workforce readiness. The lack of structured engagement with employers and professional bodies limits LIS graduates' preparedness for emerging roles in digital curation, data management, and information governance. As such, promoting stronger partnerships and integrating labour market requirements into curriculum design are imperative for producing graduates equipped to navigate contemporary and future LIS roles.

Ethical and professional training emerged as another area requiring enhancement. Although Nigerian LIS curricula provide theoretical coverage, graduates' practical preparedness to handle real-world ethical dilemmas remains insufficient. This observation aligns with Usman (2025) and Malik *et al*. (2023), who stress the importance of scenario-based learning, case studies, and situational exercises to strengthen ethical decision-making and professional responsibility. Integrating such approaches within curricula can enhance graduates' competence in navigating workplace challenges while promoting accountability and professionalism in librarianship. Finally, the study highlights significant variability in curriculum quality and resource availability across LIS institutions. Smaller or under-resourced schools often provide limited access to digital infrastructure, experienced lecturers, and practical learning opportunities, resulting in inequities in workforce readiness. This finding reflects the conclusions of Abubakar (2021) and Ezema *et al*. (2023), who note that institutional capacity is a key determinant of graduates' preparedness for professional responsibilities. Coordinated efforts to standardise key competencies, invest in teaching and technological resources, and ensure equitable curriculum implementation are therefore essential for strengthening the LIS workforce across Nigeria.

Conclusion

This study evaluated the Nigerian library school curricula to determine their effectiveness in preparing graduates for workforce participation in the contemporary library and information environment. The findings show that although the curricula provide a strong theoretical foundation, gaps persist in practical training, digital competencies, emerging technologies, and other workplace-relevant skills required in modern professional practice. The study concludes that workforce readiness in Library and Information Science depends on the extent to which curricula align with technological developments and labour market expectations. Continuous curriculum review and stronger integration of practical and industry-relevant competencies are therefore essential to enhance graduate employability and professional effectiveness in Nigeria's evolving information sector.

Recommendations

The evaluation of Nigerian library school curricula has identified gaps in workforce readiness, highlighting the need for targeted policy interventions. Based on these findings, the following recommendations are proposed:

1. NUC, LRCN, and LIS curriculum committees(department heads/academic boards) should review and update library school curricula to integrate practical skills, emerging technologies, and digital literacy to better prepare graduates for contemporary library practice.
2. LIS department heads and library administrators (university libraries, public libraries, special libraries) should strengthen partnerships between LIS schools and libraries to provide students with internships, hands-on projects, and exposure to real-world professional environments.
3. LRCN, LIS departments, and professional associations (e.g., NLA, NALISE) should facilitate workshops, seminars, and training programmes that enable LIS professionals and students to acquire new skills and remain adaptable in the changing information landscape.
4. NUC and LIS curriculum committees (department heads) should prioritise the integration of digital skills and competencies into LIS curricula, including digital literacy courses and technology-focused training programmes.
5. NUC, LRCN, and LIS departmental quality assurance units should implement mechanisms to regularly monitor and assess the relevance of curricula and training programmes, ensuring alignment with workforce needs and emerging trends in the LIS profession.

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Exploring the Potential of Gamified Moodle for Innovative Pedagogies in LIS Education: Insights from Federal Universities in North Central Nigeria

by

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Abstract

The growing demand for innovative pedagogies in Library and Information Science prompted the exploration of disruptive technologies capable of transforming teaching and learning processes. Gamification, when integrated into learning management systems such as Moodle, demonstrated the potential to improve students' motivation, engagement, and academic performance. Despite these prospects, the adoption of gamified Moodle in Nigerian universities remained underexplored, particularly in Federal Universities in North Central Nigeria. This study investigated the perceptions and adoption readiness of gamified Moodle as a pedagogical innovation in LIS education within this context. Anchored on the Technology Acceptance Model and Diffusion of Innovation Theory, the study examined LIS students' awareness of gamification, perceived usefulness, readiness for adoption, and perceived challenges hindering implementation. Data were collected through questionnaires and interviews administered across selected Federal Universities in North Central Nigeria. Descriptive statistics, correlation, and regression analyses were employed to examine relationships among awareness, perceived usefulness, readiness, challenges, and adoption intention. The findings provided empirical insights into the preparedness of LIS stakeholders to adopt gamified Moodle and identified institutional and infrastructural factors influencing its feasibility. The study also proposed a conceptual adoption framework tailored to the Nigerian context and offered practical recommendations for leveraging gamification to strengthen innovative pedagogies in LIS education and contribute to Africa's educational transformation agenda.

Keywords: Gamification, Moodle, Innovative Pedagogy, LIS Education, Federal Universities, North Central Nigeria

Introduction

Digital transformation is reshaping higher education through the integration of technologies such as artificial intelligence, cloud computing, blockchain, and the Internet of Things into teaching, learning, and institutional processes. By transcending spatial and temporal barriers, digitalization promotes collaboration, resource sharing, and inclusive learning environments (Bayu, Ferdiana, & Kusumawardani, 2021). Within this evolving landscape, Moodle has emerged as a widely adopted Learning Management System that supports collaborative and authentic learning. It facilitates project-based activities, diverse assessments, and practical skill acquisition, contributing to active student engagement (Maphosa, 2024). In a study by Balaskas et al. (2025), students' continued use of Moodle was found to be influenced by perceived usefulness, system quality, and user satisfaction, with satisfaction serving as a mediating factor. Gamification further enhances Moodle's effectiveness by integrating game elements such as badges and challenges to improve motivation and participation (Coelho & Abreu, 2025). Evidence shows that gamified Moodle environments significantly improve student motivation and learning outcomes (Haruna et al., 2018), while also increasing enjoyment and sustained engagement (Balaskas et al., 2025). Despite these advancements, LIS education faces persistent challenges, including inadequate funding, weak infrastructure, outdated curricula, and limited faculty capacity (Abubakar, 2021; Malik & Ameen, 2020). In Nigeria, these constraints hinder the integration of emerging technologies and reduce graduates' preparedness for modern information environments. Consequently, there is a critical need to explore the adoption of gamified Moodle as a strategy for enhancing engagement and strengthening LIS education in the Nigerian context.

Related studies

Awareness and Understanding of Gamified Learning Features in Moodle

Awareness and understanding of gamified learning features in Moodle are increasingly important as higher education institutions adopt technology-enhanced pedagogies. While Moodle is widely used for core functions such as content delivery, assignments, and grading, both students and lecturers tend to be more familiar with these traditional features than with advanced gamified tools like badges, leaderboards, and challenges (Nguyen-Viet & Nguyen-Viet, 2023). Although students are generally confident in navigating Moodle, their awareness of its gamification capabilities and their pedagogical value remains limited, which constrains effective adoption (Nguyen-Viet & Nguyen-Viet, 2023). Similarly, lecturers demonstrate competence in conventional uses of Moodle but often lack the expertise required to design and implement gamified elements effectively. Rivera and Garden (2021, as cited in Nguyen-Viet & Nguyen-

Viet, 2023) observed that instructors face challenges in integrating features such as competitiveness, challenge, and enjoyment into course design, leading to underutilization of Moodle's gamified potential.

Beyond Moodle, awareness of gamification in higher education has expanded, with growing recognition of its role in enhancing student motivation, engagement, and satisfaction. However, this awareness is often limited to surface-level elements such as scores, badges, and leaderboards, with less attention given to deeper components like challenge, enjoyment, and competitiveness that significantly influence learning outcomes (Hanus & Fox, 2015; López & Tucker, 2018; Van Roy & Zaman, 2018). Furthermore, studies indicate that despite increasing research interest, many stakeholders remain unaware of gamification's broader pedagogical potential to transform teaching and learning practices (Hakak et al., 2019; Zainuddin et al., 2020). These findings highlight the need for targeted training and institutional initiatives to improve awareness and maximize the benefits of gamified learning.

Perceived Benefits of Gamification in Moodle for LIS Education

The integration of gamification into Moodle has gained attention for its capacity to enhance learning through increased motivation, engagement, and improved outcomes. By incorporating elements such as badges, points, leaderboards, and challenges, gamification creates a sense of competition, achievement, and enjoyment that encourages active participation and sustained attention among learners (Hakak et al., 2019; Zainuddin et al., 2020). These features transform traditional learning environments into more interactive and learner-centred spaces. A key benefit of gamification lies in its ability to boost student motivation and engagement. Embedding game-like mechanics within Moodle fosters higher levels of interactivity and enthusiasm compared to conventional teaching approaches. Empirical evidence shows that gamified learning enhances social comparison, satisfaction, and effort (Hanus & Fox, 2015), while also improving academic performance through increased motivation (López & Tucker, 2018). Additionally, gamification promotes repeated practice, collaborative learning, and persistence in solving complex problems, thereby strengthening learning outcomes.

Gamification has also demonstrated effectiveness in professional and technical education contexts. Rivera and Garden (2021, as cited in Nguyen-Viet & Nguyen-Viet, 2023) found that gamified approaches enhance skill acquisition and deepen engagement with technical content. This is particularly relevant for Library and Information Science (LIS) education, where digital literacy, self-directed learning, and technical competencies are essential. Although LIS-specific studies are limited, existing evidence suggests that gamified Moodle environments can significantly support these requirements (Nguyen-Viet & Nguyen-Viet, 2023). Furthermore, gamification contributes to improved student satisfaction by making learning more enjoyable, reducing anxiety, and fostering a sense of achievement (Van Roy & Zaman, 2018). Gamification in Moodle offers multidimensional benefits that support motivation, engagement, satisfaction, and effective learning in LIS education.

Challenges and Barriers in Implementing Gamification

Despite the recognized benefits of gamification, its implementation in higher education, particularly in Africa and Nigeria is constrained by multiple infrastructural, institutional, and pedagogical barriers. Effective integration requires substantial investment in digital infrastructure, including reliable internet access, modern hardware, and conducive learning environments. While well-resourced institutions have invested heavily in such systems, many universities lack the necessary funding, resulting in limited access to digital learning opportunities (Massachusetts Institute of Technology, 2005). In African contexts, these challenges are intensified by poor connectivity, unstable electricity, and inadequate ICT facilities, which hinder the effective deployment of gamified learning (Hernández-de Menéndez et al., 2019; Shinde & Kolmos, 2011). Institutional support and pedagogical readiness also play a critical role. The implementation of gamification demands faculty commitment, administrative backing, and collaboration, yet resistance often arises when educators perceive it as an added burden rather than an instructional enhancement (Bastiaens & Nijhuis, 2012). Additionally, students in resource-limited environments may exhibit lower intrinsic motivation, reducing the effectiveness of gamified strategies. Moodle-specific challenges further complicate adoption. Designing gamified activities requires balancing difficulty and inclusivity; overly complex tasks may discourage participation, while overly simple ones may fail to sustain engagement. Landers (2014) notes that incorporating optional rewards and voluntary participation adds design complexity, while Rivera and Garden (2021) emphasize the need for both technical expertise and pedagogical creativity, skills many instructors lack due to insufficient training. More broadly, infrastructural deficits, limited staff capacity, and weak policy frameworks continue to hinder technology adoption in African higher education (Cukurova et al., 2020; Zainuddin et al., 2020). Addressing these challenges requires sustained investment, faculty development, and supportive institutional policies.

Theoretical framework

This study is grounded in the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) theory to explain the adoption of gamified Moodle in Library and Information Science (LIS) education. These frameworks are complementary, offering individual-level insights (TAM) and broader innovation diffusion perspectives (DOI). TAM emphasises perceived usefulness and perceived ease of use as key determinants of technology acceptance (Suhartanto et al., 2020; Ahmad, 2018; Davis, 1989). In this study, students' perceptions of gamified Moodle's ability to enhance engagement, motivation, and learning outcomes influence adoption, while ease of navigating features such as badges

and leaderboards affects readiness to use the system (Liébana-Cabanillas et al., 2020). TAM also links these perceptions to behavioural intention, with factors such as awareness, trust, perceived control, and system reliability shaping attitudes toward adoption (Alswaigh & Aloud, 2021). DOI theory explains how innovations spread within a social system, focusing on attributes such as relative advantages, compatibility, and complexity (Jamshidi & Kazemi, 2020). Gamified Moodle adoption depends on its alignment with existing LIS teaching practices and perceived benefits. DOI also highlights adopter categories and the role of institutional factors such as infrastructure, training, and policy support. Integrating TAM and DOI strengthens explanatory power (Liébana-Cabanillas et al., 2020), enabling analysis of how awareness, perceived benefits, readiness, and challenges interact. This combined framework provides a comprehensive basis for understanding adoption of gamified Moodle in Nigerian LIS education.

Purpose of study

To explore how gamified Moodle can be leveraged to foster innovative pedagogical practices, enhance student engagement, and address systemic challenges in LIS education, with specific insights from Federal Universities in North Central Nigeria.

Research Questions

1. What is the level of awareness and understanding of gamified learning features in Moodle among LIS students?
2. How do LIS students perceive the pedagogical benefits of integrating gamification into Moodle for teaching and learning?
3. What institutional, technical, and pedagogical challenges are perceived to affect the implementation of gamified Moodle in LIS education?

Research methodology

Research Approach and Design

This study adopted a quantitative research approach, which focuses on the collection and analysis of numerical data to identify patterns, relationships, and generalizations. A descriptive survey design was employed, as it enables the collection of standardized data from a relatively large population and supports the generalization of findings.

Population of the Study

The target population comprised 639 final-year students of Library and Information Science (LIS) in federal universities located in North Central Nigeria. Final-year students were considered appropriate for this study because they have acquired substantial exposure to their academic programme, are more likely to have engaged with the Moodle learning platform, and possess relevant insights into its academic and professional use. Eight (8) federal universities in the North Central region offer LIS programmes, and population data were obtained directly from the respective departmental records, ensuring accuracy and currency. See table 1.

Table 1: Population of LIS Students in Selected Federal Universities in North Central Nigeria

S/N	University Name	LIS Final Year Students Population
1	Federal University of Technology, Minna, Niger (FUTMINNA)	28
2	University of Ilorin, Kwara (UNILORIN)	206
3	University of Abuja, Abuja (UniAbuja)	59
4	Federal University of Lafia, Nasarawa (FULAFIA)	97
5	Federal University Lokoja, Kogi (FULOKOJA)	45
6	National Open University of Nigeria (NOUN)	50
7	University of Jos, Plateau (UniJos)	119
8	Joseph Sarwuan Tarka University, Makurdi, Benue	35
Total		**639**

Sample Size Determination

The sample size was determined using Yamane's (1967) formula for sample calculation:

$$n = \frac{N}{1+N(e)^2}$$

Where:

N = Total population of LIS students = 639

e = Margin of error (0.05)

$$n = \frac{639}{1+639(0.05)^2}$$

$$n = \frac{639}{1+639(0.0025)}$$

$$n = \frac{639}{1+1.5975}$$

$$n = \frac{639}{2.5975}$$

$$n \approx 246$$

Thus, the sample size =246 LIS students.

Sample Size and Sampling Technique

The sample size was determined using Yamane's (1967) formula, resulting in a sample of 246 respondents. A stratified sampling technique with proportional allocation was employed to ensure fair representation across the participating universities, with each institution constituting a stratum. See table 2.

Proportional Allocation Formula:

$$n_i = \frac{N_i \times n}{N}$$

Where:

n_i = sample size for each university

N_i = LIS final year student population in each university

N = Total final year LIS student population (639)

n = Total sample size (246)

Table 2: Allocated Samples per University

S/N	University Name	LIS Final Year Students Population	Proportional Sample (n_i)
1	Federal University of Technology, Minna, Niger (FUTMINNA)	28	11
2	University of Ilorin, Kwara (UNILORIN)	206	79
3	University of Abuja, Abuja (UniAbuja)	59	23
4	Federal University of Lafia, Nasarawa (FULAFIA)	97	37
5	Federal University Lokoja, Kogi (FULOKOJA)	45	17
6	National Open University of Nigeria, (NOUN)	50	19
7	University of Jos, Plateau (UniJos)	119	46
8	Joseph Sarwuan Tarka University, Makurdi, Benue	35	14
Total		**639**	**246**

Research Instrument

Data were collected using a structured, closed-ended questionnaire administered electronically via Google Forms. The instrument was developed in line with the study objectives to ensure uniformity in responses and facilitate ease of analysis. To ensure validity, face and content validity were established through expert review by specialists in Library and Information Science and research methodology. Their feedback informed necessary revisions to improve clarity, relevance, and adequacy of the items. The reliability of the instrument was determined through a pilot study involving respondents outside the main study population. Internal consistency was assessed using Cronbach's alpha, which yielded a coefficient of .75, indicating acceptable reliability.

Data Collection

Data were collected electronically using Google Forms. The questionnaire was distributed through institutional mailing lists, departmental forums, and relevant social media platforms. A total of 246 questionnaires were administered, out of which 152 were completed and returned, yielding a response rate of 61.8%, which is considered adequate for survey research.

Data Analysis

Data collected were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 30. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise the data and address the research questions.

Presentation of Results

Demographic representation of respondent

Table 1: Gender Distribution of Respondents (N = 152)

Gender	n	%
Female	99	65.1
Male	53	34.9

The results in Table 1 indicate that the majority of respondents were female (65.1%, n = 99), while male respondents accounted for 34.9% (n = 53). This suggests a higher level of participation among female students in the study.

Table 2: Age Distribution of Respondents (N = 152)

Age Range	n	%
18–25	72	47.4
26–35	30	19.7
36–45	31	20.4
Above 45	19	12.5

As shown in Table 2, nearly half of the respondents (47.4%, n = 72) were within the 18–25 age range, indicating that the sample was predominantly composed of younger students. Respondents aged 26–35 (19.7%, n = 30) and 36–45 (20.4%, n = 31) were moderately represented, while those above 45 years constituted the smallest proportion (12.5%, n = 19).

Table 3: Institutional Distribution of Respondents (N = 152)

University	n	%
Federal University Lokoja, Kogi (FULOKOJA)	12	7.9
Federal University of Lafia, Nasarawa (FULAFIA)	24	15.8
Federal University of Technology, Minna, Niger (FUTMINNA)	9	5.9
Joseph Sarwuan Tarka University, Makurdi, Benue	7	4.6
National Open University of Nigeria (NOUN)	16	10.5
University of Abuja, Abuja (UniAbuja)	15	9.9
University of Ilorin, Kwara (UNILORIN)	35	23
University of Jos, Plateau (UniJos)	34	22.4

Table 3 shows that respondents were drawn from multiple universities, with the highest representation from the University of Ilorin (23.0%, n = 35) and the University of Jos (22.4%, n = 34). Other institutions contributed smaller proportions, including the Federal University of Lafia (15.8%, n = 24) and the National Open University of Nigeria (10.5%, n = 16). The remaining universities each accounted for less than 10% of the sample. This distribution indicates a relatively broad institutional coverage.

Level of awareness and understanding of gamified learning features in Moodle among LIS students

Table 4 presents LIS students' level of awareness and understanding of gamified Moodle features. Students' familiarity with badges, leaderboards, and challenges influences their perceptions of Moodle's usefulness and effectiveness. Assessing awareness levels provides insight into students' readiness to engage with gamified learning environments and the potential of gamification to enhance motivation, engagement, and learning experiences.

Table 4: Respondents' Awareness of Moodle Gamification Features (N = 152)

Items Statement	SD	D	A	SA	Mean	SD*	Des.
I am aware that Moodle has gamified features such as badges, leaderboards, and challenges.	7 (4.6%)	18 (11.8%)	112 (73.7%)	15 (9.9%)	2.89	0.63	Agree
I understand how gamification features in Moodle can be used to enhance learning outcomes.	17 (11.2%)	20 (13.2%)	90 (59.2%)	25 (16.4%)	2.81	0.84	Agree
I am more familiar with traditional Moodle functions (e.g., assignments, grading) than with gamified features.	0 (0.0%)	25 (16.4%)	106 (69.7%)	21 (13.8%)	2.97	0.55	Agree
I believe students in my department lack adequate awareness of Moodle's gamification tools.	8 (5.3%)	25 (16.4%)	85 (55.9%)	34 (22.4%)	2.95	0.78	Agree
Overall Mean / SD					**2.91**	**0.7**	**Agree**

*SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

The results in Table 4 indicate a generally high level of awareness of Moodle gamification features among respondents, as reflected by the overall mean score of 2.91 (SD = 0.70), which exceeds the decision benchmark of 2.50. Item-level analysis shows that respondents agreed that they are aware of the existence of gamified features in Moodle such as badges, leaderboards, and challenges (M = 2.89, SD = 0.63). This suggests that most respondents possess basic knowledge of gamification elements embedded in the platform. Similarly, respondents agreed that they understand how these gamification features can enhance learning outcomes (M = 2.81, SD = 0.84), indicating a moderate level of functional or pedagogical awareness. Furthermore, respondents agreed that they are more familiar with traditional Moodle functions than with gamified features (M = 2.97, SD = 0.55). This implies that although awareness of gamification exists, traditional features such as assignments and grading systems still dominate their usage experience and familiarity. In addition, respondents agreed that students in their department lack adequate awareness of Moodle's gamification tools (M = 2.95, SD = 0.78). This perception points to a possible gap between staff awareness and student exposure to or understanding of these features. The findings suggest that while awareness of Moodle gamification features is relatively strong among respondents, it is not yet deeply internalized in practice, particularly when compared to traditional Moodle functionalities. The perception that students have limited awareness further underscores the need for targeted sensitization, training, and integration strategies to enhance effective utilization of gamified learning tools.

LIS students perception of the pedagogical benefits of integrating gamification into Moodle for teaching and learning

Table 5 presents LIS students' perceptions of the pedagogical benefits of integrating gamification into Moodle for teaching and learning. The table examines respondents' views on how gamified Moodle features influence motivation, engagement, learning satisfaction, anxiety reduction, and academic performance in Library and Information Science education. Understanding these perceptions is important because positive attitudes toward gamification can enhance students' acceptance and effective use of Moodle as an interactive learning platform.

Table 5: Respondents' Perception of the Benefits of Gamification in Moodle (N = 152)

Items Statement	SD	D	A	SA	Mean	SD*	Des.
Gamified Moodle features can increase my motivation to participate in academic activities.	8 (5.3%)	0 (0.0%)	105 (69.1%)	39 (25.7%)	3.15	0.67	Agree
Gamification in Moodle makes learning more interactive and engaging than traditional methods.	8 (5.3%)	0 (0.0%)	107 (70.4%)	37 (24.3%)	3.14	0.66	Agree

Using gamification in Moodle can improve student satisfaction and reduce learning anxiety.	0 (0.0%)	8 (5.3%)	121 (79.6%)	23 (15.1%)	3.1	0.44	Agree
Gamification is useful for enhancing performance in professional and technical programmes such as LIS.	4 (2.6%)	16 (10.5%)	105 (69.1%)	27 (17.8%)	3.02	0.63	Agree
Overall Mean / SD					**3.1**	**0.6**	**Agree**

*SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

The results in Table 5 reveal a strongly positive perception of the benefits of gamification in Moodle among respondents, as indicated by the overall mean score of 3.10 (SD = 0.60), which is well above the acceptance threshold of 2.50. At the item level, respondents agreed that gamified Moodle features can enhance their motivation to participate in academic activities (M = 3.15, SD = 0.67). This suggests that gamification elements are perceived as effective motivational drivers capable of increasing student engagement. In a similar vein, respondents agreed that gamification makes learning more interactive and engaging compared to traditional methods (M = 3.14, SD = 0.66), reinforcing the view that gamified environments improve the overall learning experience. Additionally, respondents agreed that gamification can improve student satisfaction and reduce learning anxiety (M = 3.10, SD = 0.44). The relatively lower standard deviation here indicates a high level of consensus, implying that this benefit is widely recognized among participants. Furthermore, respondents agreed that gamification is useful for enhancing performance in professional and technical programmes such as Library and Information Science (LIS) (M = 3.02, SD = 0.63), highlighting its applicability beyond general learning to discipline-specific contexts. The findings demonstrate that respondents not only recognize the presence of gamification in Moodle but also strongly value its pedagogical and psychological benefits. This positive perception provides a favorable foundation for the adoption and integration of gamified learning strategies, as users already associate these tools with improved motivation, engagement, satisfaction, and academic performance.

Institutional, technical, and pedagogical challenges perceived to affect the implementation of gamified Moodle in LIS education

Table 6 presents respondents' perceptions of the institutional, technical, and pedagogical challenges affecting the implementation of gamified Moodle in LIS education. The table examines barriers such as inadequate digital infrastructure, limited student training, insufficient institutional support and policies, as well as privacy and security concerns. The findings provide insight into the major factors constraining the effective adoption and utilisation of gamified Moodle platforms within the academic learning environment.

Table 6: Respondents' Perceived Challenges to the Adoption of Gamified Moodle (N = 152)

Items Statement	SD	D	A	SA	Mean	SD*	Des.
Inadequate digital infrastructure (e.g., internet connectivity, devices) is a major barrier to adopting gamified Moodle.	4 (2.6%)	1 (0.7%)	107 (70.4%)	40 (26.3%)	3.2	0.58	Agree
Limited training for students hinders the use of gamified Moodle in my department.	2 (1.3%)	4 (2.6%)	115 (75.7%)	31 (20.4%)	3.15	0.51	Agree
Institutional support and policies for gamification are insufficient in my university.	8 (5.3%)	18 (11.8%)	100 (65.8%)	26 (17.1%)	2.95	0.71	Agree
Privacy, security, or data concerns reduce my willingness to use gamified Moodle.	2 (1.3%)	33 (21.7%)	99 (65.1%)	18 (11.8%)	2.88	0.61	Agree
Overall Mean / SD					**3.05**	**0.6**	**Agree**

*SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

The findings in Table 6 indicate that respondents perceive significant challenges affecting the adoption of gamified Moodle, as reflected by the overall mean score of 3.05 (SD = 0.60), which exceeds the decision threshold of 2.50. This

suggests a general consensus that multiple structural and institutional constraints hinder effective implementation. At the item level, respondents agreed strongly that inadequate digital infrastructure, such as poor internet connectivity and limited access to devices is a major barrier (M = 3.20, SD = 0.58). This highlights the critical role of technological readiness in enabling gamified learning environments. Similarly, respondents agreed that limited training for students significantly hinders the use of gamified Moodle (M = 3.15, SD = 0.51), indicating that lack of user competence and orientation remains a key obstacle. Furthermore, respondents agreed that institutional support and policy frameworks for gamification are insufficient (M = 2.95, SD = 0.71). This points to gaps at the organizational level, including the absence of clear guidelines, strategic direction, and administrative backing necessary for sustainable adoption. In addition, respondents agreed that privacy, security, and data-related concerns reduce their willingness to use gamified Moodle (M = 2.88, SD = 0.61), suggesting that trust and data governance issues also influence adoption decisions. The results demonstrate that despite positive perceptions of gamification benefits, contextual constraints, particularly infrastructural deficits, inadequate training, weak institutional support, and data concerns pose substantial barriers. Addressing these challenges will require coordinated interventions involving investment in ICT infrastructure, targeted training programmes, supportive institutional policies, and robust data protection measures.

Discussion of findings

Level of Awareness and Understanding of Gamified Learning Features in Moodle

The findings reveal a relatively high level of awareness of gamified learning features in Moodle among LIS students, with an overall mean score of 2.91. However, respondents demonstrated greater familiarity with traditional Moodle functions than with gamified features such as badges, leaderboards, and challenges, suggesting that gamification remains peripheral to their learning experiences. These findings align with Nguyen-Viet and Nguyen-Viet (2023), who observed that students and lecturers are generally more conversant with Moodle's conventional tools than its gamified components. Similarly, limited awareness and pedagogical understanding of gamification tools reflect concerns raised by Rivera and Garden (2021, as cited in Nguyen-Viet & Nguyen-Viet, 2023) regarding inadequate instructor capacity to implement gamified strategies effectively.

From the perspective of the Technology Acceptance Model (TAM), awareness influences perceived usefulness and perceived ease of use, which shape behavioural intention toward technology adoption (Suhartanto et al., 2020; Ahmad, 2018). The findings suggest that although students possess initial awareness, this understanding may not be sufficient to encourage effective adoption and utilization of gamified Moodle. Diffusion of Innovation (DOI) theory also explains the moderate adoption level, particularly through issues of compatibility and complexity associated with gamified features (Jamshidi & Kazemi, 2020).

The findings further corroborate studies showing that gamification awareness is often limited to surface-level elements such as badges and leaderboards, rather than deeper pedagogical components including challenge, enjoyment, and competitiveness (Hanus & Fox, 2015; López & Tucker, 2018; Van Roy & Zaman, 2018). Similar concerns were raised by Hakak et al. (2019) and Zainuddin et al. (2020), who emphasized limited stakeholder understanding of gamification's broader educational potential. The findings indicate the need for targeted training, curriculum integration, and institutional support to enhance meaningful adoption of gamified Moodle in LIS education.

LIS Students' Perception of the Pedagogical Benefits of Gamification in Moodle

The findings of this study reveal a strongly positive perception of the pedagogical benefits of integrating gamification into Moodle among LIS students, as reflected in the high overall mean score (M = 3.10). Respondents agreed that gamified Moodle enhances motivation, interactivity, satisfaction, and academic performance, indicating that students perceive gamification as an effective pedagogical strategy. Specifically, students agreed that gamified Moodle features increase motivation to participate in academic activities (M = 3.15), make learning more interactive and engaging (M = 3.14), improve student satisfaction and reduce learning anxiety (M = 3.10), and enhance performance in professional and technical programmes such as LIS (M = 3.02). These findings support earlier studies which identified gamification as a valuable tool for improving student motivation and engagement through features such as badges, points, and leaderboards (Hakak et al., 2019; Zainuddin et al., 2020; Hanus & Fox, 2015). The findings also align with López and Tucker (2018), who emphasized that gamified learning environments provide more interactive and learner-centred experiences than traditional teaching methods.

Furthermore, the findings corroborate Van Roy and Zaman (2018), who reported that gamification promotes enjoyment, reduces anxiety, and improves learners' educational experiences. The positive perception of gamification in professional programmes also supports Rivera and Garden (2021, as cited in Nguyen-Viet & Nguyen-Viet, 2023) and Nguyen-Viet and Nguyen-Viet (2023), who noted that gamified approaches enhance skill acquisition and engagement with technical content.

From the perspective of the Technology Acceptance Model, the findings reflect high perceived usefulness and perceived ease of use, which positively influence technology adoption (Suhartanto et al., 2020; Ahmad, 2018; Liébana-Cabanillas et al., 2020). Similarly, the Diffusion of Innovation Theory explains that students perceive gamification as offering relative advantage and compatibility with LIS learning needs (Jamshidi & Kazemi, 2020). The findings indicate that

LIS students hold favourable perceptions of gamified Moodle, although effective implementation will require adequate awareness, training, and institutional support (Alswaigh & Aloud, 2021).

Institutional, technical, and pedagogical challenges perceived to affect the implementation of gamified Moodle in LIS education

The findings indicate that institutional, technical, and pedagogical barriers significantly constrain the implementation of gamified Moodle in LIS education, reflected in the overall mean of 3.05. Inadequate digital infrastructure emerged as a major challenge, supporting studies that identify poor internet connectivity, unstable electricity, and limited device access as barriers to digital learning in African higher education (Hernández-de Menéndez et al., 2019; Shinde & Kolmos, 2011). Insufficient funding and infrastructural investment further limit adoption (Massachusetts Institute of Technology, 2005). Limited student training reveals a pedagogical gap, consistent with Rivera and Garden (2021) and Landers (2014), while also affecting perceived ease of use within the Technology Acceptance Model (Suhartanto et al., 2020; Alswaigh & Aloud, 2021). Weak institutional support and policy frameworks hinder innovation diffusion (Bastiaens & Nijhuis, 2012; Jamshidi & Kazemi, 2020). Privacy and security concerns also reduce trust and adoption (Liébana-Cabanillas et al., 2020).

Summary

The study explored how gamified Moodle can enhance pedagogical innovation, student engagement, and learning outcomes in LIS education within Federal Universities in North Central Nigeria. The findings indicate that while students demonstrate a reasonable level of awareness of gamified Moodle features, this awareness is largely superficial and not fully translated into practical or pedagogical understanding. Despite this limitation, students expressed strong positive perceptions of the pedagogical benefits of gamification, particularly in enhancing motivation, engagement, satisfaction, and academic performance. However, the implementation of gamified Moodle is significantly constrained by institutional, technical, and pedagogical challenges, including inadequate infrastructure, limited training, weak institutional support, and concerns related to data security. The results reveal a disconnect between students' positive perceptions and the practical realities of implementation.

Conclusion

The study concludes that gamified Moodle has strong potential to transform LIS education by promoting interactive and student-centred learning. However, its effective adoption is hindered by infrastructural limitations, insufficient user competencies, and weak institutional frameworks. While students recognise its value, these barriers limit its practical utilisation. Therefore, successful integration depends on aligning awareness, capacity development, and institutional support to bridge the gap between perception and actual use.

Recommendations

1. Universities should implement structured awareness and orientation programmes that go beyond basic exposure to gamified Moodle features, focusing on their pedagogical value and practical application. This can be achieved through curriculum integration, guided demonstrations, and hands-on learning activities.
2. Institutions should promote the pedagogical integration of gamification by supporting lecturers to embed gamified strategies into course design. This includes developing interactive content, using game elements meaningfully, and aligning gamification with learning outcomes to enhance engagement and academic performance.
3. Universities should address institutional, technical, and policy barriers by investing in digital infrastructure, providing continuous training for users, and establishing clear institutional frameworks that support gamified learning, including data protection and administrative backing.

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ETHICAL PERCEPTIONS AND RESPONSIBLE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION BY UNDERGRADUATE STUDENTS

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Abstract

The rapid integration of Generative Artificial Intelligence (Gen AI) into higher education has transformed students' approaches to learning, information seeking, academic writing, and problem-solving. This study examined undergraduate students' experience with Gen AI and their perceptions of key AI ethical principles. A descriptive survey research design was adopted, and data were collected from 157 undergraduate students using a structured questionnaire. The instrument examined students' prior use of Gen AI and their perceptions of eight dimensions of AI ethics, namely accountability, fairness and bias, privacy and data protection, transparency and explainability, safety and security, responsibility and non-maleficence, trustworthiness, and human autonomy. Data were analysed using descriptive statistics, including frequency, percentage, arithmetic mean, and weighted mean. The findings revealed widespread adoption of Gen AI among undergraduate students, particularly for obtaining subject-related answers (84.1%), generating ideas for academic projects (83.4%), checking grammar and language quality (77.7%), and drafting academic content (71.3%). Students expressed concerns regarding the potential overdependence on AI, especially its possible impact on critical thinking (M = 4.09) and human skill development (M = 3.94). The overall perception of AI ethics was high (WM = 3.92), with safety and security (WM = 4.10), privacy and data protection (WM = 4.05), and trustworthiness (WM = 4.03) emerging as the most strongly endorsed ethical dimensions. However, accountability (WM = 3.53) and transparency and explainability (WM = 3.79) received comparatively lower ratings, indicating limited understanding of AI governance mechanisms. The study concludes that while undergraduate students are active users of Gen AI and demonstrate substantial awareness of AI ethical principles, important gaps remain in their understanding of accountability, explainability, and institutional responsibilities. The study recommends integrating comprehensive AI ethics literacy into higher education curricula to develop students' capacity for responsible, transparent, and critical engagement with AI technologies.

Keywords: Generative Artificial Intelligence, AI ethics, responsible AI, undergraduate students, AI literacy, higher education, digital ethics.

Background to the study

The rapid advancement of digital technologies has continuously transformed human society, reshaping economic systems, communication patterns, and knowledge production processes. From the mechanisation associated with the First Industrial Revolution to the cyber-physical systems characterising the Fourth Industrial Revolution, technological innovations have profoundly influenced virtually every sector of society. More recently, discussions surrounding the Fifth Industrial Revolution have highlighted the growing integration of artificial intelligence (AI), human-centred technologies, and collaborative intelligence in addressing complex societal challenges. Among these emerging technologies, Generative Artificial Intelligence (GenAI) has attracted significant attention due to its unprecedented capacity to generate human-like content, solve problems, and support decision-making processes. Generative Artificial Intelligence refers to a class of AI systems capable of producing new content including text, images, audio, video, and computer code, based on patterns learned from vast datasets. Contemporary GenAI tools, particularly Large Language Models (LLMs) such as ChatGPT, Gemini, Claude, and Copilot, have demonstrated remarkable capabilities in natural language understanding and content generation. These technologies have rapidly gained acceptance across diverse sectors, including healthcare, business, government, research, and education. Within higher education, GenAI is increasingly being utilised by students to support learning activities, academic writing, information retrieval, research tasks, and problem-solving processes.

The emergence of GenAI has significantly altered traditional approaches to teaching and learning. Unlike conventional search engines that primarily retrieve existing information, GenAI systems synthesise information and generate contextually relevant responses tailored to users' prompts. Consequently, students can obtain explanations, summaries, study guides, outlines, and writing assistance with unprecedented speed and convenience. This transformation has influenced how undergraduate students access knowledge, engage with academic content, and complete academic assignments. Studies have reported increasing adoption of GenAI tools among university students for tasks such as brainstorming research topics, generating ideas, summarising scholarly literature, improving writing quality, correcting

grammatical errors, and supporting project development (Chan & Hu, 2023; Kasneci et al., 2023). Beyond academic applications, undergraduate students employ GenAI for various personal and developmental purposes. These include career planning, self-improvement, productivity enhancement, health-related information seeking, interpersonal communication, and decision-making support. The accessibility, responsiveness, and personalised nature of GenAI systems have contributed to their widespread acceptance among young people. Furthermore, GenAI facilitates personalised learning experiences by enabling students to learn at their own pace, receive immediate feedback, and obtain explanations adapted to their individual learning needs. Such capabilities have the potential to enhance learning outcomes, increase student engagement, and promote independent learning.

Despite these benefits, the widespread adoption of GenAI in higher education has generated significant ethical concerns. The ability of AI systems to generate coherent and sophisticated content raises questions regarding academic integrity, originality, authorship, accountability, and responsible technology use. Students may become overly dependent on AI-generated content, potentially compromising critical thinking, creativity, and independent learning. Additionally, the ease with which AI-generated outputs can be incorporated into academic work increases the risk of plagiarism, ghostwriting, and other forms of academic misconduct. Consequently, universities worldwide are grappling with the challenge of balancing the educational benefits of GenAI with the need to preserve academic standards and integrity. Another important concern relates to the reliability and trustworthiness of AI-generated information. Although GenAI systems often produce convincing responses, they are susceptible to hallucinations, misinformation, fabricated references, and factual inaccuracies. Since these systems generate responses based on probabilistic predictions rather than genuine understanding, users may unknowingly rely on inaccurate or misleading information. Furthermore, algorithmic biases embedded within training datasets may result in discriminatory, stereotypical, or inequitable outputs, thereby raising concerns regarding fairness and social justice. These challenges underscore the importance of developing students' critical evaluation skills when interacting with AI-generated content.

Ethical considerations surrounding GenAI extend beyond academic integrity and information accuracy. Issues related to privacy, data protection, transparency, accountability, intellectual property rights, informed consent, and digital safety have become increasingly relevant in educational contexts. Students frequently interact with AI platforms by submitting personal, academic, and sometimes sensitive information, often without fully understanding how such data are collected, processed, stored, or utilised. Consequently, promoting responsible AI use requires a comprehensive understanding of these ethical dimensions and their implications for educational practice. The growing influence of GenAI has also necessitated a re-evaluation of traditional information literacy frameworks. Historically, information literacy education focused on developing students' abilities to identify information needs, locate information resources, evaluate source credibility, and utilise information effectively and ethically. However, the emergence of GenAI has fundamentally altered information-seeking behaviours, requiring the development of additional competencies commonly referred to as AI literacy. AI literacy encompasses knowledge, skills, and attitudes that enable individuals to understand AI technologies, critically evaluate AI-generated outputs, employ effective prompting strategies, recognise potential biases, and use AI tools responsibly and ethically. Consequently, higher education institutions are increasingly recognising the need to integrate AI literacy into curricula and student development programmes.

Understanding students' ethical perceptions is essential for designing effective AI literacy initiatives and institutional policies. Students' beliefs, attitudes, and perceptions regarding responsible AI use influence how they adopt, utilise, and regulate their interactions with GenAI technologies. Without a clear understanding of these perceptions, educational interventions aimed at promoting ethical AI use may fail to address students' actual concerns, expectations, and behavioural tendencies. Moreover, evidence-based insights into students' ethical perceptions can inform the development of institutional guidelines, responsible AI frameworks, and governance policies that support both innovation and academic integrity. Against this backdrop, the present study examines undergraduate students' ethical perceptions regarding the responsible use of Generative Artificial Intelligence in higher education. Specifically, the study seeks to explore students' understanding of ethical AI use, their awareness of potential risks and challenges, and their perceptions of responsible AI integration within academic environments. By investigating these issues, the study contributes to the emerging discourse on AI ethics, responsible AI governance, and AI literacy in higher education. The findings are expected to provide valuable insights for educators, policymakers, librarians, curriculum developers, and higher education administrators seeking to promote ethical, responsible, and effective use of Generative Artificial Intelligence among undergraduate students.1.4 Responsible AI and Ethical Frameworks in

Research Objectives

General Objective: To examine ethical perceptions and responsible use of generative artificial intelligence in higher education by undergraduate students.

Specific Objectives: The study seeks to:

i. Ascertain purposes of using Generative Artificial Intelligence (Gen AI) by undergraduate students.
ii. Find out perceptions (academic dishonesty, misinformation, privacy, and bias) of ethical concerns associated with Gen AI by undergraduate students.

iii. Identify dimensions of Responsible Artificial Intelligence (accountability, fairness and bias, privacy and data protection, transparency and explainability, safety and security, responsibility) by undergraduate students.

Literature Review

The rapid advancement of Artificial Intelligence (AI), particularly Generative Artificial Intelligence (GenAI), has transformed teaching, learning, and information-seeking practices within higher education. Consequently, a growing body of literature has examined students' adoption, acceptance, and educational applications of AI technologies. However, despite the increasing integration of AI into academic environments, research focusing specifically on students' ethical perceptions and responsible use of AI remains relatively limited. Existing studies have primarily concentrated on understanding students' acceptance and educational use of AI technologies. Chan and Hu (2023) found that university students generally perceived generative AI tools as beneficial for enhancing learning efficiency, supporting academic writing, generating ideas, and facilitating access to information. Similarly, Baidoo-Anu et al. (2024) reported that students viewed GenAI as a valuable educational resource capable of improving productivity, creativity, and learning outcomes. Their study revealed that students frequently employed AI tools for academic tasks such as summarising content, generating explanations, brainstorming ideas, and assisting with coursework. Likewise, Fayda-Kinik (2025) observed that undergraduate students perceived generative AI as a useful learning companion that could enhance academic performance and reduce the time required to complete assignments.

Recent studies have also highlighted the widespread adoption of AI technologies among university students. Stone (2025) reported that students increasingly rely on generative AI for academic support, particularly in information retrieval, writing assistance, and project development. However, while students generally acknowledged the usefulness of AI, many expressed uncertainty regarding the appropriate boundaries of AI use in educational settings. Similarly, the study What Undergraduate Students Need to Know and Actually Know About Generative AI (2026) found that although students actively use AI technologies, many possess only a superficial understanding of their capabilities, limitations, and broader implications. While the literature on AI adoption and acceptance continues to expand, relatively fewer studies have examined undergraduate students' perceptions of AI ethics. Most existing investigations focus on technology acceptance, perceived usefulness, and behavioural intention to use AI rather than ethical awareness and responsible engagement. This imbalance is notable given the increasing concerns surrounding algorithmic bias, misinformation, privacy violations, accountability, transparency, and academic integrity associated with AI technologies.

One of the few studies that specifically explored students' ethical perspectives is Yang et al. (2025), which examined undergraduate students' perceptions of generative AI ethics. The study found that students generally recognised ethical concerns related to fairness, transparency, privacy, and academic honesty. However, the authors noted variations in students' understanding of specific ethical principles and highlighted the need for structured ethics education. Similarly, Auwal (2025) investigated students' perceptions of AI ethical boundaries and found that while students supported human autonomy and accountability in AI use, they often struggled to identify appropriate ethical responses to complex AI-related dilemmas. The limited number of studies examining AI ethics among undergraduate students is particularly concerning because ethical awareness plays a crucial role in ensuring responsible AI use. Dignum (2018) argues that AI technologies should not only be evaluated based on their functionality and effectiveness but also on their ethical implications for individuals and society. Likewise, Floridi et al. (2018) and Floridi and Cowls (2019) proposed comprehensive ethical frameworks emphasizing principles such as beneficence, non-maleficence, autonomy, justice, and explicability. These frameworks suggest that users of AI systems, including students, must understand both the opportunities and risks associated with AI technologies.

The broader AI ethics literature has consistently identified accountability, fairness, privacy, transparency, safety, and trustworthiness as essential components of responsible AI. Jobin et al. (2019), through a review of global AI ethics guidelines, found widespread consensus regarding these ethical principles across countries and organizations. Similarly, Fjeld et al. (2020) identified fairness, transparency, accountability, privacy, and human control as recurring themes in AI governance frameworks. However, Mittelstadt (2019) cautioned that ethical principles alone are insufficient unless users understand how such principles apply in practical contexts. This concern is particularly relevant within educational environments where students increasingly interact with AI technologies without formal training in AI ethics. Another notable gap in the literature concerns the geographical concentration of existing studies. Much of the current evidence originates from North America, Europe, Asia, and other technologically advanced regions. Studies by Chan and Hu (2023), Yang et al. (2025), Stone (2025), and Auwal (2025), for example, were conducted outside the African context. Consequently, there is limited empirical evidence regarding how students in developing countries perceive the ethical dimensions of AI. This gap is significant because developing countries often face unique challenges related to digital inequality, technological infrastructure, policy development, and AI governance.

Within African higher education institutions, AI adoption is increasing rapidly, yet formal AI policies, governance structures, and ethics education initiatives remain at relatively early stages of development. The study Shaping Generative AI Governance in Higher Education: Insights from Student Perception (2025) highlighted the need for educational institutions to develop policies that promote responsible AI use while addressing ethical concerns. However,

empirical investigations examining students' ethical awareness and perceptions within African universities remain scarce. As a result, little is known about how African undergraduate students understand concepts such as accountability, fairness, privacy, transparency, trustworthiness, and human autonomy in relation to AI technologies. Furthermore, previous studies have primarily examined students' perceptions of AI benefits and challenges without sufficiently investigating whether students understand their ethical responsibilities as AI users. Morley et al. (2021), Ryan and Stahl (2020), Mökander and Floridi (2021), and Zhu et al. (2021) emphasized that responsible AI requires active participation from users who understand ethical obligations relating to privacy protection, fairness, accountability, and informed decision-making. However, evidence regarding students' awareness of these responsibilities remains limited.

Therefore, a significant gap exists in understanding how undergraduate students perceive the ethical dimensions of GenAI and whether they possess adequate awareness of the responsibilities associated with its use. Addressing this gap is particularly important within developing countries and African higher education contexts where AI adoption is accelerating while ethical governance frameworks and educational interventions are still emerging. The present study contributes to filling this gap by examining undergraduate students' perceptions of AI ethics and responsible AI use, thereby providing evidence to support the development of AI ethics education, policy formulation, and responsible AI integration within higher education.

Material and Methods

This study adopted a descriptive survey research design to investigate undergraduate students' ethical perceptions and responsible use of Generative Artificial Intelligence (GenAI) in higher education. The descriptive survey approach was considered appropriate because it enables researchers to systematically collect data from a target population and describe existing attitudes, perceptions, behaviours, and experiences regarding a particular phenomenon. (Creswell & Creswell, 2018). The study was conducted among undergraduate students in the Department of Microbiology, Federal University of Health Sciences, Ila-Orangun, Nigeria. The target population comprised all registered students across the four undergraduate levels (100, 200, 300, and 400 levels) within the department during the 2025/2026 academic session. Given the relatively manageable population size, a total enumeration sampling technique was employed. This approach involved including all eligible undergraduate students in the study, thereby providing every member of the population an equal opportunity to participate (Creswell & Creswell, 2018).

Data were collected using a structured questionnaire designed to assess students' perceptions of the ethical use and responsible adoption of Generative Artificial Intelligence in academic settings. The questionnaire contained items measuring various dimensions of ethical AI use, including academic integrity, transparency, accountability, privacy, fairness, and responsible utilisation of AI-generated content. The survey was administered during a departmental symposium attended by undergraduate students across all levels of study. Prior to data collection, participants were informed of the purpose of the study and assured of the confidentiality and anonymity of their responses. Participation was voluntary, and informed consent was obtained from all respondents. A total of 160 questionnaires were distributed, of which 157 were correctly completed and returned, yielding a response rate of 98.1%. The high response rate enhanced the reliability and representativeness of the data collected. The collected data were coded and analysed using descriptive statistical techniques. Specifically, frequency counts, percentages, means, and standard deviations were employed to summarise respondents' demographic characteristics and examine their ethical perceptions regarding the responsible use of Generative Artificial Intelligence. The results were presented using tables and descriptive narratives to facilitate interpretation and discussion of the findings. Ethical principles guiding social science research were strictly observed throughout the study.

Demographic Characteristics of Respondents

The table 1 shows the demographic characteristics of respondents in terms of gender, age, level and technological proficiency

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	46	29.3
	Female	111	70.7
Age	15-25	155	98.7
	26-35	2	1.3
	36-45	-	-
	45-55	-	-
Level	100	59	37.6
	200	52	33.1
	300	24	15.3
	400	22	14.0

Technology Proficiency Level	0	3	1.9
	1	1	0.6
	2	4	2.5
	3	1	.6
	4	17	10.8
	5	27	17.2
	6	33	21.0
	7	43	27.4
	8	28	17.8
	9	-	-

Source: Field work, 2026

The demographic distribution in table 1 of the respondents revealed that the majority of the undergraduate students were female (70.7%), while male students accounted for 29.3%. This indicates that female students constituted a larger proportion of the participants and their responses significantly shaped the overall perception of AI ethics reported in this study. Regarding age distribution, almost all respondents (98.7%) were between 15 and 25 years, with only 1.3% aged between 26 and 35 years. This suggests that the participants largely represent traditional undergraduate students who are digital natives and are likely to have substantial exposure to emerging technologies, including Generative Artificial Intelligence (Gen AI). The respondents were drawn from different levels of undergraduate study, with 100-level students constituting the largest group (37.6%), followed by 200-level students (33.1%), 300-level students (15.3%), and 400-level students (14.0%). This distribution demonstrates that students from various stages of academic progression participated in the study, providing diverse perspectives regarding AI ethics. In terms of technological proficiency, the findings indicate that most respondents possessed moderate to high levels of digital competence. The highest proportion of students rated themselves at proficiency level 7 (27.4%), followed by level 6 (21.0%), level 8 (17.8%), and level 5 (17.2%). Very few respondents reported low technological proficiency levels (0–3, 5.6%). This suggests that the majority of participants were technologically competent and therefore likely to have sufficient familiarity with digital tools, including Gen AI systems.

Research questions one: What are the purposes of using Generative Artificial Intelligence (Gen AI) by undergraduate students.

Table 2 reveal the purposes of using Generative Artificial Intelligence (Gen AI) by undergraduate students.

Table 2: Purpose of Using Gen AI

S/N	Purpose of Using Gen AI	Yes		No		Mean	StD
		Frequency	Percent	Frequency	Percent		
1	I never used Gen AI.	5	3.2	152	96.8	1.03	.176
2	I used it to generate ideas or plans for projects when I did not know where to start.	131	83.4	26	16.6	1.83	.373
3	I used it to check grammar or language issues in my writing.	122	77.7	35	22.3	1.78	.418
4	I used it to draft paragraphs for assignments.	112	71.3	45	28.7	1.71	.454
5	I used it to find answers to subject-related questions.	132	84.1	25	15.9	1.84	.367
6	I used it to search for learning resources such as articles or videos.	102	65.0	55	35.0	1.65	.479
7	I used it to search for answers to non-academic questions.	118	75.2	39	24.8	1.75	.433

8	I used it for social purposes only.	35	22.3	122	77.7	1.22	.418

Source: Field work, 2026

The table 2 on Purpose of Using Gen AI the most common uses of Gen AI included finding answers to subject-related questions (84.1%, M = 1.84, SD = 0.367) and generating ideas or plans for projects (83.4%, M = 1.83, SD = 0.373). Furthermore, a substantial proportion of students reported using Gen AI to check grammar and language errors in their writing (77.7%, M = 1.78, SD = 0.418), search for answers to non-academic questions (75.2%, M = 1.75, SD = 0.433), and draft paragraphs for assignments (71.3%, M = 1.71, SD = 0.454). Additionally, 65.0% of respondents used Gen AI to search for learning resources such as scholarly articles and educational videos (M = 1.65, SD = 0.479). However, only 22.3% reported using Gen AI exclusively for social purposes (M = 1.22, SD = 0.418).

Research question two: Students' Perspectives on AI Ethical Dimension (Beneficence, Non-maleficence, Justice, Autonomy, and Explicability) Related to Gen AI

Table 3 present the Students' Perspectives on AI Ethical Dimension (Beneficence, Non-maleficence, Justice, Autonomy, Explicability and Beneficence) Related to Gen AI with the following Scale, Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA).

Table 3: Students' Perspectives on AI Ethical Dimension Related to Gen AI

S/N	Statement	SD		D		N		A		SA			
	AI Ethical Dimension	f	%	f	%	f	%	f	%	f	%	X	SD
1	Gen AI could be used to conduct dishonest behaviours.	33	21.0	35	22.3	35	22.3	43	27.4	11	7.0	2.77	1.255
2	Gen AI could violate people's privacy rights.	41	26.1	45	28.7	25	15.9	37	23.6	9	5.7	2.54	1.263
3	Gen AI could make a specific group vulnerable.	25	15.9	36	22.9	52	33.1	33	21.0	11	7.0	2.80	1.152
4	Gen AI could weaken people's abilities to make independent decisions.	18	11.5	17	10.8	27	17.2	53	33.8	42	26.8	3.54	1.303
5	Gen AI could dissatisfy people due to its invisible processes.	25	15.9	29	18.5	44	28.0	43	27.4	16	10.2	2.97	1.230
6	Gen AI can be used to cheat or plagiarise in academic settings.	20	12.7	24	15.3	29	18.5	49	31.2	35	22.3	3.35	1.325
7	The content generated by Gen AI can be inaccurate or fabricated.	19	12.1	26	16.6	39	24.8	45	28.7	28	17.8	3.24	1.267
8	Gen AI can bypass user permissions to obtain user data.	33	21.0	38	24.2	29	18.5	49	31.2	8	5.1	2.75	1.244
9	Users may be uncertain whether their information is adequately protected.	22	14.0	19	12.1	41	26.1	57	36.3	18	11.5	3.19	1.215
10	Gen AI may generate responses based on biased information.	11	7.0	22	14.0	39	24.8	59	37.6	25	15.9	3.42	1.130
11	Some individuals may not have access to Gen AI.	19	12.1	26	16.6	25	15.9	68	43.3	19	12.1	3.27	1.227
12	Dependence on Gen AI may reduce human skills.	6	3.8	10	6.4	20	12.7	72	45.9	49	31.2	3.94	1.021

13	Frequent use of Gen AI may lead people to ignore critical thinking processes.	10	6.4	7	4.5	13	8.3	56	35.7	71	45.2	4.09	1.134
14	Sources of information provided by Gen AI may be difficult to trace.	22	14.0	40	25.5	38	24.2	44	28.0	13	8.3	2.91	1.195
15	The mechanism through which Gen AI generates responses may be unclear to users.	11	7.0	36	22.9	42	26.8	52	33.1	16	10.2	3.17	1.109

Source: Field work, 2026

The table 3 results show the highest level of agreement was recorded for the statement that frequent use of Gen AI may lead people to ignore critical thinking processes (M = 4.09, SD = 1.134), with 80.9% of respondents agreeing or strongly agreeing. Similarly, respondents strongly agreed that dependence on Gen AI may reduce human skills (M = 3.94, SD = 1.021), as 77.1% agreed or strongly agreed with this statement. A substantial proportion agreed that Gen AI may produce responses based on biased information (53.5%, M = 3.42, SD = 1.130) and that some individuals may have limited access to Gen AI technologies (55.4%, M = 3.27, SD = 1.227. Concerning academic integrity and information reliability, respondents agreed that Gen AI could be used for cheating or plagiarism in academic contexts (53.5%, M = 3.35, SD = 1.325) and that AI-generated content may sometimes be inaccurate or fabricated (46.5%, M = 3.24, SD = 1.267). Regarding transparency and privacy, respondents expressed moderate concerns that their information may not be adequately protected (M = 3.19, SD = 1.215) and that the mechanisms through which Gen AI generates responses may be unclear to users (M = 3.17, SD = 1.109). However, perceptions concerning privacy violations (M = 2.54, SD = 1.263), unauthorised access to user data (M = 2.75, SD = 1.244), and difficulties tracing information sources (M = 2.91, SD = 1.195) were relatively lower. Additionally, respondents expressed mixed opinions on whether Gen AI could be used for dishonest behaviour (M = 2.77, SD = 1.255), make particular groups vulnerable (M = 2.80, SD = 1.152), or create dissatisfaction due to its invisible processes (M = 2.97, SD = 1.230).

Research question three: Framework of AI Ethics perception (Accountability, Fairness and Bias, Privacy and Data Protection, Transparency and Explainability, Safety and Security, and Trustworthiness)

The Table 4 presents undergraduate students' perceptions of key ethical principles guiding the responsible use of Artificial Intelligence (AI), including accountability, fairness and bias, privacy and data protection, transparency and explainability, safety and security, responsibility and do-no-harm, trustworthiness, and consent and human autonomy. The interpretation is based on the mean ($\bar{x}$) and standard deviation (SD) values, where higher mean scores indicate stronger agreement with the ethical principle.

Table 4: Framework of AI Ethics perception

S/N	Statement	SD		D		N		A		SA			
	Accountability	f	%	f	%	f	%	f	%	f	%	x	SD
1	AI developers should be held responsible for harmful outcomes generated by AI systems.	25	15.9	36	22.9	35	22.3	48	30.6	13	8.3	2.92	1.228
2	Organizations using AI should explain how AI decisions affect users.	9	5.7	13	8.3	27	17.2	89	56.7	19	12.1	3.61	.998
3	AI systems should have clear mechanisms for identifying who is accountable for errors.	7	4.5	11	7.0	28	17.8	88	56.1	23	14.6	3.69	.959

4	Universities should establish guidelines governing students' use of AI tools.	9	5.7	5	3.2	28	17.8	67	42.7	48	30.6	3.89	1.060
	Fairness and Bias	SD		D		N		A		SA		x	SD
S/N	Statement	f	%	f	%	f	%	f	%	f	%		
5	AI systems should treat all users fairly regardless of gender, ethnicity, or social background.	1	.6	5	3.2	9	5.7	70	44.6	72	45.9	4.32	.777
6	AI tools can sometimes produce biased results.	4	2.5	13	8.3	35	22.3	78	49.7	27	17.2	3.71	.935
7	Developers should actively monitor and reduce bias in AI systems.	3	1.9	6	3.8	25	15.9	90	57.3	33	21.0	3.92	.832
8	Bias in AI can negatively affect vulnerable groups.	3	1.9	16	10.2	41	26.1	72	45.9	25	15.9	3.64	.935
Privacy and Data Protection		SD		D		N		A		SA			
S/N	Statement	f	%	f	%	f	%	f	%	f	%		
10	AI systems should collect only the data necessary for their operation.	4	2.5	5	3.2	20	12.7	80	51.0	48	30.6	4.04	.891
11	Users should be informed when their personal data are used by AI systems.	4	2.5	2	1.3	16	10.2	71	45.2	64	40.8	4.20	.868
12	I am concerned about how AI systems store and use personal information.	4	2.5	6	3.8	35	22.3	69	43.9	43	27.4	3.90	.935
13	Strong privacy protections are essential for trustworthy AI systems.	4	2.5	7	4.5	21	13.4	70	44.6	55	35.0	4.05	.946
Transparency and Explainability		SD		D		N		A		SA			
S/N	Statement	f	%	f	%	f	%	f	%	f	%		
14	AI systems should explain how they arrive at decisions or recommendations.	4	2.5	12	7.6	24	15.3	72	45.9	45	28.7	3.90	.986

15	Users have a right to understand why an AI system produced a specific output.	6	3.8	5	3.2	32	20.4	80	51.0	34	21.7	3.83	.933
16	Lack of transparency reduces my trust in AI systems.	10	6.4	20	12.7	47	29.9	52	33.1	28	17.8	3.43	1.117
17	AI-generated information should clearly indicate its source and limitations.	6	3.8	8	5.1	21	13.4	69	43.9	53	33.8	3.99	1.013
Safety and Security		SD		D		N		A		SA			
S/N	Statement	f	%	f	%	f	%	f	%	f	%		
18	AI systems should be thoroughly tested before public use.	3	1.9	4	2.5	12	7.6	70	44.6	68	43.3	4.25	.852
19	AI technologies can pose security risks if not properly protected.	4	2.5	11	7.0	22	14.0	77	49.0	43	27.4	3.92	.961
20	AI-generated misinformation can be harmful to society.	5	3.2	7	4.5	14	8.9	72	45.9	59	37.6	4.10	.962
21	AI developers should prioritize user safety over profit.	4	2.5	5	3.2	19	12.1	67	42.7	62	39.5	4.13	.927
Responsibility and Do No Harm		SD		D		N		A		SA			
	Statement	f	%	f	%	f	%	f	%	f	%		
22	AI systems should be designed to avoid causing harm to individuals and communities.	6	3.8	4	2.5	12	7.6	73	46.5	62	39.5	4.15	.948
23	Developers should assess potential risks before deploying AI systems.	5	3.2	9	5.7	17	10.8	82	52.2	44	28.0	3.96	.953
24	Harm caused by AI should be addressed promptly and responsibly.	4	2.5	5	3.2	18	11.5	69	43.9	61	38.9	4.13	.921
25	AI should be used only when its benefits outweigh potential risks.	9	5.7	9	5.7	35	22.3	75	47.8	29	18.5	3.68	1.027
Trustworthiness		SD		D		N		A		SA		x	SD

S/N	Statement	f	%	f	%	f	%	f	%	f	%		
26	I trust AI systems that are transparent and explainable.	8	5.1	5	3.2	24	15.3	81	51.6	39	24.8	3.88	.989
27	AI systems should comply with ethical and legal standards.	4	2.5	3	1.9	12	7.6	83	52.9	55	35.0	4.16	.844
28	Trustworthy AI should be accurate, reliable, and secure.	4	2.5	1	.6	15	9.6	58	36.9	79	50.3	4.32	.870
29	Human oversight is necessary for important AI-driven decisions.	9	5.7	6	3.8	33	21.0	75	47.8	34	21.7	3.76	1.022
Consent and Human Autonomy		SD		D		N		A		SA		x	SD
S/N	Statement	f	%	f	%	f	%	f	%	f	%		
30	Users should provide informed consent before their data are used by AI systems.	8	5.1	6	3.8	21	13.4	74	47.1	48	30.6	3.94	1.027
31	Individuals should be able to withdraw consent for AI data processing.	4	2.5	8	5.1	24	15.3	64	40.8	57	36.3	4.03	.977
32	Excessive reliance on AI may weaken human decision-making skills.	6	3.8	8	5.1	26	16.6	67	42.7	50	31.8	3.94	1.017
33	Humans should retain final control over critical decisions made with AI assistance.	6	3.8	8	5.1	27	17.2	68	43.3	48	30.6	3.92	1.012

Source: Field work, 2026

From table 4 on accountability the findings the highest-rated statement was that universities should establish guidelines governing students' use of AI tools ($\bar{x}$ = 3.89, SD = 1.060), followed by the need for clear mechanisms to identify who is accountable for AI errors ($\bar{x}$ = 3.69, SD = 0.959). Respondents also agreed that organizations should explain how AI decisions affect users ($\bar{x}$ = 3.61, SD = 0.998). However, the statement that AI developers should be held responsible for harmful outcomes generated by AI systems recorded the lowest mean score within this dimension ($\bar{x}$ = 2.92, SD = 1.228). For fairness and bias, the students exhibited strong support for fairness and bias mitigation in AI systems. The statement that AI systems should treat all users fairly regardless of gender, ethnicity, or social background recorded the highest mean score ($\bar{x}$ = 4.32, SD = 0.777), indicating strong consensus. Respondents also agreed that developers should actively monitor and reduce bias in AI systems ($\bar{x}$ = 3.92, SD = 0.832) and recognized that AI tools can sometimes produce biased results ($\bar{x}$ = 3.71, SD = 0.935).

Also, for the highest mean score was recorded for the statement that users should be informed when their personal data are used by AI systems ($\bar{x}$ = 4.20, SD = 0.868). Similarly, respondents agreed that strong privacy protections are essential for trustworthy AI systems ($\bar{x}$ = 4.05, SD = 0.946) and that AI systems should collect only the data necessary for their operation ($\bar{x}$ = 4.04, SD = 0.891). Likewise, on transparency and explainability, the highest-rated item was that AI-generated information should clearly indicate its source and limitations ($\bar{x}$ = 3.99, SD = 1.013), followed by the view that AI systems should explain how they arrive at decisions or recommendations ($\bar{x}$ = 3.90, SD = 0.986). Students also agreed that users have a right to understand why AI systems produce specific outputs ($\bar{x}$ = 3.83, SD = 0.933). However,

the statement that lack of transparency reduces trust in AI systems recorded a comparatively lower mean score ($\bar{x}$ = 3.43, SD = 1.117). And on safety and security, the highest mean score was recorded for the statement that AI systems should be thoroughly tested before public use ($\bar{x}$ = 4.25, SD = 0.852). Students also agreed that AI developers should prioritize user safety over profit ($\bar{x}$ = 4.13, SD = 0.927) and that AI-generated misinformation can be harmful to society ($\bar{x}$ = 4.10, SD = 0.962). On, responsibility and do no harm students, the statement that AI systems should be designed to avoid causing harm to individuals and communities recorded the highest mean score ($\bar{x}$ = 4.15, SD = 0.948). Respondents also agreed that harm caused by AI should be addressed promptly and responsibly ($\bar{x}$ = 4.13, SD = 0.921) and that developers should assess potential risks before deploying AI systems ($\bar{x}$ = 3.96, SD = 0.953).

For trustworthiness, the statement that trustworthy AI should be accurate, reliable, and secure obtained the highest mean score ($\bar{x}$ = 4.32, SD = 0.870), demonstrating strong consensus among respondents. Students also agreed that AI systems should comply with ethical and legal standards ($\bar{x}$ = 4.16, SD = 0.844) and that transparent and explainable AI systems are more trustworthy ($\bar{x}$ = 3.88, SD = 0.989). The relatively lower mean score for the necessity of human oversight in important AI-driven decisions ($\bar{x}$ = 3.76, SD = 1.022) nevertheless indicates moderate agreement. And finally on consent and human autonomy, the highest mean score was recorded for the statement that individuals should be able to withdraw consent for AI data processing ($\bar{x}$ = 4.03, SD = 0.977). Students also agreed that users should provide informed consent before their data are used by AI systems ($\bar{x}$ = 3.94, SD = 1.027) and that excessive reliance on AI may weaken human decision-making skills ($\bar{x}$ = 3.94, SD = 1.017). Furthermore, respondents agreed that humans should retain final control over critical decisions made with AI assistance ($\bar{x}$ = 3.92, SD = 1.012). In all, the highest levels of agreement were observed in the dimensions of Fairness and Bias ($\bar{x}$ = 4.32), Trustworthiness ($\bar{x}$ = 4.32), Safety and Security ($\bar{x}$ = 4.25), and Responsibility and Do No Harm ($\bar{x}$ = 4.15).

Discussion of Findings

Purposes of Using Generative Artificial Intelligence (GenAI) by Undergraduate Students

The findings revealed that undergraduate students had considerable experience using Generative Artificial Intelligence (GenAI) before participating in the AI ethics learning module. This pattern is unsurprising given that contemporary undergraduates largely belong to Generation Z, a cohort characterised by extensive exposure to digital technologies from an early age. The finding aligns with Baidoo-Anu et al. (2024), who reported that university students were already familiar with GenAI applications and had integrated them into various aspects of their academic activities. Similarly, Chan and Hu (2023) observed that higher education students demonstrated substantial awareness and practical experience with generative AI tools, particularly ChatGPT, for learning-related purposes. The most common uses of GenAI among respondents were finding answers to subject-related questions and generating ideas for projects. This suggests that students primarily perceive GenAI as a cognitive and academic support tool that facilitates learning, problem-solving, and idea generation. The finding corroborates Chan and Hu (2023), who found that students frequently used generative AI to obtain explanations of complex concepts, brainstorm ideas, and support coursework preparation. Likewise, Stone (2025) reported that students increasingly relied on GenAI for academic assistance, particularly during the early stages of assignments and project development.

Furthermore, a substantial proportion of respondents reported using GenAI to check grammar and language errors, search for answers to non-academic questions, and draft assignment paragraphs. This indicates that GenAI has become embedded in both educational and everyday information-seeking practices. The result is consistent with Fayda-Kinik (2025), whose study revealed that undergraduate students utilised GenAI not only for academic writing support but also for personal decision-making, communication, and obtaining general information. Similarly, Baidoo-Anu et al. (2024) found that students employed GenAI for a wide range of activities extending beyond formal learning contexts. The finding that 65.0% of respondents used GenAI to search for learning resources, including scholarly articles and educational materials, further demonstrates its emerging role as an information retrieval tool. Students appear to view GenAI as a complementary alternative to conventional search engines and academic databases. This observation is consistent with Stone (2025), who noted that students increasingly turn to GenAI as a starting point for information searches because of its conversational interface and ability to synthesise information quickly. However, this finding contrasts with Chan and Hu (2023), who reported that students still preferred traditional search engines and academic databases when seeking authoritative and verifiable academic sources, owing to concerns about the accuracy and reliability of AI-generated information. Interestingly, only a small proportion of respondents reported using GenAI exclusively for social purposes. This suggests that students predominantly perceive GenAI as an educational rather than recreational technology. The finding supports Baidoo-Anu et al. (2024), who found that academic and learning-related purposes constituted the primary motivations for GenAI use among university students. Similarly, Stone (2025) observed that students generally associated generative AI with academic productivity rather than entertainment or social interaction.

Students' Perspectives on AI Ethical Dimensions Related to GenAI

The findings indicate that undergraduate students demonstrated moderate to high awareness of ethical issues surrounding the use of Generative Artificial Intelligence. This result challenges the common assumption among some educators, librarians, and academic administrators that students may use AI technologies without adequate consideration of their ethical implications. The finding is consistent with Yang et al. (2025), who found that undergraduate students possessed considerable awareness of ethical concerns associated with GenAI, particularly regarding academic integrity, transparency, fairness, and responsible use. Similarly, Auwal (2025) reported that students increasingly recognise the ethical boundaries that should guide interactions with AI systems. The highest level of agreement was recorded for concerns that frequent use of GenAI may discourage critical thinking. Respondents also expressed concern that excessive dependence on AI could diminish human skills and intellectual capabilities. These findings align with Chan and Hu (2023), who reported that students feared overreliance on AI could weaken independent thinking, creativity, and problem-solving abilities. Likewise, Fayda-Kinik (2025) found that students identified cognitive dependency and reduced intellectual effort as major disadvantages of widespread GenAI adoption in higher education. Students also recognised ethical challenges relating to fairness and reliability. More than half of the respondents agreed that GenAI systems may generate biased responses and that unequal access to AI technologies may create educational inequalities. These concerns are consistent with broader AI ethics literature. Floridi and Cowls (2019), Jobin et al. (2019), and Fjeld et al. (2020) identify fairness and justice as fundamental ethical principles for responsible AI, emphasising the need to mitigate algorithmic bias and ensure equitable access. Similarly, Mittelstadt et al. (2016) argue that algorithmic systems may reproduce existing social and cultural biases embedded in training data, thereby reinforcing inequalities.

Concerning academic integrity and information reliability, respondents acknowledged that GenAI could facilitate plagiarism, cheating, and the production of inaccurate or fabricated information. This finding corroborates Yang et al. (2025), who found that students expressed concerns regarding the misuse of GenAI for academic dishonesty. Similarly, Chan and Hu (2023) reported widespread student awareness that AI-generated outputs may contain factual inaccuracies, fabricated references, and misleading information. These concerns are also reflected in the broader literature on responsible AI, which emphasises the importance of reliability, accountability, and transparency in AI-generated content (Zhu et al., 2021; Mökander & Floridi, 2021). With respect to transparency and privacy, respondents expressed moderate concern about the protection of personal information and the opacity of AI decision-making processes. This finding supports the explicability principle proposed by Floridi et al. (2018) and Floridi and Cowls (2019), which emphasises that AI systems should be transparent and understandable to users. Similarly, Ryan and Stahl (2020) argue that users often have limited understanding of how AI systems collect, process, and utilise data, creating concerns regarding privacy, accountability, and informed consent. The findings therefore suggest that students are aware of potential privacy risks but may not fully understand the technical mechanisms underlying AI operations.

Finally, respondents expressed mixed views regarding whether GenAI could encourage dishonest behaviour, make certain groups vulnerable, or create dissatisfaction due to its invisible processes. The relatively high proportion of neutral responses suggests uncertainty about some of the broader societal implications of AI technologies. This observation is consistent with Stone (2025), who reported that many students remain uncertain about the long-term social consequences of GenAI despite recognising its immediate educational benefits. Likewise, the study by Shaping Generative AI Governance in Higher Education: Insights from Student Perception (2025) found that students generally understood basic ethical concerns but exhibited limited awareness of complex governance, accountability, and societal impact issues. This suggests a need for structured AI ethics education that moves beyond technical use toward a deeper understanding of the social, legal, and ethical dimensions of artificial intelligence. In all, the findings demonstrate that undergraduate students are active users of GenAI and generally possess a reasonable awareness of its ethical implications. However, the persistence of uncertainty regarding transparency, governance, bias, and societal impacts highlights the importance of integrating AI ethics education into undergraduate curricula to promote responsible, critical, and informed use of emerging AI technologies.

Framework of AI Ethics perception (Accountability, Fairness and Bias, Privacy and Data Protection, Transparency and Explainability, Safety and Security, and Trustworthiness)

The findings revealed that respondents generally demonstrated positive perceptions regarding accountability in AI systems. The highest-rated statement indicated that universities should establish clear guidelines governing students' use of AI tools, followed by the need for mechanisms that clearly identify who should be held accountable for AI-related errors. Students also agreed that organizations should explain how AI-driven decisions affect users. These findings suggest that undergraduate students recognize the importance of institutional governance and accountability structures

in promoting the responsible use of AI technologies. This result is consistent with Ryan and Stahl (2020), who argued that effective AI governance requires clear accountability mechanisms for both developers and users. Similarly, Morley et al. (2021) emphasized that ethical AI implementation depends on the establishment of practical governance frameworks that define responsibilities among stakeholders. The finding also supports the recommendation of Jobin et al. (2019), who identified accountability as one of the most frequently cited principles in global AI ethics guidelines. In the context of higher education, students appear to expect universities to provide clear policies regarding acceptable and unacceptable uses of AI in academic work. However, the statement that AI developers should be held responsible for harmful outcomes generated by AI systems received the lowest mean score within this dimension. This may indicate uncertainty among students regarding the distribution of responsibility between developers, institutions, and users. The finding partially contrasts with Auwal (2025), whose study reported that students increasingly attributed responsibility for AI-related harms to technology developers and platform providers. The present study suggests that respondents view accountability as a shared responsibility involving AI developers, educational institutions, and end users.

The findings demonstrated strong support for fairness and bias mitigation in AI systems. Students overwhelmingly agreed that AI systems should treat all users fairly regardless of gender, ethnicity, or social background. Respondents also supported continuous efforts by developers to monitor and reduce algorithmic bias while acknowledging that AI tools can produce biased outcomes. This finding aligns with Floridi and Cowls (2019), who identified justice and fairness as fundamental ethical principles necessary for socially responsible AI systems. Similarly, Fjeld et al. (2020) and Jobin et al. (2019) found fairness to be one of the most widely endorsed principles across international AI ethics frameworks. The findings also support Mittelstadt et al. (2016), who argued that algorithmic systems may unintentionally reproduce societal inequalities due to biases embedded within training datasets and computational models. The strong concern expressed by students may reflect increasing public awareness of how AI systems can perpetuate discrimination and unequal treatment. This finding is further supported by Yang et al. (2025), who reported that undergraduate students recognized algorithmic bias as a major ethical challenge associated with generative AI technologies.

The results revealed a high level of concern regarding privacy and data protection. Respondents strongly agreed that users should be informed whenever their personal information is used by AI systems. They also emphasized the importance of strong privacy protections and supported the principle that AI systems should collect only the minimum amount of data necessary for their operation. These findings are consistent with Floridi et al. (2018), who identified privacy as a central ethical requirement for trustworthy AI systems. Likewise, Ryan and Stahl (2020) noted that transparency regarding data collection and processing practices is essential for protecting users' rights and maintaining public trust. Jobin et al. (2019) similarly found that privacy protection remains one of the most frequently cited ethical concerns in AI governance frameworks worldwide. The strong concern demonstrated by respondents suggests that students are increasingly aware of the risks associated with data misuse, unauthorized access, and excessive data collection. This finding also supports the observations of Yang et al. (2025), who found that university students regarded data privacy as one of the most important ethical considerations when using AI-powered applications.

The findings indicate that respondents generally supported transparency and explainability in AI systems. Students agreed that AI-generated information should clearly indicate its sources and limitations and that users should understand how AI systems arrive at decisions or recommendations. This demonstrates a recognition that transparency contributes to informed decision-making and responsible AI use. The findings align with Floridi and Cowls (2019), who proposed explicability as a core principle of ethical AI. Similarly, Dignum (2018) argued that transparency enables users to understand and evaluate AI-generated outputs, thereby fostering responsible adoption of AI technologies. Ryan and Stahl (2020) also emphasized that explainable AI promotes accountability and informed user engagement. Furthermore, Zhu et al. (2021) highlighted transparency and explainability as essential requirements for operationalizing responsible AI. Although respondents valued transparency, the comparatively lower rating for the statement that lack of transparency reduces trust suggests that some students may not fully appreciate the direct relationship between explainability and trustworthiness. This finding contrasts somewhat with Mökander and Floridi (2021), who argued that transparency is a prerequisite for public trust in AI systems.

The findings demonstrated strong support for safety and security measures in AI development. Students overwhelmingly agreed that AI systems should undergo rigorous testing before public deployment. They also agreed that developers should prioritize user safety over profit and acknowledged the harmful consequences of AI-generated misinformation. These findings are consistent with Floridi et al. (2018), who identified non-maleficence, or the obligation to avoid harm, as a key ethical principle in AI development. Similarly, Hagendorff (2020) emphasized that AI systems should be designed and evaluated to minimize risks to individuals and society. The findings also support Zhu et al. (2021), who argued that responsible AI implementation requires continuous safety testing, risk assessment, and security monitoring before and after deployment. The high level of concern for safety and security among respondents may reflect increasing

awareness of misinformation, deepfakes, cyber threats, and other risks associated with emerging AI technologies. Similar concerns were reported by Fayda-Kinik (2025), who found that students considered misinformation and misuse among the major risks associated with generative AI.

The results revealed strong support for the ethical principle of avoiding harm in AI applications. Respondents agreed that AI systems should be designed to prevent harm to individuals and communities and that potential risks should be assessed before deployment. Students also emphasized that harms resulting from AI use should be addressed promptly and responsibly. This finding is consistent with Floridi et al. (2018), who identified beneficence and non-maleficence as foundational principles for ethical AI development. Similarly, Morley et al. (2021) argued that ethical AI requires proactive risk assessment and mitigation strategies throughout the AI lifecycle. Hagendorff (2020) also emphasized that minimizing harm remains a central objective of responsible AI governance. The findings suggest that students understand that AI technologies should contribute positively to society while minimizing potential adverse consequences. This awareness reflects a growing ethical consciousness among undergraduate users regarding the broader societal impacts of AI systems.

The findings revealed that respondents considered trustworthiness a critical characteristic of AI systems. Students strongly agreed that trustworthy AI should be accurate, reliable, secure, and compliant with ethical and legal standards. They also acknowledged that transparency and explainability contribute to trustworthiness. These findings support the work of Mökander and Floridi (2021), who emphasized that trustworthy AI requires transparency, accountability, reliability, and ethical compliance. Similarly, Floridi and Cowls (2019) argued that trustworthiness emerges when AI systems consistently demonstrate fairness, safety, and respect for human rights. The findings also align with Morley et al. (2021), who highlighted trustworthiness as an essential outcome of responsible AI governance. Although respondents moderately supported the need for human oversight in important AI-driven decisions, the relatively lower score may suggest confidence in AI capabilities or limited understanding of the risks associated with fully autonomous decision-making. This observation partially contrasts with Auwal (2025), who reported stronger support among students for continuous human oversight of AI-assisted decisions.

The findings demonstrated positive perceptions regarding consent and human autonomy in AI use. Students strongly agreed that individuals should have the right to withdraw consent for AI data processing and that informed consent should be obtained before personal data are used. Respondents also agreed that excessive reliance on AI could weaken human decision-making abilities and emphasized the need for humans to retain final control over important decisions. These findings are consistent with Floridi and Cowls (2019), who identified autonomy as a fundamental ethical principle that must be protected in AI-mediated environments. Similarly, Auwal (2025) found that students strongly supported maintaining human control over AI systems and opposed excessive delegation of critical decisions to algorithms. The findings also support Dignum (2018), who argued that ethical AI should augment rather than replace human agency and decision-making. The results therefore suggest that students recognize the benefits of AI while simultaneously valuing human judgment, independence, and control over consequential decisions.

Conclusion

the findings demonstrate that undergraduate students possess considerable experience using Generative AI, primarily for academic purposes such as obtaining subject-related information, generating ideas, improving writing quality, and completing assignments. The respondents also showed substantial awareness of major ethical concerns associated with Gen AI, particularly the risks of reduced critical thinking, overdependence, academic dishonesty, misinformation, and algorithmic bias. However, lower levels of agreement on issues such as privacy violations, data security, transparency, and social vulnerability suggest gaps in students' understanding of more complex AI ethical principles. These findings underscore the importance of integrating comprehensive AI ethics education into university curricula to ensure that students not only utilise Gen AI effectively but also understand its broader ethical, social, and technological implications. *The overall perception of AI ethics among undergraduate students was high, with Safety and Security, Privacy and Data Protection, and Trustworthiness emerging as the most strongly endorsed ethical dimensions. Conversely, Accountability and Transparency and Explainability recorded comparatively lower scores, highlighting areas where further AI ethics awareness and educational interventions may be required.*

Recommendations

1. University administrators should integrate AI ethics and literacy modules into the curriculum through compulsory courses, workshops, and practical case studies to strengthen students' understanding of accountability, transparency, and responsible AI use.
2. Librarians should provide continuous training on critical evaluation of AI-generated content, enabling students to identify misinformation, bias, plagiarism, and limitations of AI systems effectively.
3. University management and the library units should develop and enforce institutional guidelines on ethical AI use, clearly defining acceptable practices, academic integrity standards, and consequences for AI-related misconduct.

4. AI developers and technology providers should enhance transparency and explainability features by clearly disclosing information sources, limitations, and decision-making processes to improve users' trust and understanding.
5. Government agencies, regulatory bodies, and higher education institutions should collaborate to establish data privacy and AI governance frameworks that protect users' rights, promote fairness, and ensure responsible AI deployment.
6. Students should adopt responsible AI use practices by verifying AI-generated information with credible sources, maintaining academic integrity, applying critical thinking, and using AI as a learning support tool rather than a substitute for independent reasoning and decision-making.

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Fostering Creativity and Collaboration in Libraries through the Development of Maker Spaces and Innovation Hubs

By

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Abstract

This paper explores the strategic role of libraries in fostering creativity and collaboration through the development of maker spaces and innovation hubs. As libraries transition from traditional repositories of knowledge to dynamic learning environments, the integration of hands-on, user-driven innovation spaces has become increasingly relevant. Drawing on conceptual frameworks from constructivist learning theory and the participatory library model, the paper examines how maker spaces and innovation hubs can reposition libraries as catalysts for community-based innovation, interdisciplinary collaboration, and creative problem-solving. The rationale for this shift is rooted in the growing demand for 21st-century skills such as critical thinking, design thinking, and digital literacy. By providing access to tools such as 3D printers, coding platforms, and collaborative workspaces, libraries can democratize innovation and support both formal and informal learning across diverse user groups. This conceptual discourse identifies key benefits, implementation challenges, and global best practices, offering policy and strategic recommendations for sustainable integration. It argues that with appropriate support and planning, maker spaces and innovation hubs can transform libraries into vibrant centers for knowledge creation, entrepreneurship, and social inclusion. The paper concludes with actionable guidance for library administrators, policymakers, and educators seeking to reposition library services in an innovation-driven world.

Keywords: Academic Libraries, Maker Spaces, Innovation Hubs, Creativity, Collaboration

Introduction

Libraries, traditionally viewed as quiet sanctuaries for reading and information retrieval, have undergone a profound transformation over the past two decades. Both academic and public libraries are increasingly redefining their roles—not only as stewards of knowledge—but also as active agents of community engagement, innovation, and creativity. In the digital age, users no longer rely solely on libraries for access to printed resources. Instead, they seek dynamic spaces that support collaborative learning, hands-on exploration, and interdisciplinary problem-solving (Lippincott, 2015; ACRL, 2016). This shift has compelled libraries to reposition themselves at the intersection of education, technology, and innovation, embracing new service models and spatial configurations that reflect contemporary user needs.

Figure 1: Maker spaces and innovation hubs in the library

One of the most significant innovations in this transformation is the emergence of **maker spaces** and **innovation hubs** within library environments as in figure 1. Originating from the global maker movement—a grassroots initiative that encourages individuals to create, invent, and learn through practical engagement—these spaces have become increasingly popular in libraries across North America, Europe, Asia, and parts of Africa (Burke, 2014; Davies, 2017). Maker spaces are designed as collaborative environments equipped with tools and technologies such as 3D printers, laser cutters, robotics kits, and design software, where users can engage in hands-on learning and digital fabrication. Innovation hubs often encompass broader functions, offering platforms for entrepreneurship, digital creativity, and research incubation, while fostering community engagement and capacity building (Wong & Partridge, 2016).

These spaces embody the ideals of **creativity**—the generation of original, valuable ideas (Runco & Jaeger, 2012)—and **collaboration**, which entails individuals or groups working collectively toward shared objectives, often producing outcomes that surpass individual efforts (Dillenbourg, 1999). Unlike traditional library services focused on information consumption, maker spaces and innovation hubs promote a **participatory culture**, where users transition from passive recipients of information to active co-creators of knowledge and solutions (Jenkins et al., 2009).

Despite the growing popularity of these initiatives, many libraries—particularly in developing contexts—still grapple with structural, financial, and policy-related barriers that hinder the effective integration of such spaces. Questions remain regarding the sustainability, impact, and inclusiveness of maker-based initiatives in libraries. This paper is therefore guided by the core question: *How can libraries leverage maker spaces and innovation hubs to foster creativity and collaboration in the 21st century?*

The purpose of this paper is to explore how libraries, both academic and public, are reimagining their roles through the development and deployment of maker spaces and innovation hubs. Drawing on a systematic review of literature and illustrative cases, the study aims to highlight the strategic value of these spaces in enhancing user engagement, fostering innovation, and advancing the educational and social missions of libraries.

The paper is structured as follows: The next section provides a conceptual framework and definitions of key terms, followed by a methodology detailing the systematic review process. The third section presents key findings and thematic insights from the literature. The fourth section discusses the implications for policy and practice, and the final section concludes with recommendations for library managers, educators, and policymakers.

Methodology

This paper adopts a conceptual review methodology aimed at critically exploring the transformation of library spaces through the integration of maker spaces and innovation hubs. As a theoretical discourse, the study does not rely on primary data collection but instead synthesizes existing literature and policy documents to offer a nuanced understanding of how libraries are repositioning themselves to foster creativity and collaboration in the 21st century.

The review draws upon a diverse range of secondary sources, including peer-reviewed journal articles, institutional reports, strategic policy documents, and published case studies. Literature was sourced from reputable databases such as Scopus, Google Scholar, Web of Science, and ERIC, using key search terms including "library maker spaces," "innovation hubs in academic libraries," "creative learning environments," and "collaborative library spaces." To ensure a balanced perspective, the study includes materials from both developed and developing countries, thereby reflecting

a wide spectrum of library environments and socio-economic contexts. Global policy documents from organizations such as the International Federation of Library Associations and Institutions (IFLA), the American Library Association (ALA), and UNESCO were also consulted to provide insight into international best practices and frameworks.

The analytical approach employed is a thematic synthesis of the selected literature, guided by techniques commonly used in qualitative research (Thomas & Harden, 2008). This involved identifying recurring patterns and emerging themes related to innovation in library spaces, such as the reconfiguration of physical environments, the integration of digital tools, shifts toward participatory and active learning, and the institutional role of libraries in promoting knowledge creation. Particular attention was given to conceptual models that link creativity and collaboration with spatial design and technological engagement, as proposed by researchers such as Koh and Abbas (2015) and Wong and Partridge (2016). The review also examines contextual challenges—such as infrastructural limitations, funding constraints, and policy gaps—that may affect the successful implementation of maker spaces in libraries, especially in resource-constrained settings (Trotter, 2016; Davies, 2017).

By synthesizing theoretical and practical insights across disciplines and regions, this methodology provides a comprehensive framework for understanding how maker spaces and innovation hubs are reshaping the mission, design, and user engagement strategies of modern libraries.

Table 1: Chart: Methodology of the Study

Component	Description
Type of Study	Conceptual review / Theoretical discourse — no primary data collected; relies on synthesis of existing literature and policy documents.
Purpose	To critically explore how library spaces are transforming through the integration of maker spaces and innovation hubs to foster creativity and collaboration in the 21st century.
Sources of Information	- Peer-reviewed journal articles - Institutional reports - Strategic policy documents - Case studies from developed and developing countries
Databases Used	- Scopus - Google Scholar - Web of Science - ERIC
Key Search Terms	"library maker spaces," "innovation hubs in academic libraries," "creative learning environments," "collaborative library spaces"
Global Policy Sources	- IFLA (International Federation of Library Associations and Institutions) - ALA (American Library Association) - UNESCO
Analytical Approach	Thematic synthesis (qualitative approach) — identification of recurring patterns and emerging themes (Thomas & Harden, 2008).
Thematic Focus Areas	- Reconfiguration of library physical environments - Integration of digital tools - Participatory/active learning - Libraries as knowledge creation hubs
Conceptual Models Referenced	- Koh and Abbas (2015): Creativity and collaboration in spatial and technological contexts - Wong and Partridge (2016): Design thinking in library innovation
Contextual Issues Explored	- Infrastructure limitations - Funding constraints - Policy and sustainability gaps (Trotter, 2016; Davies, 2017)
Outcome of Methodology	Provides a comprehensive and multidimensional framework for understanding the strategic role of maker spaces and innovation hubs in repositioning modern libraries.

Findings and Discussion

Justification for Maker Spaces and Innovation Hubs in Libraries

The integration of maker spaces and innovation hubs within libraries is increasingly justified by their capacity to foster essential 21st-century skills, including critical thinking, creativity, collaboration, and digital literacy. As the educational paradigm shifts from rote learning to active, inquiry-based learning, libraries are being reimagined as vibrant, participatory spaces that complement classroom instruction (Kurti, Kurti, & Fleming, 2014). Maker spaces, in particular, provide a physical and intellectual platform for experimentation and iterative problem-solving, allowing users to engage in the design, prototyping, and testing of ideas. This aligns with global education goals emphasizing transferable skills, lifelong learning, and adaptability in the knowledge economy (OECD, 2021).

Furthermore, these spaces offer strong support for STEAM (Science, Technology, Engineering, Arts, and Mathematics) education and project-based learning. They enable users to explore interdisciplinary concepts through hands-on activities such as coding, robotics, digital fabrication, and artistic creation. Such integration is particularly relevant in academic libraries, where students are encouraged to apply theoretical knowledge to real-world challenges, thereby reinforcing learning outcomes and innovation readiness (Sheridan et al., 2014).

Models and Best Practices

Globally, libraries have adopted varied models of maker spaces and innovation hubs that reflect institutional priorities, user demographics, and resource availability. In North America, prominent examples include the *Media Lab* at the

University of Michigan and the *Makerspace* at the Chattanooga Public Library, which offer a mix of digital fabrication tools, creative software, and mentorship programs (Slatter & Howard, 2013). In Europe, the Helsinki Central Library Oodi incorporates a makerspace equipped with recording studios, 3D printers, and sewing machines, offering users the opportunity to develop both technical and creative skills (IFLA, 2019).

In emerging economies, the adoption of maker spaces is gaining traction despite infrastructural and funding limitations. For instance, the University of Lagos Library in Nigeria and the Kenya National Library Service have piloted innovation hubs focused on youth empowerment, digital skills, and entrepreneurship. These models often rely on donor funding, public-private partnerships, and community-driven programming to sustain their operations (Oladele, 2020; Nnadozie, 2019).

Typically, these spaces offer a wide range of programs including design thinking workshops, coding bootcamps, creative arts sessions, STEM clubs, and business incubation support. They also serve as venues for academic collaboration, faculty-student research prototyping, and inclusive community engagement.

Benefits

One of the most profound benefits of incorporating maker spaces into library environments is the empowerment of users as creators rather than passive consumers of information. This user-centric model enhances agency, self-directed learning, and innovation capacity (Burke, 2014). Libraries become sites where individuals of all ages and backgrounds can explore ideas, develop digital and manual skills, and transform abstract concepts into tangible outputs.

Moreover, these spaces foster community engagement and intergenerational learning by facilitating inclusive programs that bring together students, educators, artisans, entrepreneurs, and retirees. The open and collaborative nature of maker spaces supports peer-to-peer knowledge sharing, mentorship, and collaborative problem-solving—elements that are vital in cultivating innovation ecosystems within and beyond academic institutions (Britton, 2012).

Additionally, innovation hubs often serve as incubators for entrepreneurship, especially among youth and underserved populations. Through workshops, access to prototyping tools, and idea-sharing platforms, users are encouraged to develop scalable solutions to local challenges, thus contributing to economic empowerment and social development.

Challenges

Despite their promise, several challenges hinder the effective implementation and sustainability of maker spaces and innovation hubs in libraries. A key limitation is infrastructure and funding, particularly in developing countries where libraries struggle with outdated facilities, unreliable electricity, and limited internet access (Trotter, 2016). Even in well-resourced environments, the initial setup costs for equipment, software, and space redesign can be prohibitive without long-term institutional or external support.

Another major issue is the training needs of librarians and facilitators. As the roles of library staff evolve, there is an increasing need for capacity building in areas such as technology integration, workshop facilitation, and creative design (Koh & Abbas, 2015). Without ongoing professional development, staff may be ill-equipped to manage these new service models effectively.

Finally, policy and sustainability concerns also present barriers. Many institutions lack clear strategic plans or policies for managing and assessing the impact of these spaces. In some cases, maker initiatives are donor-driven and short-lived, raising questions about long-term commitment, scalability, and institutionalization within library frameworks (Davies, 2017).

Table 2: Chart: Key Themes from the Review on Maker Spaces and Innovation Hubs in Libraries

Theme	Findings	Supporting Evidence
Justification for Maker Spaces and Innovation Hubs	Libraries are shifting from passive repositories to active learning environments that support creativity, collaboration, and digital literacy. Maker spaces enhance 21st-century skills such as critical thinking and problem-solving through hands-on, project-based learning.	Kurti, Kurti, & Fleming (2014); OECD (2021); Sheridan et al. (2014)
Models and Best Practices	Diverse implementations exist globally—from the University of Michigan Media Lab to the Helsinki Central Library Oodi. In developing countries, libraries like the University of Lagos Library and Kenya National Library Service are adapting innovation hubs with support from donors and community partnerships.	Slatter & Howard (2013); IFLA (2019); Oladele (2020); Nnadozie (2019)
Benefits to Libraries and Users	Maker spaces empower users as active creators, promote interdisciplinary learning, facilitate community engagement, and support entrepreneurship and innovation. They also foster intergenerational learning and peer collaboration.	Burke (2014); Britton (2012)

Challenges to Implementation	Challenges include infrastructural limitations (power, internet), high initial setup costs, lack of trained personnel, and absence of sustainable policy frameworks. In many cases, initiatives are donor-driven without long-term strategic integration.	Trotter (2016); Koh & Abbas (2015); Davies (2017)

Conclusion and Recommendations

The transformation of library spaces through the integration of maker spaces and innovation hubs represents a paradigm shift in the role of libraries in the 21st century. This conceptual review has highlighted the growing global recognition of libraries as active sites for knowledge creation, interdisciplinary collaboration, and experiential learning. By promoting creativity, critical thinking, and problem-solving, maker spaces support the development of essential 21st-century skills while aligning library services with emerging pedagogical trends such as STEAM education and project-based learning.

The review also reveals that the successful implementation of maker spaces moves library services beyond traditional transactional roles—such as book lending and reference assistance—toward **transformational engagement**, where users are empowered as creators, innovators, and contributors to their communities. This evolution positions libraries not merely as repositories of knowledge but as **platforms for innovation and social inclusion**.

However, this shift requires deliberate planning, supportive infrastructure, and a clear strategic vision. The experiences of libraries across both developed and developing contexts show that while maker spaces offer immense potential, their long-term success depends on addressing contextual challenges such as funding, staff preparedness, institutional alignment, and equitable access.

In light of these findings, the following **practical recommendations** are proposed to support the sustainable integration of maker spaces and innovation hubs in libraries:

First, **policy support** is essential at both institutional and governmental levels. Library development strategies should explicitly incorporate innovation spaces into broader educational and digital inclusion policies. National library associations and higher education regulators can play a key role by offering guidelines and evaluation frameworks for these initiatives.

Second, libraries should cultivate **strategic partnerships** with stakeholders in the education, technology, and private sectors. Collaborations with universities, tech hubs, NGOs, and donor agencies can provide the technical expertise, funding, and community engagement needed to design and scale effective maker-based programs.

Third, continuous **capacity building for librarians and library staff** must be prioritized. As facilitators of learning and innovation, librarians require training in emerging technologies, design thinking, and program facilitation to effectively manage and sustain maker spaces. Professional development programs, certification workshops, and mentorship models can address this critical skills gap.

Lastly, there must be a strong focus on **inclusion and accessibility planning**. Maker spaces should be designed to accommodate diverse users, including individuals with disabilities, older adults, and underrepresented groups. Universal design principles, inclusive programming, and culturally responsive materials can help ensure that these spaces truly serve as democratic environments for all.

In conclusion, maker spaces and innovation hubs hold transformative potential for libraries—redefining their purpose, expanding their reach, and enhancing their relevance in the digital age. With intentional strategies and collaborative action, libraries can continue to evolve as engines of creativity, innovation, and community empowerment.

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FROM SILENCE TO STRATEGY: REDEFINING ACADEMIC LIBRARY VISIBILITY IN THE DIGITAL AGE

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Abstract

In the digital age, Nigerian academic libraries face challenges regarding visibility as users increasingly bypass traditional systems for online alternatives. Grounded in the Theory of Planned Behaviour, this study investigated the influence of strategic marketing on the visibility of academic libraries in Nigerian universities. The study adopted a descriptive survey design with a correlational approach. Data were collected via electronic questionnaires from 314 library personnel randomly selected across the North-Central, South-South and South-West geopolitical zones while data analysis involved descriptive statistics and Pearson correlation. Findings revealed a high level of overall library visibility ($\bar{x}$ =3.10), although online presence specifically was rated as moderate. Similarly, libraries practice strategic marketing to a high extent ($\bar{x}$=3.06), but they appear to prioritise physical accessibility and collection updates over digital access strategies. Major challenges hindering effective implementation included limited funding, inadequate ICT facilities, and staff resistance to innovation. More importantly, the Pearson correlation analysis established a significant, positive relationship ($r = .53$, $p < .05$) between strategic marketing and library visibility. The study concluded that strategic marketing is a crucial driver of library relevance. Consequently, it recommended that universities invest in robust ICT infrastructure to improve online presence and accessibility in the digital era.

Keywords: Academic Libraries, Digital Age, Library Visibility, Nigeria, Strategic Marketing

Introduction

Academic libraries are the intellectual nerve centers of higher education institutions, established to collect, organise, preserve and disseminate information resources that support learning, teaching and research. These libraries, today, perform far more than the traditional role of managing print materials, since they now provide access to digital repositories, online databases and other electronic resources, which makes it easier for both students and faculty to access, share and use the information resources efficiently. However, in the current digital era, academic libraries face growing competition from open web resources such as Google Scholar, ResearchGate and Academia.edu, which provide free and direct access to vast amounts of scholarly content. This competition has made it necessary for libraries to adopt stronger strategic promotional approaches to remain visible and relevant.

Library visibility simply refers to the degree to which a library's resources and services can be easily discovered, accessed and recognised by its target users, both within and outside its parent institution. Salisu and Okpala (2024) defined it as the degree to which academic libraries make their intellectual outputs accessible and recognisable through open access platforms and digital marketing strategies. Similarly, Cox (2021) described library visibility as the intentional positioning of a library within the institutional and digital environment in ways that make its contributions explicit, valued and publicly perceived. In essence, without intentional visibility efforts, academic libraries risk being overshadowed by commercial databases and social media platforms. Thus, visibility ensures that a library's resources, expertise and services are easily discoverable and valued by users, which would in turn strengthen institutional reputation and research impact.

One promising approach to improve library visibility is strategic marketing, which entails a deliberate planning and implementation of promotional activities in alignment with organisational goals. According to Vraimaki et. al. (2023), strategic marketing in libraries involves a systematic and purposeful process of aligning library services with the expectations of target audiences to enhance visibility, relevance and sustainability. Similarly, Stoupenos and Woods

(2023) defined it as the integration of marketing principles into library operations to ensure that resources are effectively promoted to reach wider academic audiences. Strategic marketing goes beyond just advertising the library as it involves using data and digital tools to actively engage users and show that the library is an important partner in teaching, learning and research.

Academic libraries can use different types of strategic marketing to improve their visibility. One of such is digital marketing, which uses social media, email and websites to create awareness and engage users (Kaur, 2019). Another is content marketing, which involves creating and sharing informative resources such as blogs, tutorials and research guides; and relationship marketing, which focuses on building lasting connections with stakeholders through collaboration and user-centered services (Aslam, 2018). Additionally, Vraimaki et al. (2023) highlighted branding and value communication as emerging forms of strategic marketing that help libraries project a distinct identity within their institutions. Beyond these, academic libraries can also adopt a fuller strategic marketing framework such as the 7 Ps of the marketing-mix which include, Product, Price, Place, Promotion, People, Process and Physical Evidence.

The 7Ps model, originally developed by Booms and Bitner (1981) for services marketing, is particularly well suited to libraries, which primarily offer intangible services. Within this framework, Product represents library services; Place refers to physical and digital access channels; Promotion encompasses communication and outreach activities; People highlights the role of librarians; Process focuses on service delivery; and Physical Evidence includes tangible features such as facilities, signage and branding. Finally, Price, within the library context, rarely involves direct payment since most library services are offered free of charge. Instead, it reflects the perceived value of what the library provides and the non-monetary costs users associate with accessing those services. These costs may include the time and effort required to locate materials, the convenience of accessing digital resources, or conditions tied to being a user, as well as borrowing privileges. In some cases, libraries introduce limited fees for specialised or value-added services, such as printing, photocopying, binding, interlibrary loans among others, to maintain operations without compromising accessibility. In this sense, "price" represents a balance between user convenience, perceived value and resource sustainability. Empirical evidence shows that applying the 7 Ps framework (or its e-marketing mix variants) helps libraries enhance user satisfaction, engagement and overall institutional visibility (ElFadel & Othman, 2024; Kwan et al., 2023).

Statement of the problem

Despite the recognised importance of academic libraries in supporting research, teaching and learning, many academic libraries in Nigeria continue to struggle with low visibility and limited user engagement in the digital age. The rapid advancement of information technologies and the emergence of online platforms such as social media networks, open-access databases and generative Artificial Intelligence tools like ChatGPT and Microsoft Copilot, have significantly changed the way users search for and access information. As a result, many users now bypass traditional library systems, leading to the underutilisation of valuable library resources, including digital collections and institutional repositories.

While strategic marketing has been identified globally as an important approach to enhancing library visibility, many Nigerian academic libraries appear to lack well-defined marketing strategies or the required expertise to implement them effectively. In addition, existing promotional activities in many cases tend to be uneven and largely traditional, which may limit their ability to engage increasingly digitally oriented users. Moreover, there is insufficient empirical evidence on how strategic marketing practices such as the 7 Ps marketing framework, can be adapted to the unique challenges of Nigerian academic environments. This study, therefore, seeks to address this gap by examining how strategic marketing can improve academic library visibility in terms of digital presence, user awareness and perceived relevance within higher education institutions.

Research questions

The study answered the following research questions:

1. What is the current level of visibility of academic libraries in Nigeria in the digital age?
2. To what extent do academic libraries in Nigeria apply strategic marketing to enhance their visibility?
3. What are challenges hindering the effective implementation of strategic marketing strategies for enhancing the visibility of academic libraries in Nigeria?
4. Is there a significant relationship between strategic marketing and visibility of academic libraries in Nigeria in the digital age?

Literature review

In today's digital era, academic libraries are under increasing pressure to enhance the visibility of their services, collections and overall impact. However, many institutions continue to struggle with maintaining a strong online presence and ensuring discoverability. Asubiaro (2017) found that more than half of Nigerian academic libraries lacked dedicated websites, while those that had them exhibited low web-impact factors, limiting their visibility and user engagement. Similarly, Daniel and Bassey (2021) reported that although librarians in Kwara State, Nigeria, recognised the potential of social media for promoting library services, inadequate infrastructure and limited digital skills hindered their effectiveness. These findings highlight that, despite the growing awareness of digital transformation, academic library visibility in Nigeria remains constrained by both technical and institutional challenges.

To address these challenges, academic libraries are increasingly adopting strategic marketing practices aimed at improving visibility, user engagement and service utilisation. Marketing is no longer considered a peripheral activity but a strategic necessity for sustaining libraries in today's competitive higher education environment. Research has shown that deliberate marketing efforts can significantly improve users' awareness and use of library services. For instance, Ezeani and Eke (2022) found that effective marketing strategies positively influenced information service utilisation in Nigerian academic libraries. Likewise, Acharya and Tippanna (2023) observed that libraries globally employ diverse approaches such as user segmentation, digital campaigns and targeted outreach initiatives to strengthen their brand identity and communicate value more effectively.

Despite growing recognition of its importance, the extent of strategic marketing in academic libraries remains limited, since Duranceau and Nankivell (2021) reported that many libraries engage in basic promotional activities like e-newsletters and workshops but often lack comprehensive marketing plans that align with institutional goals. This suggests that marketing is still treated as an occasional activity rather than a core strategic function. Supporting this view, Iwu et. al. (2023) noted that Nigerian university libraries must revamp efforts to adopt relevant marketing strategies, this stresses the gap between awareness and structured implementation.

Empirical studies show that strategic marketing plays a vital role in improving the visibility and perceived value of academic libraries. For instance, Vraimaki et al. (2023) found that Greek academic libraries with well-structured marketing plans experienced higher user engagement and improved perceptions of their relevance and sustainability. Similarly, Aslam (2018) noted that targeted branding, consistent messaging and aligning marketing goals with institutional missions significantly enhanced library recognition across campuses. Notably, the growing use of digital and social media platforms has also become a key component of strategic marketing in libraries. Mulimani (2024) demonstrated that actively using platforms such as X (formerly Twitter), Instagram and institutional repositories helped increase research visibility and user participation. Libraries that employed analytics and audience segmentation techniques were found to engage more effectively with students, scholars and external stakeholders. In addition, Kaur (2019) emphasised that maintaining a strong online presence, through search engine optimization and interactive communication channels, is essential for building digital credibility and reinforcing the library's position as a central information center.

Theoretical framework

The Theory of Planned Behaviour (TPB) helps explain how academic libraries in Nigeria use strategic marketing to improve their visibility in the digital era. Proposed by Ajzen in 1991, the theory states that individual's actions are shaped by three main factors: their attitude toward the behaviour, the social pressure or expectations they feel (subjective norms) and their confidence in performing the behaviour (perceived behavioural control). For librarians, this means that their willingness to engage in marketing depends on how they view marketing, the expectations of their institutions and colleagues, as well as their belief in their ability to use digital marketing tools.

Using TPB to study strategic marketing in Nigerian academic libraries shows how intentions can lead to real actions that boost library visibility. For example, a librarian who has a positive attitude toward marketing, receives strong institutional support and feels confident in using digital tools is more likely to adopt creative approaches such as social media promotion, online exhibitions and virtual outreach. These actions help libraries gain more recognition online and attract wider user engagement. Therefore, applying TPB allows researchers to identify the psychological and environmental factors that influence librarians' marketing behaviour, which provides insight into how academic libraries can become more visible, competitive and valuable in the digital age.

Methodology

The study adopted a descriptive survey research design with a correlational approach to investigate the extent of strategic marketing practices and their effect on the visibility of academic libraries in Nigeria. This design is considered appropriate because it enables the researcher to gather quantifiable data from a representative sample of the population. The population of the study comprised library personnel working in public universities (federal and state) in NigeriaTo ensure adequate national representation, a multistage sampling technique was adopted. In the first stage, three geopolitical zones (North-Central, South-South, and South-West) were purposively selected to reflect the diversity of public universities across Nigeria. In the second stage, 12 public universities were selected from the chosen zones using simple random sampling. The selected universities were University of Abuja, Nasarawa State University, Kwara State University, Federal University Lokoja, University of Ibadan, Obafemi Awolowo University, Lagos State University, Federal University of Agriculture, Abeokuta, University of Calabar, University of Benin, Delta State University, and University of Uyo. The research instrument was administered electronically through Google Forms to library personnel in the selected academic libraries across these institutions. This approach was adopted to reach respondents efficiently across the different locations and to obtain a broad representation of library personnel in public universities. At the end of the data collection process, a total of 314 completed questionnaires were returned and found valid for analysis

The questionnaire served as the primary data collection instrument and was structured into three sections addressing the current level of visibility of academic libraries in Nigeria, the extent of strategic marketing practices adopted to enhance visibility, as well as the challenges limiting the effective implementation of strategic marketing. Data analysis involved

both descriptive and inferential statistical techniques. Descriptive statistics, including frequency counts, percentages and means, were used to summarise respondents' characteristics and to answer research questions one to three, while Pearson correlation analysis was employed to examine the relationship between strategic marketing practices and library visibility (research question four). All analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

Results

Research question one: What is the current level of visibility of academic libraries in Nigeria in the digital age?

Table 1: Level of visibility of academic libraries in Nigeria in the digital age

S/N	ITEMS	SD F %	D F %	A F %	SA F %	x̄	Rank
1	The library is perceived as contributing significantly to the university's research visibility.	–	–	202 (64.3%)	112 (35.7%)	3.36	**1**
2	The university community values the library as a credible and dependable information source.	23 (7.3%)	–	172 (54.8%)	119 (37.9%)	3.31	**2**
3	Users regard the library as an essential part of the university's academic life.	–	–	239 (76.1%)	75 (23.9%)	3.24	**3**
4	The library's electronic services are visible and easy to discover through search engines or university portals.	–	23 (7.3%)	224 (71.3%)	67 (21.3%)	3.14	**4**
5	The library's website or online systems are well integrated into the university's main website.	–	28 (8.9%)	225 (71.7%)	61 (19.4%)	3.11	**5**
6	Academic staff often depend on the library for teaching and research support.	23 (7.3%)	–	239 (76.1%)	52 (16.6%)	3.09	**6**
7	Students recognize the library's role in improving their academic performance.	23 (7.3%)	–	239 (76.1%)	52 (16.6%)	3.09	**6**
8	Students and staff are aware of the range of services provided by the library.	–	51 (16.2%)	202 (64.3%)	61 (19.4%)	3.03	**8**
9	Library services are frequently mentioned or featured in university communications	–	45 (14.3%)	217 (69.1%)	52 (16.6%)	3.02	**9**
10	The library's relevance has grown despite the availability of alternative information sources online.	46 (14.6%)	–	223 (71.0%)	45 (14.3%)	3.00	**10**
11	Attendance or participation in library activities (e.g., orientations, exhibitions, trainings) is encouraging.	–	68 (21.7%)	195 (62.1%)	51 (16.2%)	2.95	**11**
12	There is noticeable growth in user visits or service requests in recent times.	–	69 (22.0%)	193 (61.5%)	52 (16.6%)	2.95	**11**
13	The library's digital resources (e.g., databases, e-books, repositories) are widely used by students and staff.	–	74 (23.6%)	195 (62.1%)	45 (14.3%)	2.91	**13**
14	The library's online platforms receive regular engagement or inquiries from users.	–	74 (23.6%)	195 (62.1%)	45 (14.3%)	2.91	**13**
15	The library has a strong online presence within the university community.	23 (7.3%)	28 (8.9%)	263 (83.8%)	–	2.76	**15**
	Weighted mean: 3.10 **Criterion mean: 2.50**						

Table 1 illustrates the level of visibility of academic libraries in Nigeria in the digital age. The result revealed a weighted mean score of 3.10, which is considerably higher than the criterion mean score of 2.50. This indicates a high level of visibility of academic libraries in Nigeria in the digital age. More specifically, the result showed that majority of the respondents agreed that the library is perceived as contributing significantly to the university's research visibility (x̄

=3.36); and that the university community values the library as a credible and dependable information source ($\bar{x}$ =3.31). However, the respondents view the online presence of their library within the university community to be moderate ($\bar{x}$ =2.76).

Research question two: To what extent do academic libraries in Nigeria apply strategic marketing to enhance their visibility?

Table 2: Extent of strategic marketing by academic libraries in Nigeria

S/N	ITEMS	SD F %	D F %	A F %	SA F %	$\bar{x}$	Rank
1	The library's physical environment is easily accessible.	–	–	179 (57.0%)	135 (43.0%)	3.43	**1**
2	The library regularly updates its collection to meet the changing needs of users.	–	–	196 (62.4%)	118 (37.6%)	3.38	**2**
3	The library staff actively engage with users to understand their information needs.	–	–	209 (66.6%)	105 (33.4%)	3.33	**3**
4	Users can easily request or access services online without difficulty.	–	51 (16.2%)	129 (41.1%)	134 (42.7%)	3.26	**4**
5	The library collaborates with other institutions to improve access to wider information resources.	–	28 (8.9%)	181 (57.6%)	105 (33.4%)	3.25	**5**
6	The library uses social media platforms (such as Facebook, X, Instagram) to promote its services and resources.	–	46 (14.6%)	150 (47.8%)	118 (37.6%)	3.23	**6**
7	A variety of digital and print resources are provided to serve different user groups.	–	–	247 (78.7%)	67 (21.3%)	3.21	**7**
8	The library's physical environment is attractive, clean, and conducive for study	28 (8.9%)	–	197 (62.7%)	89 (28.3%)	3.19	**8**
9	The library staff demonstrate professionalism and a positive attitude in service delivery.	–	28 (8.9%)	220 (70.1%)	66 (21.0%)	3.12	**9**
10	The library has a clear and consistent brand identity (logo, slogan or design style).	–	51 (16.2%)	174 (55.4%)	89 (28.3%)	3.12	**10**
11	User feedback is considered in improving existing library products and services.	–	50 (15.9%)	202 (64.3%)	62 (19.7%)	3.04	**11**
12	The library services are offered in ways that minimize users' time and effort.	–	56 (17.8%)	197 (62.7%)	61 (19.4%)	3.02	**12**
13	The library organizes awareness campaigns, exhibitions, or outreach programmes to attract users.	–	73 (23.2%)	174 (55.4%)	67 (21.3%)	2.98	**13**
14	The library's borrowing, renewal and registration processes are fast and efficient.	–	51 (16.2%)	224 (71.3%)	39 (12.4%)	2.96	**14**
15	The library designs services (such as information literacy or reference services) to support academic and research goals.	28 (8.9%)	28 (8.9%)	190 (60.5%)	68 (21.7%)	2.95	**15**
16	The library provides free access to high-quality electronic resources.	–	79 (25.2%)	173 (55.1%)	62 (19.7%)	2.95	**15**
17	Library services are accessible remotely via digital platforms and mobile applications.	28 (8.9%)	23 (7.3%)	202 (64.3%)	61 (19.4%)	2.94	**17**
18	Email newsletters, flyers or posters are used to inform users about library activities.	28 (8.9%)	46 (14.6%)	179 (57.0%)	61 (19.4%)	2.87	**18**

19	Staff regularly undergo training to improve their digital and marketing skills.	28 (8.9%)	46 (14.6%)	179 (57.0%)	61 (19.4%)	2.87	**18**
20	The library's website and online catalogue provide easy access to resources.	28 (8.9%)	51 (16.2%)	174 (55.4%)	61 (19.4%)	2.85	**20**
	Weighted mean: 3.06 **Criterion mean: 2.50**						

The results in Table 2 present the extent to which academic libraries in Nigeria engage in strategic marketing. The weighted mean score of 3.06, which exceeds the criterion mean of 2.50, shows that these libraries adopt strategic marketing practices to a high extent. The most prominent marketing strategies identified include ensuring that the library's physical environment is easily accessible ($\bar{x}$ = 3.43), regularly updating collections to meet users' evolving needs ($\bar{x}$ = 3.38), and actively engaging with users to understand their information needs ($\bar{x}$ = 3.33). Conversely, the least employed strategy is the provision of easy access to resources through the library's website and online catalogue ($\bar{x}$ = 2.85).

Research question three: What are the challenges limiting the effective implementation of strategic marketing by academic libraries in Nigeria to improve their visibility?

Table 3: Challenges hindering effective strategic marketing

S/N	ITEMS	SD F %	D F %	A F %	SA F %	$\bar{x}$	Rank
1	Limited funding constrains the library's ability to organize promotional or outreach programmes.	–	112 (35.7%)	100 (31.8%)	102 (32.5%)	2.97	1
2	Inadequate ICT facilities affect online marketing and communication efforts.	23 (7.3%)	50 (15.9%)	167 (53.2%)	74 (23.6%)	2.93	2
3	Resistance to innovation among staff hinders the adoption of marketing-oriented practices.	23 (7.3%)	45 (14.3%)	195 (62.1%)	51 (16.2%)	2.87	3
4	Weak collaboration between the library and academic departments affects marketing efforts.	–	73 (23.2%)	213 (67.8%)	28 (8.9%)	2.86	4
5	Heavy workload and administrative duties limit librarians' participation in marketing activities.	23 (7.3%)	102 (32.5%)	115 (36.6%)	74 (23.6%)	2.76	5
6	Many library staff have low awareness of the importance of strategic marketing.	39 (12.4%)	62 (19.7%)	163 (51.9%)	50 (15.9%)	2.71	6
7	The library receives inadequate support from university management for marketing initiatives.	23 (7.3%)	112 (35.7%)	129 (41.1%)	50 (15.9%)	2.66	7
8	There is no clear policy or framework guiding library marketing activities.	–	136 (43.3%)	150 (47.8%)	28 (8.9%)	2.66	7
9	Strategic marketing is not given adequate priority in the university's overall development agenda.	23 (7.3%)	106 (33.8%)	157 (50.0%)	28 (8.9%)	2.61	9
10	Librarians lack sufficient training and skills in marketing and communication.	39 (12.4%)	136 (43.3%)	111 (35.4%)	28 (8.9%)	2.41	10
	Weighted mean: 2.74 **Criterion mean: 2.50**						

The result shows that the major challenges hindering the effective implementation of strategic marketing in academic libraries in Nigeria include limited funding, which restricts the organisation of promotional and outreach activities ($\bar{x}$ = 2.97); inadequate ICT facilities, which weaken online marketing and communication efforts ($\bar{x}$ = 2.93); and resistance to innovation among staff, which slows the adoption of marketing-oriented practices ($\bar{x}$ = 2.87). In contrast, the item indicating that librarians lack adequate training and skills in marketing and communication ($\bar{x}$ = 2.41) does not appear to constitute a significant challenge. Overall, the high weighted mean score of 2.74 suggests that the identified challenges are present and noteworthy.

Research question four: Is there a significant relationship between strategic marketing and visibility of academic libraries in Nigeria in the digital age?

Table 4: Relationship between strategic marketing and visibility of academic libraries in Nigeria in the digital age

Variables	N	Mean	Std.Dev	r	P	Remark
Strategic marketing	314	3.06	.38	.533		
Library visibility	3.14	3.10	.40		.000	Sig.

The Pearson correlation analysis examined the relationship between strategic marketing and the visibility of academic libraries in Nigeria. The result showed a moderate, positive and statistically significant relationship between the two variables, (r = .53, p < .001). This indicates that higher levels of strategic marketing are associated with increased visibility of academic libraries in the digital age.

Discussion of findings

The study found a high level of visibility of academic libraries in Nigeria in the digital age. More specifically, majority of the respondents agreed that the library is perceived as contributing significantly to the university's research visibility. This finding aligns with recent studies showing that strategic marketing and digital engagement can enhance the visibility of academic libraries. For instance, Vraimaki et al. (2023) and Mulimani (2024) reported that libraries using structured marketing plans and digital platforms recorded improved user engagement and stronger research visibility.

The findings also showed libraries adopt strategic marketing practices to a high extent. This is in tandem with recent studies emphasising the growing recognition of marketing as essential for strengthening library visibility. Ezeani and Eke (2022) and Acharya and Tippanna (2023) noted that libraries increasingly use structured marketing approaches and user-centred engagement to enhance service delivery. The prominence of strategies such as accessible physical spaces, updated collections and active user engagement also reflects the shift towards more deliberate efforts to understand and meet user needs. Also, the low utilisation of website-based access and online catalogues is consistent with earlier evidence from Asubiaro (2017), who reported weak web presence and low digital visibility in Nigerian academic libraries. This suggests that although libraries are improving in physical and interpersonal marketing practices, gaps in digital and web-based marketing still persist.

The study revealed that limited funding, inadequate ICT facilities and resistance to innovation hinder strategic marketing in academic libraries. This is consistent with earlier studies. Daniel and Bassey (2021) highlighted poor infrastructure and institutional constraints as major barriers to effective digital marketing, while Iwu, Okoro and Uwaifo (2023) also noted the need for libraries to strengthen their commitment to adopting modern marketing strategies. However, the finding that inadequate marketing skills are not a major challenge contrasts with earlier evidence, such as the observations of Daniel and Bassey (2021), who reported limited digital competence among librarians. This difference may indicate gradual improvement in staff skills or increased professional development efforts in recent years.

Lastly, the study found a moderate, positive and statistically significant relationship between the two variables. This indicates that higher levels of strategic marketing are associated with increased visibility of academic libraries in the digital age. This is supported by literature. For example, Ezeani and Eke (2022) found that effective marketing strategies significantly enhanced information service utilisation in Nigerian academic libraries. Similarly, Vraimaki et al. (2023) observed that well-structured marketing plans improved user engagement and perceptions of library relevance. This implies that deliberate marketing efforts are closely linked to increased visibility and recognition of academic libraries in the digital era.

Conclusion

The study concludes that strategic marketing is an important driver of visibility for academic libraries in Nigeria. Libraries that actively engage in marketing practices such as creating accessible physical spaces, updating collections and interacting with users, are more likely to be perceived as valuable contributors to their universities' research and academic missions. While progress has been made in adopting marketing strategies, significant challenges such as limited funding, inadequate ICT infrastructure and resistance to innovation continue to constrain the full potential of these initiatives. Importantly, the positive relationship between strategic marketing and library visibility stresses the necessity for libraries to embrace marketing as a core institutional strategy and leverage both traditional and digital channels to strengthen their presence and relevance in the digital age. To achieve this, there is a need for sustained investment, continuous staff development and the integration of digital tools to ensure that Nigerian academic libraries remain competitive, visible and responsive to evolving user needs.

Recommendations

The following recommendations are made based on the findings of the study:

1. Given that the online presence of academic libraries was found to be only moderate despite their high overall visibility and that inadequate ICT facilities emerged as a major challenge to strategic marketing, universities should invest in robust ICT infrastructure. This should include functional library websites, online catalogues and integrated

digital platforms to enhance online visibility, improve access to resources and support effective digital marketing and communication.

2. Since the study revealed that academic libraries adopt strategic marketing practices to a high extent and that strategic marketing has a significant positive relationship with library visibility, academic libraries should design and implement structured marketing strategies aligned with institutional goals. Such strategies should deliberately integrate physical, digital and user-centred approaches to further strengthen visibility and user engagement in the digital age.
3. Although librarians' lack of marketing skills was not identified as a major challenge, the strong relationship between strategic marketing and library visibility stresses the need to further strengthen staff capacity. Continuous professional development programmes should therefore be provided to enhance librarians' competencies in digital marketing, social media engagement and effective user communication. This will enable more impactful implementation of marketing initiatives.
4. In view of the finding that resistance to innovation among staff hinders the effective implementation of strategic marketing, library management should promote an organisational culture that rewards innovation and creativity. Also, encouraging staff to experiment with new marketing ideas and recognising innovative efforts will help reduce resistance and support the adoption of contemporary marketing practices.
5. Since limited funding was identified as a major challenge affecting promotional and outreach activities, universities and library management should allocate dedicated budgets for library marketing and visibility initiatives. Adequate funding will enable libraries to organise sustained promotional campaigns, outreach programmes, user engagement events and awareness activities that enhance institutional and research visibility.

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Generative Artificial Intelligence Literacy among Librarians in Higher Education Institutions: A Systematic Review

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Abstract

This study explores the level of generative AI literacy among librarians in higher education institutions. It explores the range of Gen AI tools in use, the competencies of generative AI literacy required of librarians, the extent of adoption, and the challenges with librarians' use of generative AI in higher education institutions. The study employed a systematic review of literature, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Peer-reviewed journal articles and conference proceedings published between 2020 and 2025 were retrieved from Scopus, LISA, and Web of Science databases. After rigorous screening, quality appraisal, and synthesis, 31 articles were included for analysis. The findings show that the existing literature is largely centred on conversational large language models, especially ChatGPT, which dominate discussions and applications within academic libraries. Other generative AI tools receive comparatively limited attention. The review further demonstrates that generative AI literacy extends beyond basic operational skills. Instead, it requires a combination of technical adaptability, digital competence, effective prompt construction, critical evaluation of outputs, and strong ethical judgement. In terms of engagement, most librarians are experimenting with or gradually integrating generative AI into selected services rather than implementing it at an advanced, institution-wide level. At the same time, concerns about bias, inaccuracy, misinformation, authorship ambiguity, and academic integrity are prominent, alongside data privacy risks and infrastructural limitations that affect sustainable adoption. The review concludes that while generative AI presents substantial opportunities for enhancing academic library services, its sustainable integration depends on deliberate governance, institutional readiness, and continuous professional development.

Keywords: Generative AI, AI literacy, Academic librarianship, Higher education, Systematic review

Introduction

The advancement of artificial intelligence (AI) in recent years has introduced powerful tools that are reshaping the way knowledge is created, managed, and disseminated. Among these innovations, generative AI (GenAI) can produce human-like text, images, audio, and even code. Generative AI tools such as ChatGPT, Copilot, DeepSeek, Gemini, and DALL-E are increasingly being applied in diverse contexts ranging from education and healthcare to business and climate science (Euchner, 2023; Narayanan, 2024). Within higher education, these tools are useful for information professionals, especially librarians, who play central roles in supporting teaching, research, and lifelong learning. As such, an exploration of generative AI tools and literacy among librarians in higher education institutions has become both timely and necessary.

Generative AI tools are designed to extend human creativity and productivity by leveraging large datasets and sophisticated machine learning models. They are particularly valuable in environments that rely heavily on information access, knowledge creation, and critical evaluation. As Atkins et al. (2024) argue in the context of climate literacy, generative AI tools can enhance learning outcomes and provide novel ways of synthesizing complex information. However, these tools have limitations such as inaccuracies, biases, and ethical issues. As a result, librarians can be considered as one of the professional groups that may help patrons to mitigate their risks, and this proposes a re-examination of their skillsets, particularly their level of AI literacy.

AI literacy refers to the knowledge, competencies, and critical awareness required to effectively use and evaluate AI technologies. In the case of generative AI, literacy extends beyond technical proficiency to include ethical discernment, critical evaluation of outputs, and pedagogical integration (Chee et al., 2025; Chiu, 2025). Annapureddy et al. (2025) highlight twelve defining competencies for generative AI literacy, which encompass understanding how AI systems work, evaluating their limitations, identifying potential biases, and applying them in domain-specific contexts. For librarians, developing these competencies is essential to maintain their relevance as custodians of reliable information and as facilitators of academic inquiry in an age of algorithmically generated content.

Within higher education institutions, librarians already play a crucial role in fostering digital and information literacy among students and faculty. The introduction of generative AI tools, however, requires a shift from traditional literacies toward more advanced forms of technological engagement. Bozkurt (2024) emphasizes that generative AI literacy has become an imperative in the educational landscape, framing it as a new "currency" of relevance in academic spaces. Failure to engage with these emerging literacies risks leaving both librarians and their institutions behind in an

increasingly competitive and digitally driven academic environment. This indicates the need for systematic efforts to understand how librarians are adapting to generative AI and to what extent literacy in these tools is being cultivated.

The discussion of librarians' AI literacy is still growing, but there is significant recognition in scholarly discourse. Deshen and Noa (2024), for instance, contend that librarians must not only be consumers of AI tools but also critical evaluators and educators who help their communities navigate the complexities of algorithmically generated knowledge. This dual responsibility makes AI literacy particularly significant in higher education, where librarians act as gatekeepers of scholarly information and promoters of ethical research practices. Their ability to evaluate generative AI outputs, detect misinformation, and integrate AI into library services directly influences how students and faculty engage with these technologies (Meakin, 2024).

Problem Statement

The emergence of generative AI has opened new frontiers in the production and consumption of information, transforming knowledge systems and reshaping higher education institutions (HEIs). Tools such as Copilot, DeepSeek, Gemini, and DALL-E are increasingly integrated into academic workflows, enabling advanced content generation, personalized assistance, and enhanced learning experiences (Euchner, 2023; Atkins et al., 2024). For higher education institutions, these technologies present both opportunities and challenges in teaching, research, and information services. Librarians are uniquely positioned to guide responsible adoption of generative AI. However, their ability to do so effectively is contingent on their level of generative AI literacy (Annapureddy et al., 2025; Bozkurt, 2024; Diyaolu et al., 2025).

Despite the growing prominence of generative AI, evidence suggests that librarians' preparedness to engage with these tools remains uneven and under-examined. Jo (2023) notes that while generative AI holds immense promise in accelerating knowledge discovery, it also carries risks of misinformation, bias, and over-reliance that could undermine academic integrity. Similarly, Lo (2023) argues that the profession is at a crossroads, as librarians are confronted with questions about their roles in an AI-mediated future, whether as mere users of these tools or as critical leaders who help shape their responsible deployment. Yet, little or no effort has been made to assess how librarians in higher education institutions are navigating this transition, or what competencies they currently possess to manage generative AI in ways that align with their professional mandate of safeguarding reliable knowledge.

Existing studies on generative AI literacy provide useful theoretical frameworks but are often either general in scope or focused on other domains. For example, Annapureddy et al. (2025) propose twelve competencies defining generative AI literacy, but their study is not tailored to librarianship. Atkins et al. (2024) examine generative AI in climate literacy, while Deshen and Noa (2024) highlight the importance of librarians' AI literacy in broad terms without providing empirical evidence of adoption and practices in higher education contexts. Furthermore, the scholarship on librarians' engagement with generative AI tends to be speculative. This creates a significant gap in understanding the extent to which librarians are developing generative AI literacy, the challenges they face, and the implications for academic library services. This study, therefore, seeks to fill this gap by conducting a systematic review of literature on generative AI literacy among librarians in higher education institutions. The importance of this study at this time cannot be overstated. This study is necessary to consolidate current knowledge, identify gaps in practice and research, and provide a foundation for future strategies.

Objectives of the Study

The study aims to explore generative AI literacy among librarians in higher education institutions. Specifically, the following objectives guided the study:

1. To explore the range of generative AI tools used by librarians in higher education institutions.
2. To identify the core competencies of generative AI literacy required of librarians in higher education institutions.
3. To determine the extent to which librarians in higher education are engaging with generative AI tools.
4. To identify the challenges associated with librarians' use of generative AI in higher education contexts.

Methodology

This study adopted a systematic review approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. PRISMA, as explained by Moher et al. (2009), provides a structured approach for reporting evidence-based reviews through four sequential phases: identification, screening, eligibility, and inclusion. Its application enhances the rigor, transparency, and reproducibility of systematic reviews. The increasing use of systematic literature reviews in library and information science (LIS) research validates the choice of this approach for the present study (Ayinde et al., 2026; Lee et al., 2025; Mabona et al., 2024).

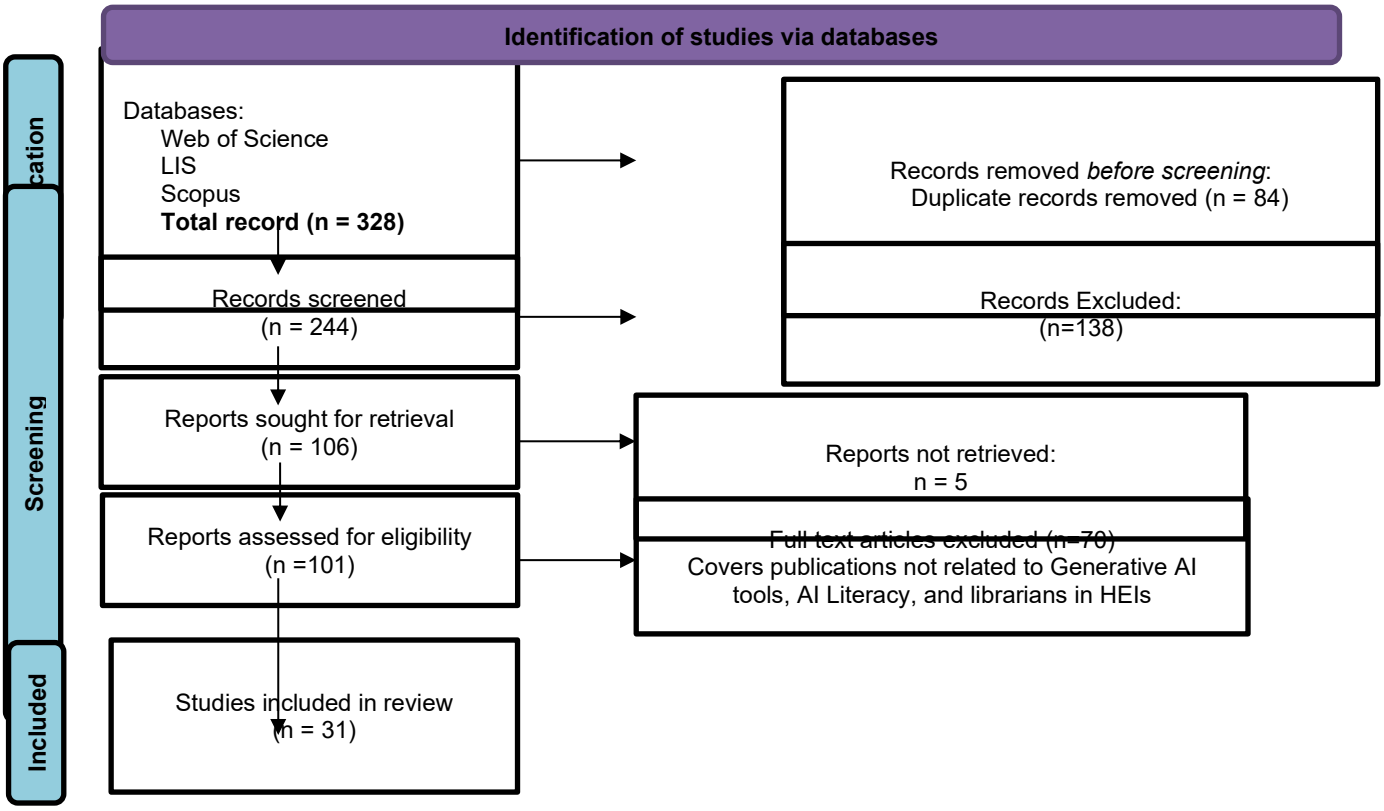
The search process targeted English-language, peer-reviewed journal articles and conference proceedings published between 2020 and 2025, reflecting the recent surge of research on generative AI. To ensure comprehensiveness and credibility, the databases of Scopus, LISA, and Web of Science were searched. These were selected because they index high-quality, peer-reviewed publications relevant to LIS and related disciplines. The search terms were carefully designed to capture the central variables of the study. For Scopus and LISA, the query was: TITLE-ABS-

KEY(("generative AI" OR "generative artificial intelligence" OR "large language model*" OR "LLM" OR ChatGPT OR Gemini OR Claude OR Bard) AND (librar* OR "academic librar*" OR "university librar*" OR "college librar*" OR "library staff" OR "library professional*" OR "information professional*" OR "information servic*") AND ("higher education" OR "higher education institution*" OR university OR college OR "tertiary education" OR postsecondary OR academic) AND ("literacy" OR "AI literacy" OR "digital literacy" OR "information literacy" OR "technology adoption").

For Web of Science, the search string was adapted as TS=("generative AI" OR "generative artificial intelligence" OR "large language model*" OR "LLM" OR ChatGPT OR Gemini OR Claude OR Bard) AND TS=(librar* OR "academic librar*" OR "university librar*" OR "college librar*" OR "library staff" OR "information professional*") AND TS=("higher education" OR "higher education institution*" OR university OR college OR "tertiary education" OR postsecondary OR academic) AND TS=("literacy" OR "AI literacy" OR "information literacy" OR "digital literacy" OR "technology adoption")

This strategy ensured retrieval of publications that explicitly addressed generative AI tools in relation to librarianship, higher education, and literacy. Filters were applied to restrict results to articles and conference proceedings within the LIS field. The search process was conducted between May and July 2025. Results from all databases were exported into an Excel spreadsheet for collation and de-duplication. The initial search yielded 328 records (Figure 1). After removing duplicates and triplicates, 244 articles remained for title and abstract screening. Following PRISMA guidelines, a more detailed full-text screening was conducted on 101 articles, out of which 70 were excluded because they did not focus on academic librarianship, AI literacy, or generative AI practices in higher education contexts. 5 articles were excluded due to retrieval issues.

Fig 1. Procedure for Inclusion and Exclusion



Conflicts regarding inclusion or exclusion were jointly resolved by the two researchers, based on criteria such as year of publication, alignment with the study's scope, peer-review status, and authenticity of findings. At the end of the review process, 31 articles met the inclusion criteria and were synthesized for final analysis (Figure 1). The review process is summarized using the PRISMA flow diagram, which outlines the identification, screening, eligibility, and inclusion stages (Faulkner & Reiter, 2025). To ensure the inclusion of methodologically sound studies, a structured quality appraisal was conducted using the Evidence-Based Library and Information Practice Critical Appraisal Checklist developed by Glynn (2006). This instrument was also adopted by Liu and Liu (2023) in their systematic review, thereby supporting its applicability in evidence synthesis within library and information science research. The checklist evaluates five key areas, including clarity of research objectives, appropriateness of methodology, coherence between data and findings, attainment of stated objectives, and provision of recommendations for further research. Each criterion

was rated on a three-point scale of Yes (2-points), Partial (1-point), and (0-point), giving a maximum obtainable score of ten points. Consistent with Liu and Liu (2023), studies scoring five points and above were considered to have met the minimum methodological quality required for inclusion in the review. The quality assessment scores for selected studies are shown in Table 1.

Table 1: Quality assessment score of selected studies

		Score					
S/n	**Study**	Statement of research objectives	Utilization of research method	Discussion of outcome	Answer to research questions	Presentations of suggestions	Total Score
1.	Casidsid, L. I., & Pama, P. J. A.	2	2	2	2	1	9
2.	Formanek, M.	2	2	2	2	1	9
3.	Boateng, F.	1	1	2	1	1	6
4.	Carroll, A. J., & Borycz, J.	2	2	2	2	1	9
5.	Viner, J.	1	1	1	1	1	5
6.	Hosseini, M., & Holmes, K.	1	1	2	1	0	5
7.	Chen, X. S., & Feng, Y.	2	2	1	1	1	7
8.	Wibowo, M. P.	1	2	1	0	1	5
9.	Michalak, R., Tzoc, E., & Lewis, J. D.	1	2	1	1	2	7
10.	Luo, L.	2	2	2	2	1	9
11.	Fan, Y. U. A. N., & Jia, L. I.	2	1	1	1	1	6
12.	Oddone, K., Garrison, K., & Gagen-Spriggs, K.	2	1	1	1	1	6
13.	Vogus, B.	2	1	1	1	1	6
14.	Gmiterek, G., & Kotuła, S. D.	2	2	2	2	1	9
15.	Cox, A.	2	2	2	1	2	9
16.	Gupta, V.	2	2	2	2	1	9
17.	Ko, C. R., & Chiu, M. H.	2	2	1	2	1	8
18.	Adarkwah, M. A., et al.	2	2	2	2	1	9
19.	Kim, J.	2	2	2	2	1	9
20.	Torres, J. M.	2	2	2	1	1	8
21.	Wheatley, A., & Hervieux, S.	2	2	2	2	2	10
22.	Chen, Y., et al.	2	2	2	2	1	9
23.	Zhang, L.	1	1	1	1	1	5
24.	Mwantimwa, K., & Msoffe, G.	2	2	2	2	2	10
25.	Kesselman, M. A., & Esquivel, W.	1	1	1	1	1	5
26.	Boyle, C.	2	1	1	1	1	6
27.	Reza, R. B., Mahmud, M. R., & Ahmed, S. Z.	2	2	2	1	1	8
28.	Martínez-Camacho, H., et al.	2	2	2	2	1	9
29.	Ammar, A. S. A., Shehata, A., & Eldakar, M.	2	2	2	2	2	10
30.	Bridges, L. M., McElroy, K., & Welhouse, Z.	1	1	1	1	1	5
31.	Oladokun, B. D., Irivike, F. E., Enakrire, R. T., & Ajani, Y. A.	2	2	2	2	1	9

Results

Research characteristics

Holistically, this study consists of 29 peer-reviewed journals and 2 conference papers. None of the papers used adopted a mixed-method approach (Appendix A). The distribution of articles by year of publication indicates a steady and notable increase in scholarly interest in generative artificial intelligence within the library and information science (LIS) domain. As shown in Figure 2, the number of publications was relatively low in 2023, reflecting the early stages of discourse around generative AI applications in librarianship. The volume of publications grew considerably in 2024, suggesting that the academic community quickly began to explore the implications of tools such as ChatGPT, Bard, and Gemini in higher education contexts. The trend reached its peak in 2025, when the largest number of articles was published. This implies the expanding relevance of generative AI in LIS research and practice

Fig 2. Distribution of articles by year of publication

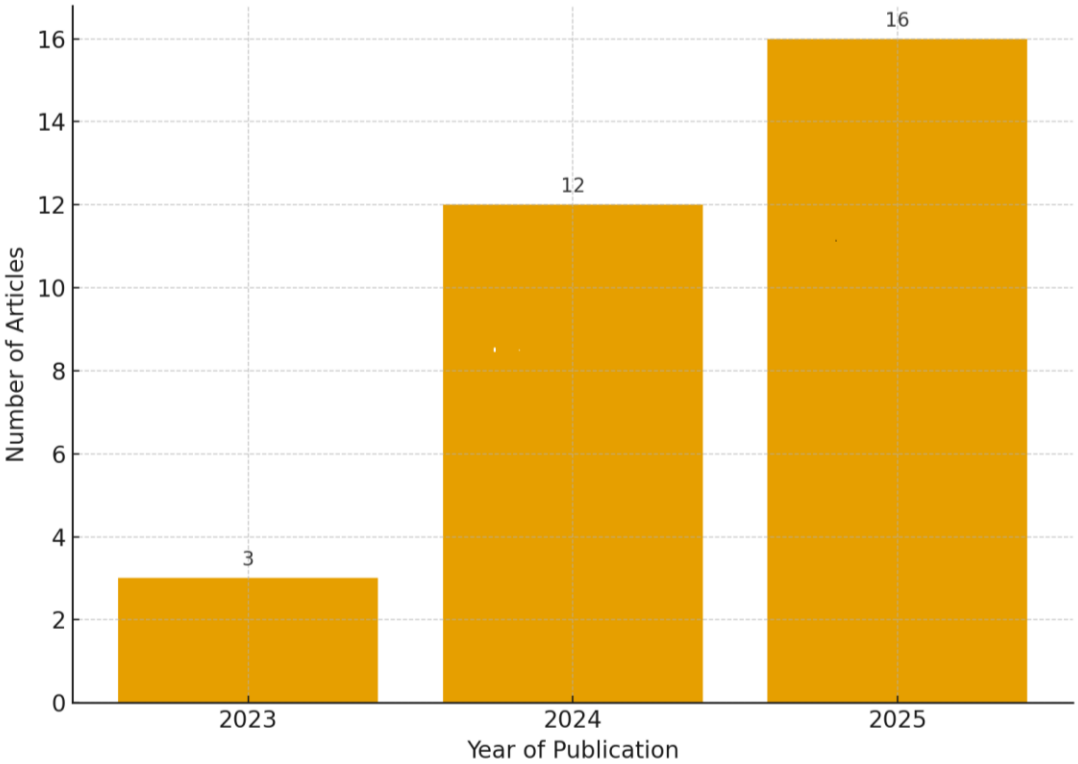
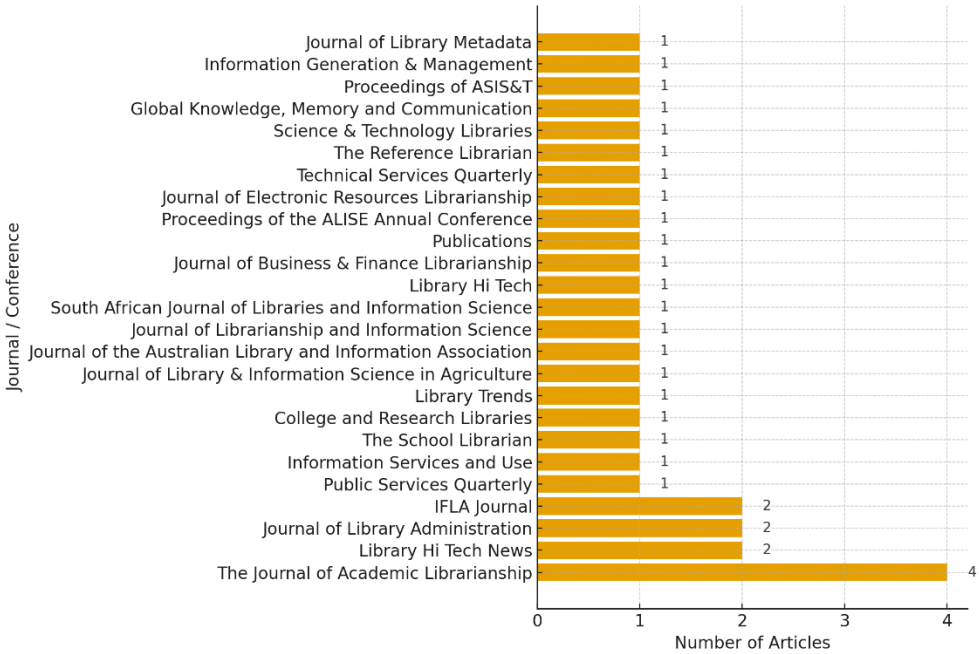


Fig 3. Number of articles included in major outlets



In terms of outlets, the graphical distribution of articles across journals and conference proceedings reveals that some journals serve as primary hubs for this emerging body of knowledge (Figure 3). The Journal of Academic Librarianship stands out as the leading venue, publishing more articles than any other journal, thereby reinforcing its role as a central platform for research on technology adoption in academic libraries. Other journals such as IFLA Journal, Library Hi

Tech News, and Journal of Library Administration also hosted multiple publications, highlighting their engagement with the discourse on AI in library services.

Table 2: Tyes of Generative AI tools employed by librarians in higher educational institutions

Source: Authors own work

S/n	Types of GEN AI tools	Article no.	Number of articles	Percentage
1.	ChatGPT	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14, 15, 16, 17, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31	28	90.32%
2.	Google Bard (Gemini)	6, 9, 10, 15, 20, 26, 27, 29, 30	9	29.03%
3.	Chatbot	22, 24	2	6.45%
4.	Quillbot	10, 12	2	6.45%
5.	Grammarly	9, 10	2	6.45%
6.	DALL-E	8, 10, 27	3	9.68%
7.	Midjourney	10	1	3.22%
8.	Siri	21	1	3.22%
9.	Alexa	21	1	3.22%
10.	Google Assistant	21	1	3.22%
11.	Microsoft Copilot	6, 9, 15, 25	4	12.90%
12.	Claude	30	1	3.22%
13.	Perplexity	12, 14	2	6.45%
14.	Botsonic	14	1	3.22%
15.	Chatbase	14	1	3.22%
16.	Semantic Scholar	28	1	3.22%
17.	Consensus	28	1	3.22%
18.	Research Rabbit	28	1	3.22%
19.	Litmaps	9	1	3.22%
20.	Scite.ai	9	1	3.22%
21.	tlooto Copilot	19	1	3.22%

Table 2 shows the types of generative AI tools employed by librarians across the 31 studies reviewed. ChatGPT was the most frequently reported tool (n = 28), indicating its dominant position in academic library discourse and practice. Google Bard (Gemini) followed with moderate representation (n = 9). Microsoft Copilot appeared in fewer studies (n = 4), suggesting emerging but still limited institutional adoption. Among image generation tools, DALL-E was identified in a small proportion of the studies (n = 3, 9.68%). Overall, Table 2 indicates a strong concentration around large language models, particularly ChatGPT, with other tools receiving comparatively limited scholarly attention.

Table 3: Competencies of generative AI literacy required of librarians in higher education institutions

S/n	Dimensions	Competencies	Article no.	Number of articles	Percentage
1.	Ethics-related competencies	Ethical awareness	1, 12, 29	3	9.68%
		Ethical AI use	2, 7, 25	3	9.68%
		Ethical judgement	5, 22	2	6.45%
		Ethical knowledge	15	1	3.22%
		Digital ethics	9, 12	2	6.45%
		Ethical literacy	30	1	3.22%
		Ethical prompt	23	1	3.22%
2.	Digital and Technical Literacies	Digital literacy	1, 18, 12, 28	4	12.90%

		Technical proficiency	6, 14	2	6.45%
		Technical adaptability	2, 6, 15, 18, 24, 28	6	19.36%
		Metadata adaptability	2, 31	2	6.45%
		Institutional compliance	10	1	3.22%
3.	Prompting and content creation skills	Prompt engineering	5, 7, 8, 10,	4	12.90%
		Content refinement	8	1	3.22%
		Editorial judgment	8	1	3.22%
		Content evaluation	5, 9, 19	3	9.68%
		Bias detection	11	1	3.22%
4.	Critical and evaluative competencies	Critical assessment of AI outputs	2,	1	3.22%
		Critical thinking	6, 14, 27	3	9.68%
		Evaluation literacy	3, 21, 29	3	9.68%
		Ability to compare and select tools	26	1	3.22%
		Caution	13	1	3.22%
5.	Information and data literacies	Data literacy	2, 20	2	6.45%
		Information literacy	23, 26	2	6.45%
		Authority	17	1	3.22%
		Information creation	17	1	3.22%
		Research	17	1	3.22%
		Scholarship	17	1	3.22%
		Searching skills	17	1	3.22%
6.	Innovation and strategic competencies	Innovation	13, 15, 31	3	9.68%
		Strategic thinking	30	1	3.22%
		Entrepreneurial literacy	16	1	3.22%
7.	Personal and professional development	Soft skill skills development	1	1	3.22%
		Emotional intelligence	16	1	3.22%
		Continuous learning	24	1	3.22%
		Instructional design	4, 20	2	6.45%

Table 3 presents the competencies of generative AI literacy required of librarians. Technical adaptability was the most cited competency (n = 6, 19.36%), reflecting the importance of adjusting to rapidly evolving AI systems. Digital literacy (n = 4, 12.90%) and prompt engineering (n = 4, 12.90%) were also frequently reported, indicating the need for foundational digital skills and effective prompt formulation. Ethical awareness (n = 3, 9.68%), ethical AI use (n = 3, 9.68%), critical thinking (n = 3, 9.68%), evaluation literacy (n = 3, 9.68%), innovation (n = 3, 9.68%), and content evaluation (n = 3, 9.68%) were moderately represented. The data, therefore, suggests that generative AI literacy is anchored on technical adaptability, prompting competence, ethical responsibility, and evaluative judgement.

Table 4: **Extent of librarians' engagement with generative AI tools**

S/n	Dimensions	Extent of engagement	Article no.	Number of articles	Percentage
1.	Early Engagement	Experimental, cautious, uneven, limited, emerging, formative	1, 2, 3, 5, 6, 9, 12, 13, 15, 17, 18, 22, 23, 27, 28, 30	16	51.62%
2.	Transitional engagement	Piloting; Moderate; Task-specific; Expanding; Significant	4, 7, 10, 11, 14, 16, 20, 21, 24, 25	10	32.26%
3.	Advanced engagement	Active; Proactive; Widespread; Strong	8, 19, 26, 29, 31	5	16.12%

Table 4 categorises the extent of librarians' engagement with generative AI tools. Early engagement accounted for over half of the studies (n = 16, 51.62%), showing that most libraries are still at experimental or formative stages of adoption. Transitional engagement was reported in nearly one third of the studies (n = 10, 32.26%), reflecting structured piloting and task-specific use. Advanced engagement was least represented (n = 5, 16.12%), indicating that widespread and proactive integration remains limited. The distribution suggests that generative AI adoption in academic libraries is progressing gradually, with most institutions still in early phases.

Table 5: Challenges associated with librarians' use of generative AI tools in higher education contexts

S/n	Dimensions	Challenges	Article no.	Number of articles	Proportion (%)
1.	Ethnical concerns	Bias	1, 2, 3, 4, 5, 9, 11, 20, 26, 30	10	32.25%
		Ethical issues	1, 4, 8, 9, 12, 13, 15, 19, 22, 23, 26, 28, 30	13	41.93%
		Plagiarism	1, 12	2	6.45%
		Misuse	11, 12	2	6.45%
		Authorship, attribution, and copyright issues	8	1	3.22%
		Data privacy	3, 9, 14, 19, 22, 24, 30	7	22.58%
		Security issues	3, 22	2	6.45%
		Loss of human judgment	19	1	3.22%
		Lack of contextual sensitivity	31	1	3.22%
2.	Financial	Lack of funding or financial resources	3, 9, 15, 18, 24	5	16.12%
3.	Technical	Inaccuracy	2, 3, 7, 10, 11, 21, 23, 27, 29	9	29.03%
		Reliability issues	3, 4, 21, 22, 24	5	16.12%
		Hallucination	6, 7, 17, 31	4	12.90%
		Technical complexity	27	1	3.22%
		Data quality	15	1	3.22%
		Scalability and Interoperability	3	1	3.22%

		Technology dependence	3	1	3.22%
		Misleading information	6	1	3.22%
		Outdated information	20	1	3.22%
		Data training issues	6	1	3.22%
4.	Institutional/Infrastructural	Policy gaps	9, 11, 17, 25	4	12.90%
		Change management	3	1	3.22%
		Lack of technological infrastructure	1, 14, 18, 24, 28, 31	6	19.35%
		Poor internet access	18, 31	2	6.45%
		Unreliable power supply	15, 24	2	6.45%
		Computing power and storage	15	1	3.22%
		Lack of access to subscription-based or proprietary databases	7	1	3.22%
		Training	3, 5, 31	3	9.68%
5.	External Issues	Limitations in cultural alignment	29	1	3.22%
		Language gaps	28	1	3.22%
		Lack of local context	29	1	3.22%
6.	Personal issues	Fear of losing job	3, 6, 13, 24	4	12.90%
		Anxiety	1	1	3.22%
		Low familiarity with technology	16	1	3.22%
		Lack of expertise or skills	15, 18,	2	6.45%
		Digital literacy gaps	17, 31	2	6.45%
		Threat to critical thinking	11, 14,	2	6.45%
		Over-reliance	3, 10, 11, 23	4	12.90%
		Trust issues	5, 6, 21, 25	4	12.90%
		Staff resistance	28	1	3.22%
		Attitude of library staff	24	1	3.22%
		User acceptance	3	1	3.22%

Table 5 outlines the challenges associated with librarians' use of generative AI tools. Ethical issues were the most prominent challenge (n = 13, 41.93%), followed by bias (n = 10, 32.25%) and inaccuracy (n = 9, 29.03%). Data privacy concerns were also notable (n = 7, 22.58%). Infrastructural limitations, particularly lack of technological infrastructure (n = 6, 19.35%), and financial constraints (n = 5, 16.12%) were evident. Reliability issues were equally reported (n = 5, 16.12%). These findings indicate that ethical and technical concerns remain central barriers, reinforced by institutional and resource-related constraints.

Discussion of the Findings

This study reviewed 31 published studies to examine the range of generative AI tools discussed in the literature, the core competencies required of librarians, the extent of engagement with these tools, and the associated challenges within higher education contexts. The discussion that follows is organised according to the four research questions guiding the review.

What is the range of generative AI tools among librarians discussed in the literature?

The findings reveal a strong concentration around large language models, particularly ChatGPT. Across the studies reviewed, ChatGPT emerged as the most consistently examined and applied generative AI tool. The literature positions it as a multifunctional system supporting reference services, instructional design, cataloguing, systematic searching, and scholarly communication (Casidsid & Pama, 2025; Formanek, 2025; Luo, 2025; Oladokun et al., 2025). Its prominence reflects both accessibility and versatility, which have made it the entry point for generative AI experimentation in academic libraries.

Other conversational systems such as Google Bard (Gemini) and Microsoft Copilot appear in comparative and applied discussions, often evaluated alongside ChatGPT for instructional and professional tasks (Torres, 2024; Boyle, 2025; Ammar et al., 2025). Visual generation tools including DALL-E and Midjourney are mentioned primarily in exploratory contexts, suggesting that text-based applications remain central in librarianship. By implication, the findings indicate that the literature is currently shaped by a narrow but intensive engagement with conversational AI systems.

What are the core competencies of generative AI literacy required of librarians in higher education institutions?

The findings show that generative AI literacy is conceptualised as a composite of technical, ethical, evaluative, and strategic competencies. Technical adaptability is consistently presented as essential, reflecting the rapidly evolving nature of AI systems and their continuous updates (Cox, 2024; Hosseini & Holmes, 2023). Librarians are expected to remain flexible and responsive to technological change, integrating new functionalities into existing services.

Digital literacy and prompt engineering are repeatedly emphasised as foundational skills. Effective prompting is portrayed as a decisive factor in determining the relevance and quality of AI outputs (Carroll & Borycz, 2024; Zhang, 2024). The findings suggest that prompting is not merely mechanical but involves critical thinking, contextual awareness, and instructional competence. Librarians are increasingly positioned as mediators who guide users in responsible and productive AI interaction (Ko & Chiu, 2024; Boyle, 2025).

Ethical awareness and responsible AI use form another central component of generative AI literacy. Concerns about bias, misinformation, authorship, and transparency require librarians to exercise sound ethical judgement (Oddone et al., 2024; Fan & Jia, 2024; Bridges et al., 2024). Evaluation literacy and critical thinking are therefore inseparable from AI competence. Librarians must assess accuracy, authority, and reliability before integrating AI outputs into services (Chen et al., 2024; Reza et al., 2025).

To what extent are librarians in higher education engaging with generative AI tools?

The findings indicate that engagement is largely exploratory and developmental. Many studies describe cautious experimentation, pilot initiatives, and task specific applications (Vogus, 2023; Viner, 2023; Zhang, 2024). Librarians are testing generative AI in instructional settings, content creation, searching processes, and workflow optimisation, but widespread institutional integration remains limited.

Some studies document more structured integration, where AI tools are embedded in systematic searching, pedagogical strategies, and social media communication (Chen & Feng, 2025; Wibowo, 2025; Torres, 2024). A smaller body of literature portrays proactive and institution wide engagement, suggesting movement toward strategic adoption in certain contexts (Kim, 2025; Martínez-Camacho et al., 2025). This means that adoption appears to be shaped by institutional readiness, policy clarity, and professional confidence. The implication is that higher education libraries are in a transitional phase, balancing innovation with caution. Sustained institutional support, governance frameworks, and targeted training will likely determine whether engagement evolves into long-term integration.

What challenges are associated with librarians' use of generative AI in higher education contexts?

The findings consistently identify ethical concerns as the most prominent challenge. Issues related to bias, authorship, attribution, and responsible use permeate the literature (Bridges et al., 2024; Fan & Jia, 2024; Vogus, 2023). Librarians express concern about the reliability and integrity of AI generated content, particularly in academic environments where accuracy and credibility are paramount.

Technical limitations such as inaccuracy, hallucination, and reliability problems are also frequently discussed (Chen & Feng, 2025; Reza et al., 2025). These challenges complicate trust formation and necessitate human oversight. Data privacy and security concerns further intensify institutional hesitation, particularly where user data and confidential information are involved (Chen et al., 2024; Gmiterek & Kotuła, 2025).

Institutional barriers including inadequate infrastructure, limited funding, and absence of clear policies constrain effective adoption (Adarkwah et al., 2024; Mwantimwa & Msoffe, 2025). Professional concerns such as fear of job displacement, over reliance, and trust deficits reveal that generative AI adoption intersects with identity and role redefinition (Gupta, 2025; Hosseini & Holmes, 2023). These challenges carry important implications. Ethical governance mechanisms must accompany technological implementation. Clear institutional policies, transparent guidelines, and professional development initiatives are necessary to mitigate risk. Furthermore, librarians must be empowered not as passive adopters but as critical evaluators and strategic leaders in AI integration.

Implications for the Findings

The findings of this study have implications for policy and practice in academic librarianship.

Implications for Policy

The findings of this review indicate the need for comprehensive and proactive policy frameworks to guide the integration of generative AI in academic libraries. The strong concentration of the literature around large language models such as ChatGPT and related systems demonstrates that adoption is occurring rapidly, often ahead of formal institutional regulation. This creates policy vulnerabilities, particularly in areas relating to authorship, attribution, intellectual property, data privacy, and academic integrity. Institutions must therefore develop clearly articulated generative AI policies that define acceptable use, disclosure requirements, verification standards, and accountability mechanisms. Ethical concerns identified in the findings, including bias, misinformation, and reliability limitations, further reinforce the need for governance structures that prioritise transparency and responsible implementation.

The findings also show that generative AI literacy extends beyond technical familiarity to include ethical judgement, evaluative reasoning, and strategic adaptability. This has policy implications for professional standards and competency frameworks in academic librarianship. National and institutional bodies responsible for library standards should

formally integrate AI literacy into professional competency guidelines. Policies should mandate continuous professional development in generative AI, ensuring that librarians are equipped to manage evolving tools effectively. Without structured policy support, AI competence may remain uneven across institutions, thereby widening professional disparities.

Institutional and infrastructural constraints identified in the findings highlight the importance of policy backed investment in digital infrastructure. Reliable internet access, adequate computing capacity, secure data management systems, and sustainable funding models are essential for meaningful AI integration. Policy makers must therefore align AI adoption strategies with broader digital transformation agendas within higher education. Financial planning should account for subscription models, licensing agreements, cybersecurity safeguards, and long-term sustainability considerations. In addition, institutional policies should establish review committees or oversight bodies to monitor AI implementation, evaluate risks, and ensure compliance with ethical and regulatory standards.

The professional concerns identified in the findings, including fear of job displacement and trust deficits, also call for policy interventions that clarify the role of generative AI in academic libraries. Policies should explicitly position AI as a supportive tool that enhances, rather than replaces, professional expertise. Clear communication of institutional intentions and transparent decision-making processes will be critical in fostering confidence and collective ownership of AI initiatives.

Implications for Practice

The findings suggest that generative AI adoption in academic libraries is largely exploratory and transitional. For practice, this indicates the need for deliberate and structured implementation strategies rather than isolated experimentation. Librarians should embed generative AI within clearly defined service areas such as information literacy instruction, research support, cataloguing, and content creation. Pilot projects should be accompanied by systematic evaluation processes that assess accuracy, user satisfaction, efficiency gains, and ethical compliance. This approach will enable libraries to transition from cautious experimentation to evidence-informed integration.

The multidimensional nature of generative AI literacy identified in the findings implies that practice must prioritise continuous capacity development. Training programmes should focus not only on tool operation but also on prompt engineering, critical evaluation of outputs, bias detection, and ethical decision-making. Librarians must develop the ability to verify AI-generated information before dissemination, thereby maintaining professional credibility and safeguarding academic standards. Embedding AI literacy within user education programmes will further strengthen the instructional role of librarians as mediators of responsible AI use.

Ethical and technical challenges documented in the findings require practical safeguards within daily operations. Librarians should establish internal review protocols for AI-assisted outputs, particularly in research consultations and instructional materials. Clear documentation of AI assisted processes can enhance transparency and accountability. Practices that encourage human oversight will mitigate risks associated with hallucination, misinformation, and contextual inaccuracies.

Infrastructural limitations identified in the findings also shape practical considerations. Libraries operating in resource-constrained environments may need to adopt phased implementation strategies, prioritising high-impact use cases while advocating for improved technological support. Collaborative partnerships within and across institutions can facilitate shared learning and resource optimisation. Finally, the evolving engagement with generative AI suggests a shift in professional roles toward strategic coordination, evaluative oversight, and ethical stewardship. Librarians in practice must embrace adaptive mindsets and cultivate innovative approaches to service delivery. By integrating generative AI thoughtfully and responsibly, academic libraries can enhance efficiency and user support while preserving the core professional values of accuracy, integrity, and critical engagement.

Conclusion

This study examined generative AI literacy among librarians in higher education institutions through a systematic review of 31 studies. The findings demonstrate that generative AI has rapidly entered academic library discourse and practice, with large language models, particularly ChatGPT and related systems, dominating current applications. The review reveals that librarians are increasingly aware of the potential of generative AI to support reference services, research assistance, instructional delivery, content development, and administrative efficiency. However, adoption remains largely exploratory and transitional, indicating that while interest and experimentation are widespread, comprehensive institutional integration is still developing.

The study further establishes that generative AI literacy is a multidimensional construct. Effective engagement requires not only technical familiarity but also competencies in prompt engineering, digital literacy, critical evaluation, ethical reasoning, adaptability, and innovation. Librarians are expected to verify AI generated outputs, detect bias and misinformation, and guide users in responsible application. These competencies position librarians not merely as users of AI tools but as mediators, educators, and evaluators within evolving digital information ecosystems.

Despite the opportunities presented by generative AI, the review identifies persistent challenges that shape its integration in higher education contexts. Ethical concerns, including bias, inaccuracy, authorship ambiguity, and academic integrity risks, remain central. Data privacy and reliability issues further complicate implementation. Institutional constraints

such as inadequate infrastructure, limited funding, and uneven professional training also affect the pace and depth of adoption. These challenges indicate that generative AI integration requires deliberate governance, structured professional development, and sustained institutional support.

Finally, the study concludes that generative AI literacy is becoming an essential competency in academic librarianship. While the technology presents transformative possibilities for service delivery and scholarly support, its responsible and effective integration depends on balanced policy development, ethical oversight, infrastructural readiness, and continuous capacity building. Academic libraries that proactively cultivate structured AI literacy frameworks will be better positioned to harness innovation while preserving professional standards, intellectual integrity, and user trust.

Limitations and Future Research

This study has some limitations. First, it relied exclusively on English-language, peer-reviewed publications, which may have excluded valuable information from non-English, book chapter, and grey literature sources. Second, the focus on selected databases such as Scopus, LISA, and Web of Science, though justified for quality assurance, might have omitted relevant studies indexed elsewhere. Third, the review was limited to publications between 2020 and 2025, potentially excluding earlier foundational works that could have provided a broader historical perspective. Additionally, while PRISMA guidelines ensured rigor in the review process, the final synthesis still depended on the subjective judgment of the researchers during screening and quality appraisal, which may have introduced bias.

Future studies should therefore expand the scope by including non-English publications, grey literature, book chapters, and additional databases. In addition, longitudinal studies and empirical investigations across diverse regions would also provide a deeper understanding of how generative AI literacy is developing among librarians in higher education institutions worldwide.

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S/n	Year	Authors	Title	Type of publication	Method
1.	2025	Casidsid, L. I., & Pama, P. J. A.	Librarians' Acceptance of ChatGPT Generative AI: A Systematic Literature Review	Journal article	Review
2.	2025	Formanek, M.	Exploring the potential of large language models and generative artificial intelligence (GPT): Applications in Library and Information Science	Journal article	Conceptual
3.	2025	Boateng, F.	The transformative potential of Generative AI in academic library access services: Opportunities and challenges	Journal article	Conceptual/
4.	2024	Carroll, A. J., & Borycz, J.	Integrating large language models and generative artificial intelligence tools into information literacy instruction	Journal article	Case Study / Pedagogical Application
5.	2023	Viner, J.	Enhancing educational Experiences: How Can Generative AI Tools Support School Librarians?	Journal article	Conceptual
6.	2023	Hosseini, M., & Holmes, K.	The evolution of library workplaces and workflows via generative AI	Journal article	Conceptual/Discussion
7.	2025	Chen, X. S., & Feng, Y.	Exploring the use of generative artificial intelligence in systematic searching: A comparative case study of a human librarian, ChatGPT-4 and ChatGPT-4 Turbo	Journal article	Comparative Case Study
8.	2025	Wibowo, M. P.	Generative AI for library social media content creation and communication	Journal article	Conceptual
9.	2025	Michalak, R., Tzoc, E., & Lewis, J. D.	Practical Considerations for Adopting Generative AI Tools in Academic Libraries	Journal article	Conceptual
10.	2025	Luo, L.	Use of Generative AI in Aiding Daily Professional Tasks: A Survey of Librarians' Experiences	Journal article	Survey

11.	2024	Fan, Y. U. A. N., & Jia, L. I.	Opportunities, Challenges, and Future Directions for Generative Artificial Intelligence in Library Information Literacy Education: A Scoping Review	Journal article	Scoping Review
12.	2024	Oddone, K., Garrison, K., & Gagen-Spriggs, K.	Navigating generative AI: The teacher librarian's role in cultivating ethical and critical practices	Journal article	Conceptual
13.	2023	Vogus, B.	Generative AI and ChatGPT: Friend or foe for academic libraries?	Journal article	Conceptual Commentary
14.	2025	Gmiterek, G., & Kotuła, S. D.	Generative artificial intelligence in the activities of academic libraries of public universities in Poland	Journal article	Survey
15.	2024	Cox, A.	Academic librarian competencies and artificial intelligence	Journal article	Conceptual Analysis
16.	2025	Gupta, V.	Factors influencing librarian adoptions of ChatGPT technology for entrepreneurial support	Journal article	Survey
17.	2024	Ko, C. R., & Chiu, M. H.	How Can Academic Librarians Support Generative AI Literacy: An Analysis of Library Guides Using the ACRL Information Literacy Framework	Conference Proceeding	Content Analysis
18.	2024	Adarkwah, M. A., et al.	Exploring the Transformative Journey of Academic Libraries in Africa before and after COVID-19 and in the Generative AI Era	Journal article	Conceptual/Exploratory
19.	2025	Kim, J.	Academic Library with Generative AI: From Passive Information Providers to Proactive Knowledge Facilitators	Journal article	Conceptual/Discussion
20.	2024	Torres, J. M.	Leveraging ChatGPT and Bard for academic librarians and information professionals: a case study of developing pedagogical strategies using generative AI models	Journal article	Case Study
21.	2024	Wheatley, A., & Hervieux, S.	Comparing generative artificial intelligence tools to voice assistants using reference interactions	Journal article	Comparative Study
22.	2024	Chen, Y., et al.	The Impact of Generative Artificial Intelligence Technologies on Chinese Librarians' Information Behavior and Ethical Discussion: An Empirical Study Based on a Small Sample	Conference Proceeding	Empirical
23.	2024	Zhang, L.	Exploring generative AI with ChatGPT for possible applications in information literacy instruction	Journal article	Conceptual
24.	2025	Mwantimwa, K., & Msoffe, G.	Application of generative artificial intelligence in library operations and service delivery: A scoping review	Journal article	Scoping Review
25.	2024	Kesselman, M. A., & Esquivel, W.	Generative AI and generative libraries and beyond – conference report on IFLA and IFA	Journal article	Conference Report
26.	2025	Boyle, C.	ChatGPT, Gemini, & Copilot: Using generative AI as a tool for information literacy instruction	Journal article	Conceptual/Applied
27.	2025	Reza, R. B., Mahmud, M. R., & Ahmed, S. Z.	Evaluating AI Excellence: A Comparative Analysis of Generative Models in Library and Information Science	Journal article	Comparative Analysis

28.	2025	Martínez-Camacho, H., et al.	Generative artificial intelligence and university libraries in Latin America	Journal article	Literature Review/Interview
29.	2025	Ammar, A. S. A., Shehata, A., & Eldakar, M.	Evaluating generative AI tools in Arabic academic libraries: a comparative analysis of ChatGPT-4o and Gemini's performance and practical queries	Journal article	Comparative Analysis
30.	2024	Bridges, L. M., McElroy, K., & Welhouse, Z.	Generative artificial intelligence: 8 critical questions for libraries	Journal article	Conceptual
31.	2025	Oladokun, B. D., Irivike, F. E., Enakrire, R. T., & Ajani, Y. A.	Use and Application of ChatGPT-4o by Cataloguers and Bibliographers from Botswana, Nigeria, and South Africa	Journal article	Empirical Survey

Appendix A

Details of selected publications included in the study

HARNESSING ARTIFICIAL INTELLIGENCE TOOLS FOR ROUTINE LIBRARY SERVICES: A CASE STUDY OF SELECTED ACADEMIC LIBRARIES IN KADUNA STATE

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Abstract

This study investigates the integration and utilization of Artificial Intelligence (AI) tools in the routine operations of academic libraries within Kaduna State, Nigeria. Four (4) research questions were raised for the purpose of this study. Quantitative research methodology was used to conduct the study using a descriptive survey research design, targeting professional librarians and library staff across selected tertiary institutions. The population comprised professional and para-professional library staff across some selected tertiary institutions, including Ahmadu Bello University (ABU) Zaria, Kaduna State University (KASU), and the Nigerian Defence Academy (NDA). A structured questionnaire was administered to a sample of 218 respondents using a total enumeration technique for librarians and purposive sampling for support staff. Data were analyzed using frequencies, percentages, and mean scores. The findings revealed that while awareness of AI is high (mean = 3.42), actual harnessing of AI for routine services is limited to specific areas. The most widely used tools include AI-based plagiarism checkers (Turnitin), writing assistants (Grammarly), and basic WhatsApp-integrated chatbots for reference queries. Respondents noted that these tools improved speed and accuracy in metadata management; however, advanced AI applications like robotic process automation (RPA) and AI-driven predictive analytics remain largely untapped. The primary barriers identified were erratic power supply, limited internet bandwidth, and a significant deficit in technical AI competencies among 64.2% of the respondents. The study concludes that AI adoption in Kaduna State academic libraries is currently in a nascent "tool-centric" phase rather than a systematic integration. It recommends that institutional managements prioritize sustainable digital infrastructure and intensive AI-literacy training to transition toward smart library ecosystems.

Keywords: Artificial Intelligence, Academic Libraries, Routine Services, Kaduna State, Smart Libraries, Digital Infrastructure

Introduction

Academic libraries have historically served as the nerve centers of higher education institutions, anchoring research, teaching, and learning activities. The primary mandate of these libraries is to acquire, process, preserve, and disseminate information resources that align with the curriculum and research directions of their parent institutions. For decades, this mandate was executed through traditional, manual systems. The late 20th century, however, ushered in the Integrated Library System (ILS), which automated foundational cataloging, circulation, and acquisition functions (Borgman, 2019). Today, the global information landscape is undergoing an even more disruptive transformation driven by Artificial Intelligence (AI).

Artificial Intelligence broadly defined as the simulation of human intelligence processes by machines, particularly computer systems encompass machine learning, natural language processing (NLP), computer vision, and robotics (Russell & Norvig, 2020). In the context of Library and Information Science (LIS), AI represents a paradigm shift from static digital repositories to dynamic, predictive, and user-centric "smart libraries" (Cox et al., 2019). Routine library services, which include descriptive cataloging, classification, circulation tracking, serials control, and basic reference queries, are highly structured and repetitive. Consequently, they are prime candidates for AI-driven automation.

Globally, advanced academic libraries are leveraging AI to revolutionize their workflows. For instance, NLP-driven chatbots provide 24/7 reference assistance, machine learning algorithms optimize collection development by predicting future book usage, and computer vision automates the shelf-reading process to locate misplaced volumes (Wheatley & Hervieux, 2019).

In developing nations like Nigeria, the narrative is evolving within a unique socio-economic framework. Academic libraries in Nigeria, particularly within Kaduna State a major educational hub in northern Nigeria hosting institutions like Ahmadu Bello University (ABU) Zaria, Kaduna State University (KASU), and the Nigerian Defence Academy (NDA) face a dual pressure. They must cater to an increasingly tech-savvy generation of students and researchers while navigating foundational challenges related to infrastructure, funding, and technical skill gaps (Okafor, 2021). While the

theoretical benefits of AI in Nigerian libraries are widely discussed in literature, empirical data regarding its practical implementation in routine operations remains sparse.

Statement of the Problem

The rapid expansion of student enrollment in Kaduna State tertiary institutions has placed an unprecedented administrative burden on academic library workflows. Routine operations such as cataloging newly acquired resources, manual shelf-rectification, tracking serial publications, and answering repetitive directional or reference queries consume a disproportionate amount of librarians' operational hours. This manual intensity reduces the time available for higher-value professional tasks, such as deep research consultation, information literacy instruction, and institutional repository curation.

Artificial Intelligence offers a viable mechanism to mitigate these operational bottlenecks. However, preliminary observations indicate that despite the global proliferation of accessible AI tools, academic libraries in Kaduna State appear hesitant or selective in their adoption. There is a palpable disconnect between the theoretical awareness of AI capabilities and its systematic application in daily library routines.

Furthermore, existing local studies often generalize AI's impact across all sectors or focus exclusively on southwestern Nigerian libraries, leaving a contextual gap regarding the specific realities, capabilities, and structural impediments faced by institutions in Kaduna State. Without empirical verification of how these libraries utilize AI, the specific tools they deploy, and the unique structural bottlenecks they encounter, it remains difficult to design actionable intervention strategies. This study directly addresses this gap.

Research Questions

The following Research Questions were raised for this study

1. What is the level of awareness of AI tools among library staff in academic libraries in Kaduna State?
2. What specific AI tools are currently deployed for routine library services in the selected institutions?
3. What is the perceived impact of AI deployment on the operational efficiency of routine library workflows?
4. What are the challenges hindering the comprehensive adoption and integration of AI tools in these libraries?

Literature Review

Concept of Artificial Intelligence in Academic Libraries

The concept of Artificial Intelligence within library environments has transitioned from science fiction into an operational imperative. According to Kaplan and Haenlein (2019), AI refers to a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.

In the academic library paradigm, this is operationalized through the concept of the "Smart Library". A smart library represents an intersection of smart physical spaces, smart data management, and smart user interfaces, heavily underpinned by AI, the Internet of Things (IoT), and big data analytics (Schöpfel, 2018). Routine library services refer to those foundational, recurring tasks required to maintain the daily functionality of the library. Historically, these are categorized into technical services (acquisition, cataloging, classification, and serials processing) and public services (circulation, reference queries, inter-library loans, and user education). As automated library systems evolve, AI tools function as advanced cognitive layer extensions on top of existing Integrated Library Systems (ILS), shifting the human librarian's role from data entry to algorithmic verification and high-level knowledge curation.

Awareness and Perceptions of AI among Librarians

The literature regarding the level of AI awareness among librarians globally reveals a spectrum ranging from cautious optimism to existential anxiety. In a comprehensive study conducted by Cox et al. (2019) across international academic libraries, it was discovered that while a vast majority of librarians possessed a high conceptual awareness of AI, very few felt equipped to manage or implement AI projects. Within the African continent, studies by Asuquo and Aquaowo (2022) indicate that AI awareness is largely theoretical and heavily tied to consumer-grade AI tools (such as search engines or generative AI text editors) rather than domain-specific library AI tools.

Perceptions are similarly split. On one hand, librarians view AI as an empowering ally capable of liberating them from mundane tasks, thereby increasing job satisfaction. On the other hand, there remains an undercurrent of technophobia rooted in the fear of professional obsolescence and job displacement a phenomenon coined as "algorithmic anxiety" (Tella et al., 2022).

Deployment of AI Tools in Routine Library Workflows

Empirical studies demonstrate that AI tools have successfully penetrated several key areas of routine library services, though implementation remains highly uneven across geographical regions.

- **Technical Services (Cataloging, Classification, and Metadata Management)**
  Cataloging and classification are highly rules-based activities governed by standardized frameworks such as Resource Description and Access (RDA) and the Library of Congress Classification (LCC) systems. This structural rigidity makes them ideal for Machine Learning (ML) intervention. Advanced AI tools can

automatically scan electronic text, extract core metadata (author, title, publisher, publication date), and map these fields into MARC21 or BIBFRAME formats with high accuracy (Omame & Alex-Nmecha, 2021).
Furthermore, auto-classification tools use Natural Language Processing to analyze the full text or abstracts of digital theses and dissertations, automatically assigning relevant subject headings.

- **Public Services (Reference Services and User Interaction)**
  Reference services have experienced the most visible AI integration via Conversational AI and chatbots. Libraries globally utilize AI chatbots to manage first-tier reference inquiries handling routine questions regarding opening hours, library policies, WIFI access procedures, and navigating physical shelf locations (Wheatley & Hervieux, 2019).
  By resolving these high-volume, repetitive inquiries automatically, chatbots ensure that professional reference librarians can dedicate uninterrupted blocks of time to complex bibliometric queries and systematic literature reviews.
- **Collection Management and Plagiarism/Integrity Verification**
  AI algorithms are increasingly used to drive predictive analytics in collection development. By tracking long-term circulation history, institutional demographics, faculty research trends, and cross-institutional usage patterns, machine learning models can predict which upcoming monographs or journal subscriptions will experience high demand, optimizing acquisition expenditures (Fernandez, 2020).
  Simultaneously, routine user services now incorporate AI-driven academic integrity tools. Plagiarism detection platforms such as Turnitin utilize sophisticated semantic matching algorithms to identify non-original text patterns, paraphrasing anomalies, and potentially AI-generated text, a service managed routinely by academic librarians for postgraduate workflows (Oseghale & Gani, 2023).
- **Impact of AI Adoption on Operational Efficiency**
  The primary metric used to justify AI deployment in corporate and academic sectors alike is operational efficiency. Efficiency gains materialize primarily through the optimization of speed and accuracy.
  In a study evaluating the automation of metadata creation, Smith (2021) demonstrated that AI systems could catalog digital documents at a rate thousands of times faster than human catalogers, while maintaining a comparable error rate that decreases progressively over time as the underlying machine learning model is exposed to more training data.
  Furthermore, AI-driven automation minimizes human fatigue errors. Human catalogers or indexers working long hours are prone to inconsistencies in subject heading assignments due to cognitive exhaustion; algorithmic indexers apply rules with absolute consistency. This continuous operational capability transforms the library into an institution that processes data 24 hours a day, 7 days a week, fundamentally changing the throughput capacity of technical service departments.

Challenges to AI Adoption in Developing Country Libraries

Despite the well-documented advantages, the systematic adoption of AI tools in academic libraries within developing countries, particularly Sub-Saharan Africa, is constrained by a matrix of systemic challenges.

- **Infrastructure Deficits**
  The foundational layer of any AI ecosystem is robust infrastructure. AI computations, particularly those involving cloud-based neural networks and real-time natural language processing, require stable, high-bandwidth internet connectivity and uninterrupted electrical power supplies.
  In Nigeria, the persistent challenges of grid instability and the prohibitive cost of dedicated internet bandwidth serve as a severe bottleneck (Gbaje & Okojie, 2020). When fundamental IT infrastructure is unreliable, libraries cannot confidently rely on cloud-hosted AI applications for core daily services.
- **Technical Skills and Competency Gaps**
  The shift toward AI-enabled libraries requires a corresponding evolution in professional competencies. Librarians no longer simply need to know how to navigate a database or apply cataloging rules; they increasingly require data literacy, an understanding of algorithmic bias, basic prompt engineering skills, and the capacity to manage AI vendor contracts (Cordell, 2020).
  Laniyan (2023) notes that library science curricula in Nigerian tertiary institutions remain largely anchored in traditional methodologies, producing graduates who possess significant technical AI competency deficits. This lack of internal expertise creates a strong dependency on external IT departments, slowing down troubleshooting and innovation.
- **Financial and Institutional Constraints**
  AI tools, particularly institutional subscriptions to enterprise software, predictive analytics engines, and advanced proprietary chatbots, require substantial initial capital investment and ongoing maintenance funding.
  Faced with declining budgetary allocations from parent institutions, many Nigerian academic libraries find themselves forced to prioritize basic physical infrastructure upkeep and core print/electronic acquisitions over speculative, high-cost AI projects (Okafor, 2021).

Theoretical Framework

This study is theoretically framed within the Technology Acceptance Model (TAM), originally propounded by Fred Davis in 1989, and subsequently expanded into the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003). TAM posits that an individual's behavioral intention to adopt a new technology is principally determined by two cognitive factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In the context of this study, Perceived Usefulness refers to the degree to which library staff believe that utilizing AI tools will enhance their job performance and operational efficiency. Perceived Ease of Use relates to how user-friendly, accessible, and intuitive they perceive these AI tools to be.

UTAUT expands this model by introducing critical moderating variables: performance expectancy, effort expectancy, social influence, and facilitating conditions. Facilitating conditions defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system is highly relevant to this study. It allows for the structural incorporation of infrastructural realities (power, internet, training) as vital explanatory components for the actual adoption levels observed in Kaduna State academic libraries.

Research Methodology

This study adopted a quantitative research methodology utilizing a descriptive survey research design. A descriptive survey design is highly appropriate for this investigation as it enables the systematic collection of quantifiable data from a relatively large population to describe patterns, trends, opinions, and current states of affairs without manipulation of variables (Creswell & Creswell, 2018). The sample size for the study comprised 218 professional and paraprofessional staff in the three selected academic libraries in Kaduna State as seen in table 3.1

A total enumeration technique was applied to all professional librarians across the three institutions, given their direct oversight roles in routine service design and technological procurement. For para-professional and support staff, purposive sampling was utilized to select individuals who directly interface with the daily operational workflows of the technical and public service departments. The questionnaire was used as instrument for data collection for this study. Mean of 2.5 served as the benchmark for analyzing the data obtained for this study.

Table 3.1 Distribution of Population and Sample across Institutions

	Professional Staff	Support/Para-professional Staff	Total Targeted
Ahmadu Bello University (ABU), Zaria	52	74	126
Kaduna State University (KASU), Kaduna	18	32	50
Nigerian Defence Academy (NDA), Kaduna	14	28	42
Total	84	134	218

Source: Admin offices of the Libraries (2026)

Data Analysis, Results and Discussion

Response Rate

Out of the 218 questionnaires distributed across the three institutions, 201 questionnaires were retrieved fully completed and found valid for analysis, representing a highly successful response rate of 92.2%. This high response rate is attributed to the aggressive follow-up protocol implemented by the research assistants.

Demographic Profile of Respondents

The demographic analysis indicated a well-distributed representation of respondents. Of the 201 participants, 108 (53.7%) were males, while 93(46.3%) were females. In terms of institutional distribution, 117(58.2%) were from ABU Zaria, 45(22.4%) from KASU while 39(19.4%) were from NDA. Professionally, 78(38.8%) were certified professional librarians, while 123(61.2%) comprised para-professional library officers and administrative/technical support staff.

Analysis of Research Questions

Research Question 1: Level of Awareness of AI Tools

To establish the level of awareness of AI tools among library staff, respondents rated their familiarity with various conceptual facets and application forms of AI. The compiled mean scores are presented in Table 1

Table 1: Staff Level of Awareness of Artificial Intelligence Tools

	Statement of Awareness	Mean ($\bar{X}$)	SD	Remark
1	I am aware of generative AI tools for writing assistance (e.g., Grammarly, ChatGPT).	3.68	0.47	Very High
2	I am aware of AI-based tools for academic integrity and plagiarism checking (e.g., Turnitin).	3.61	0.51	Very High
3	I am aware of natural language processing chatbots used for responding to user queries.	3.34	0.62	High
4	I am aware of machine learning applications for automated cataloging and classification.	2.85	0.78	High
5	I am aware of advanced AI tools like Robotic Process Automation (RPA) for shelf management.	1.82	0.89	Low
	Cluster Aggregate Mean	**3.42**	**0.65**	**High Awareness**

Source: Researchers' Computation (2026)

The data in Table 1 clearly shows that the overall awareness of AI among library staff across Kaduna State academic libraries is high, with an aggregate cluster mean of 3.42. The highest level of awareness concentrated around generic writing assistants $\bar{X} = 3.68$ and plagiarism checkers $\bar{X} = 3.6$.

Conversely, awareness plummeted significantly when transitioning to highly domain-specific and advanced applications like Robotic Process Automation $\bar{X} = 1.82$. This implies that while staff regularly interact with ubiquitous consumer-grade AI, their exposure to specialized library robotics is heavily constrained.

Research Question 2: Specific AI Tools Deployed for Routine Services

Respondents were presented with a checklist of AI applications to select which tools are systematically deployed and utilized in their library's daily routines.

Table 2: Deployment and utilization rates of AI tools across routine services

	Specific AI Tools Deployed for Routine Services	Frequency	Percentage(%)
1	Turnitin Plagiarism Check	67	33.4
2	Grammarly Writing Assistant	57	28.3
3	WhatsApp / Basic Chatbots	50	24.9
4	AI Cataloging Modules	21	10.4
5	Robotic Automation / RPA	6	3.0
	Total	**201**	**100%**

Source: Researchers' Computation (2026)

The deployment matrix clearly illustrates that AI integration is currently compartmentalized. The most heavily deployed tools are Turnitin 67(33.4%) which is integrated into postgraduate and faculty research evaluation workflows and Grammarly 57(28.36%), utilized by technical staff for processing repository abstracts.

Basic WhatsApp-integrated chatbots or pre-programmed automated response scripts are deployed by 50(24.9%) of respondents to handle basic digital reference desk operations. However, actual AI-integrated modules within their Integrated Library Systems for automated metadata generation stand at a low 21(10.48%), and advanced physical robotics or automated storage and retrieval systems (ASRS) are virtually non-existent 6(3.0%).

Research Question 3: Perceived Impact of AI on Operational Efficiency

This question sought to understand how the selective deployment of these tools has altered the efficiency of routine workflows. The responses are captured in Table 3.

Table 3: Perceived Impact of AI Tools on Routine Operational Efficiency

	Perceived Impact Indicators	Mean ($\bar{X}$)	SD	Remark
1	AI tools significantly reduce the time spent processing and verifying academic manuscripts.	3.54	0.52	Strongly Agree
2	Use of AI language tools improves the linguistic accuracy of catalog records and metadata entries.	3.21	0.64	Agree
3	Automated reference tools (chatbots) improve response times to student informational queries.	3.12	0.71	Agree
4	Deployed AI tools free up professional librarians from repetitive, routine administrative tasks.	2.89	0.83	Agree
5	Deployed AI tools have minimized human data entry errors in circulation and catalog logs.	2.74	0.79	Agree
	Cluster Aggregate Mean	3.10	0.70	Significant Positive Impact

Source: Researchers' Computation (2026)

The assessment of operational impact yielded an aggregate mean of $\bar{X} = 3.10$, indicating that library staff strongly perceive AI as a force multiplier for efficiency. The most pronounced impact is observed in manuscript verification and plagiarism processing $\bar{X} = 3.54$, where tasks that manually took days are resolved in minutes. Staff also recognized that even basic text assistants and reference automation appreciably enhanced the professional image of the library by improving accuracy $\bar{X} = 3.21$ and turnaround speed $\bar{X} = 3.1$.

4.3.4 Research Question 4: Challenges Hindering Comprehensive AI Integration

To discover the key bottlenecks preventing a holistic transition from a tool-centric phase to a smart ecosystem, respondents evaluated a list of structural challenges. The findings are documented in Table 4.

Table 4: Challenges Hindering Comprehensive Adoption of AI Tools

	Challenges Hindering Comprehensive Adoption of AI Tools	Mean ($\bar{X}$)	SD	Remark
1	Erratic electrical power supply disrupts continuous server and cloud-AI tool operations.	3.76	0.43	Critical Barrier
2	Insufficient Internet bandwidth slows down cloud-based AI system queries and responses.	3.64	0.49	Critical Barrier
3	Deficit in technical AI competencies and data literacy among existing library personnel.	3.48	0.55	Critical Barrier
4	Lack of targeted financial allocation and high licensing costs for enterprise AI software.	3.32	0.61	Critical Barrier
5	Insufficient institutional policy frameworks or strategic roadmaps driving AI adoption.	3.11	0.72	Critical Barrier
	Cluster Aggregate Mean	**3.46**	**0.56**	**Highly Significant Barriers**

Source: Researchers' Computation (2026)

The data in Table 4 reveals that infrastructural constraints represent the most formidable barrier to contemporary library modernization in Kaduna State. Erratic power supply topped the list $\bar{X} = 3.76$, closely followed by inadequate Internet bandwidth $\bar{X} = 3.64$.

Crucially, 64.2% of total respondents specifically indicated a severe personal and institutional deficit in advanced technical AI competencies $\bar{X} = 3.48$, noting that while they can use basic consumer interfaces, they lack the data engineering skills required to train or systematically integrate machine learning APIs into their native library catalogs.

Discussion of Findings

The empirical results of this study paint a clear picture of the current technological status of academic libraries in Kaduna State: they are firmly anchored in a nascent, "tool-centric" phase of AI utilization rather than a holistic, smart ecosystem integration.

The finding that awareness is universally high $\bar{X} = 3.42$ but restricted primarily to consumer writing tools and plagiarism checkers aligns with the conclusions of Asuquo and Aquaowo (2022), who observed that African librarians are highly conversant with mainstream technology trends but face a structural disconnect when attempting to implement enterprise-level library software.

The concentration of active deployment around Turnitin and Grammarly reflects an institutional pressure to manage research integrity rather than an internal, proactive strategy to optimize core library operations. While it is highly positive that these tools have demonstrably elevated processing speed and metadata accuracy $\bar{X} = 3.10$, leaving the core cataloging, classification, and shelf-reading processes completely unautomated means that the primary administrative bottlenecks remain unresolved. This dynamic supports the Technology Acceptance Model (TAM) framework; librarians clearly perceive the *usefulness* (PU) of AI, but their *perceived ease of use* (PEOU) is severely throttled by the environmental and structural constraints under which they operate.

The identified challenges specifically power, bandwidth, and the competency deficit reported by 64.2% of respondents resonate strongly with the broader African LIS literature. Gbaje and Okojie (2020) have repeatedly emphasized that no sustainable digital transformation can occur in an environment plagued by power instability.

Furthermore, the competency gap highlights a critical systemic flaw: you cannot build smart libraries without smart librarians. If professional training programmes exclude hands-on computational data management, AI adoption will remain limited to basic web-based tools.

However, systemic progress toward a comprehensive smart library ecosystem is heavily restricted by persistent power failures, poor bandwidth, lack of direct funding, and a critical deficit in technical AI and data competencies among nearly two-thirds of the library workforce.

Conclusion

Based on empirical findings, this study concludes that academic libraries in Kaduna State are willing but structurally constrained participants in the global artificial intelligence revolution. They have successfully harnessed foundational, client-facing AI applications to improve the efficiency of manuscript checking and basic digital user interactions.

However, the transition into systematic, automated technical services (such as auto-classification and predictive collection management) has not yet occurred. The current pattern of adoption is reactive and fragmented, rather than proactive and systematic. Until the foundational deficits in electrical infrastructure, campus internet networks, and professional computational competencies are addressed, these libraries will remain in a superficial tool-centric phase, unable to realize the full benefits of a smart library ecosystem.

Recommendations

The following recommendations were brought forward

1. **Prioritize Sustainable Digital Infrastructure:** Institutional managements (University Senates, Governing Councils, and Library Boards) must urgently decouple library server systems from the unstable general electrical grid by investing heavily in dedicated, high-capacity solar energy configurations and securing high-speed, institutional-grade fiber-optic bandwidth subscriptions.
2. **Implement Intensive AI-Literacy and Competency Training:** Library administrations must move beyond basic ICT training and organize targeted, continuous professional development workshops focused on data literacy, machine learning API configuration, prompt engineering, and algorithmic data management for existing staff.
3. **Establish Strategic AI Policy Frameworks:** The Nigerian Library Association (NLA) in conjunction with local library directors should formulate actionable national and institutional AI integration roadmaps that provide standardized guidelines for ethical AI use, data privacy management, and procurement of library-specific cognitive tools.
4. **Form Cross-Institutional Consortia for AI Licensing:** To mitigate high software procurement costs, academic libraries in Kaduna State should form collaborative consortia to collectively negotiate affordable, enterprise-level regional licensing agreements for advanced AI software and predictive analytics engines.

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Impact of Creative Library Programs on Community Participation: An Empirical Study of Public Libraries in Katsina State

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Abstract

This study examined the impact of creative library programs on community participation in public libraries in Katsina State, Nigeria, with particular focus on Katsina Metropolis, Funtua, and Daura. The study was guided by four research questions which focused on the types of creative library programs available, the extent of community participation, the impact of creative programs on participation, and the challenges affecting their implementation. A descriptive survey research design was adopted, and data were collected using a structured questionnaire administered to library staff and users. A total of 177 questionnaires were distributed, out of which 172 were returned and found usable, representing a high response rate. Findings revealed that public libraries in Katsina State offer several creative programs such as reading clubs, storytelling sessions, and digital literacy workshops, although innovative services such as makerspaces are still limited. The study also found that community participation is moderate, with higher involvement in attendance-based activities than in active engagement such as volunteering and program planning. Furthermore, creative library programs were found to positively influence community participation by increasing patronage, improving social interaction, and strengthening the relevance of public libraries as community hubs. However, the study identified key challenges including inadequate funding, poor ICT infrastructure, lack of trained personnel, and low community awareness. The study concluded that while creative library programs enhance community participation, their effectiveness is constrained by structural and institutional challenges. It was recommended that government and library stakeholders increase funding, improve ICT infrastructure, and strengthen staff capacity and community engagement strategies to enhance the effectiveness of public libraries in Katsina State.

Keywords: *Creative library programs, community participation, public libraries, Katsina State, makerspaces, library services.*

Introduction

Public libraries have traditionally been recognized as institutions established for information provision, literacy promotion, and lifelong learning (International Federation of Library Associations and Institutions [IFLA], 2022). However, the contemporary public library has evolved beyond its conventional role as a repository of books to become an active community hub that promotes social interaction, innovation, creativity, and civic engagement (Aabø & Audunson, 2021; IFLA, 2022). In many societies, public libraries now organize creative programs such as reading clubs, makerspaces, storytelling sessions, cultural exhibitions, digital literacy workshops, art competitions, entrepreneurship training, innovation labs, and recreational activities aimed at increasing community involvement and strengthening social cohesion (Williment & Jones-Grant, 2020; Lankes, 2021). These creative library programs have increasingly become strategic tools for attracting diverse community members and enhancing participation in library activities (Klinenberg, 2018; Aabø & Audunson, 2021).

Community participation refers to the active involvement of individuals and groups in planning, implementing, and benefiting from developmental activities within their communities (United Nations, 2021). In the library context, community participation manifests through attendance at library events, collaboration in program design, volunteerism, use of library services, partnerships with local organizations, and engagement in knowledge-sharing activities (Williment & Jones-Grant, 2020). Public libraries that successfully integrate creative programs often experience increased patronage, stronger relationships with users, and improved public perception of library relevance within society (Lankes, 2021). Recent studies have shown that innovative and participatory programs in libraries contribute significantly to community connectedness, inclusion, and social development (Aabø & Audunson, 2021; Klinenberg, 2018).

Globally, public libraries have embraced creativity-driven initiatives to remain relevant in the digital era. Internationally, family-making programs, makerspaces, and club-based activities have been adopted in several public libraries to stimulate collaborative learning and strengthen social interaction among participants (Slatter & Howard, 2022; Moorefield-Lang, 2021). Studies indicate that such programs encourage collective creativity, shared learning experiences, and active participation of community members in library activities (Moorefield-Lang, 2021). Similarly, library clubs and social programs have positively influenced users' perceptions of libraries, transforming them into vibrant community spaces rather than passive information centres (Aabø & Audunson, 2021).

In developed countries, public libraries increasingly function as community development centres where creative engagement activities support lifelong learning and local problem-solving (Klinenberg, 2018). Programs such as

technology training, arts and crafts workshops, cultural events, and innovation hubs have been introduced to bridge social divides and encourage citizen participation (Lankes, 2021). Evidence suggests that these initiatives strengthen community resilience, promote inclusivity, and increase the frequency of library usage (IFLA, 2022; Slatter & Howard, 2022). Public libraries have therefore become vital instruments for social innovation and community empowerment (Aabø & Audunson, 2021).

In Nigeria, public libraries continue to face challenges such as inadequate funding, poor infrastructure, limited technological facilities, and declining patronage (Nigerian Library Association [NLA], 2022; Nwokocha & Okeke, 2021). Despite these constraints, some libraries have adopted innovative and creative programs to enhance community engagement. For instance, community-oriented initiatives including job search corners, idea exchange platforms, and use of library spaces for social development activities have reportedly improved public perception and increased library patronage in some Nigerian public libraries (Aina & Ojo, 2022). Furthermore, social innovation practices are increasingly being advocated within Nigerian public libraries to improve inclusivity, community responsiveness, and relevance in the era of rapid technological transformation (Igbinovia & Popoola, 2023).

The introduction of creative programs in Nigerian public libraries also aligns with emerging trends emphasizing makerspaces and innovation-driven services (Igbinovia & Popoola, 2023). Such initiatives provide opportunities for users to collaborate, acquire practical skills, and participate actively in community-based learning experiences (Moorefield-Lang, 2021). These developments demonstrate the potential of creative library programs to reposition public libraries as centres for social interaction and community participation (Lankes, 2021). Nevertheless, empirical evidence regarding the extent to which these programs influence community participation in public libraries remains limited, particularly within the Nigerian context (Aina & Ojo, 2022; Nwokocha & Okeke, 2021).

Although previous studies have examined community engagement, makerspaces, and innovative library services, there remains inadequate empirical investigation into how creative library programs specifically affect community participation in public libraries (Igbinovia & Popoola, 2023; Slatter & Howard, 2022). Consequently, this study seeks to examine the impact of creative library programs on community participation with particular emphasis on public libraries. The study is expected to provide evidence on how creative initiatives can enhance library relevance, increase community involvement, and support sustainable development through effective public library services (IFLA, 2022; United Nations, 2021).

Statement of the Problem

Public libraries have traditionally served as centers for information access, education, literacy development, and community engagement. However, rapid technological advancement, changing information-seeking behaviors, and the increasing reliance on digital platforms have significantly altered how communities interact with libraries. Consequently, many public libraries are experiencing declining patronage, reduced physical visits, and limited community participation in their activities and services. This situation has raised concerns regarding the continued relevance and sustainability of public libraries in contemporary society.

In response to these challenges, public libraries across different parts of the world have introduced creative library programs such as makerspaces, reading clubs, storytelling sessions, digital literacy training, cultural exhibitions, arts and craft activities, community forums, gaming initiatives, and entrepreneurship workshops aimed at enhancing user engagement and strengthening relationships with their communities. These programs are intended not only to improve library visibility but also to transform libraries into active community hubs that encourage participation, collaboration, and social inclusion.

Despite the growing adoption of creative library programs internationally, evidence suggests that many public libraries in developing countries, particularly Nigeria, continue to struggle with low community participation and limited public engagement. Public libraries in Nigeria are often characterized by inadequate funding, obsolete resources, insufficient technological facilities, poor awareness of library services, and limited innovative programming. As a result, community members may perceive libraries as traditional book-centered institutions with minimal opportunities for interaction and participation. This perception has contributed to reduced patronage and underutilization of public library services.

Furthermore, although some public libraries have begun introducing creative activities and community-oriented initiatives, there is limited empirical evidence regarding the effectiveness of these programs in promoting community participation. Existing studies in library and information science have largely concentrated on areas such as information service delivery, collection development, user satisfaction, digital services, and library utilization, while insufficient attention has been given to examining how creative library programs influence community involvement and participation within public libraries. Consequently, there is inadequate understanding of whether these innovative programs significantly contribute to increased community engagement, improved library usage, and stronger relationships between libraries and their host communities.

The absence of sufficient empirical studies on the impact of creative library programs creates a knowledge gap and limits the ability of library administrators and policymakers to develop evidence-based strategies for enhancing community participation. Therefore, this study seeks to investigate the impact of creative library programs on community participation in public libraries with the intention of providing empirical evidence on the extent to which

such programs influence community engagement and contribute to the transformation of public libraries into vibrant centers for community development.

Research Questions

The study seeks to examine the impact of creative library programs on community participation in public libraries. Specifically, the study intends to provide answers to the following research questions:

1. What types of creative library programs are available in public libraries for promoting community participation?
2. To what extent do community members participate in creative programs organized by public libraries?
3. What is the impact of creative library programs on community participation in public libraries?
4. What challenges affect the implementation of creative library programs in enhancing community participation in public libraries?

Literature Review

This literature review focuses on the impact of creative library programs on community participation in public libraries. Public libraries have increasingly adopted creative programs such as reading clubs, makerspaces, storytelling sessions, digital literacy training, cultural exhibitions, and community outreach activities to improve user engagement and participation. These initiatives are aimed at transforming libraries into active community centres that support learning, interaction, and social development.

The review therefore examines conceptual literature on creative library programs and community participation, relevant theoretical frameworks, and empirical studies from local and international contexts. The review is expected to establish existing knowledge on the subject and identify gaps that necessitate further investigation within public libraries.

Types of creative library programs are available in public libraries for promoting community participation

Creative library programs have become important strategies used by public libraries to increase community engagement and enhance their social relevance. Modern public libraries now organize diverse programs beyond conventional book lending services, including reading clubs, storytelling sessions, makerspaces, digital literacy training, cultural exhibitions, innovation hubs, entrepreneurship workshops, art competitions, and recreational activities (Lankes, 2021; Moorefield-Lang, 2021). These programs are designed to create interactive learning environments and encourage community members to actively participate in library activities. Studies have shown that makerspaces and innovation laboratories particularly promote collaboration, creativity, and practical skill acquisition among users, thereby transforming libraries into centres for knowledge exchange and social interaction (Moorefield-Lang, 2021; Paul et al., 2024).

Internationally, public libraries increasingly implement family-making programs, community clubs, digital inclusion projects, and technology-based learning activities as mechanisms for improving social participation and strengthening community relationships (Ramya & Majeed, 2025). Such initiatives have repositioned libraries as active community hubs rather than passive information centres. Evidence further suggests that cultural heritage programs, creative writing clubs, and innovation spaces encourage users' involvement and improve library visibility within communities (Slatter & Howard, 2022).

Within Nigeria, public libraries have gradually adopted innovative services despite infrastructural limitations. Community engagement initiatives such as job search corners, idea exchange platforms, school outreach programs, readership campaigns, cultural heritage displays, and social learning spaces have been introduced in some public libraries to improve patronage and participation (Osuigwe, 2020; Nwofor et al., 2017). The establishment of cultural heritage spaces in some Nigerian libraries further demonstrates efforts toward promoting community participation through indigenous knowledge preservation and social inclusion (Osuchukwu & Udeze, 2021).

Community members' participation in creative programs organized by public libraries

Community participation in public library programs is increasingly recognized as an indicator of library effectiveness and societal relevance. Participation occurs through attendance at events, involvement in planning activities, volunteer services, collaborative projects, and utilization of library resources (Williment & Jones-Grant, 2020). Studies indicate that creative programs significantly increase users' engagement and strengthen relationships between libraries and their host communities (Aabø & Audunson, 2021). Libraries that organize participatory programs often experience increased patronage and stronger public support.

Globally, evidence suggests that community participation is high where libraries provide user-centred and innovative programs. Ramya and Majeed (2025) found that communities actively participated in public library engagement programs because such initiatives addressed local social and educational needs. Creative activities including reading clubs, digital workshops, and community events reportedly increased attendance and fostered social inclusion among users.

Similarly, libraries offering makerspaces and collaborative learning activities recorded improved user engagement and repeated participation (Moorefield-Lang, 2021).

In Nigeria, participation in creative library programs remains moderate due to challenges such as inadequate facilities and poor funding; however, innovative services introduced in some libraries have shown promising outcomes. Osuigwe (2020) reported increased patronage and improved community perception following the introduction of innovative programs such as job search services and community space utilization in the Kenneth Dike State Central e-Library, Awka. Similarly, community-oriented cultural activities have enhanced public interaction and participation in some Nigerian libraries (Osuchukwu & Udeze, 2021).

Impact of creative library programs on community participation in public libraries

Creative library programs play an important role in enhancing community participation by creating opportunities for interaction, collaboration, learning, and social inclusion. Public libraries that implement innovative programs often experience increased patronage, stronger community relationships, and improved perceptions regarding library relevance (Klinenberg, 2018). Such programs encourage active citizenship and transform libraries into social infrastructures supporting community development.

International studies have demonstrated positive impacts of creative initiatives on community engagement. Makerspaces, digital learning centres, and cultural activities have been found to improve users' participation by encouraging collaborative learning and practical skill development (Moorefield-Lang, 2021). Public libraries functioning as community engagement hubs have also

reported improved participation and stronger community connections through innovative programming (Ramya & Majeed, 2025). Likewise, creative engagement strategies contribute to user empowerment, knowledge sharing, and sustained library utilization (Paul et al., 2024).

In Nigeria, innovative projects introduced in public libraries have reportedly increased community patronage and strengthened social interaction. Nwofor et al. (2017) observed that creative programs such as reading campaigns, cultural exhibitions, and school outreach activities enhanced community involvement and transformed libraries into community development centres. Osuigwe (2020) also found that innovative community-based services improved library visibility and public participation. These findings suggest that creative programs can significantly reposition Nigerian public libraries as centres of community engagement and social innovation.

Challenges affecting the implementation of creative library programs in enhancing community participation

Despite the benefits associated with creative library programs, several challenges affect their implementation, particularly in developing countries. International studies identify inadequate funding, technological constraints, shortage of skilled personnel, and limited infrastructure as major barriers to implementing innovative library services (Slatter & Howard, 2022). Libraries introducing makerspaces and digital innovation hubs often face challenges relating to equipment acquisition, staff training, and sustainability of programs (Moorefield-Lang, 2021).

In Nigeria, the situation appears more severe due to persistent institutional challenges affecting public libraries. Studies have identified poor funding, inadequate technological infrastructure, limited internet access, insufficient staff training, and declining patronage as major constraints limiting innovation in public libraries (Nwokocha & Okeke, 2021). The implementation of makerspaces in Nigerian libraries has particularly been hindered by inadequate facilities, lack of technological resources, and insufficient policy support (Okuonghae, 2019).

Similarly, cultural heritage and community engagement initiatives in Nigerian libraries face challenges related to preservation facilities, staffing, and financial support (Osuchukwu & Udeze, 2021). Community engagement programs also experience sustainability issues due to limited partnerships and inadequate awareness among users (Osuigwe, 2020). These constraints continue to limit the effectiveness of creative programs in enhancing community participation in Nigerian public libraries.

Research Methodology

This study adopted a quantitative approach with a descriptive survey research design. This design is appropriate because it allows the researcher to collect data from respondents in their natural setting and describe existing conditions regarding creative library programs and community participation in public libraries in Katsina State. It also enables the use of questionnaires to obtain quantitative data from librarians and library users.

The study was conducted in public libraries in Katsina State, Nigeria, with particular focus on major library locations in Katsina Metropolis, Funtua, and Daura.

Table 1: Population of the Study

Location	Public Library	Staff Population	Active Users Population	Total Population
Katsina Metropolis	Katsina State Central Library	25	120	145
Funtua	Funtua Zonal Public Library	15	80	95

Daura	Daura Zonal Public Library	12	65	77
Total		52	265	317

Source: Katsina State Library Board

The study use Taro Yamane (1967) formula for sample size determination at 5% error margin.

A sample size of 177 respondents were selected. Using a stratified sampling technique to ensure fair representation of staff and users across the three libraries. Proportionate allocation was applied.

The sample distribution across the libraries is below:

Table 2: Sample Distribution across the Libraries

S/N	Location	Population	Proportion (%)	Sample Size
1	Katsina Metropolis (Central Library)	145	45.7%	81
2	Funtua Zonal Library	95	29.9%	53
3	Daura Zonal Library	77	24.3%	43
	Total	317	100%	177

The study employed stratified sampling technique to divide respondents into strata based on library location (Katsina Metropolis, Funtua, Daura). Proportionate sampling was used to allocate sample sizes based on population size of each library and Simple random sampling technique was used to select individual respondents (staff and users) within each stratum to ensure equal chance of selection.

Instrument for Data Collection

A structured questionnaire titled *"Creative Library Programs and Community Participation Questionnaire was used for data collection. Which* consist of sections on: Types of creative programs available, Level of participation, Impact on community participation, and Challenges affecting implementation.

Out of the 177 questionnaires distributed to respondents across the selected public libraries in Katsina State (Katsina Metropolis, Funtua, and Daura), a total of 172 questionnaires were correctly completed, returned, and found usable for data analysis. This represents a very high response rate, indicating strong willingness and cooperation from respondents.

In terms of distribution across the libraries, the returned questionnaires were proportionately obtained as follows:

In Katsina Metropolis (Central Library), out of the 81 questionnaires distributed, 79 were returned and found usable. In Funtua Zonal Library, out of the 53 questionnaires distributed, 52 were returned and found usable, and In Daura Zonal Library, out of the 43 questionnaires distributed, 41 were returned and found usable.

Overall, the high retrieval rate across the three libraries suggests effective field administration of the instrument and reliable engagement of both library staff and users. The slight non-response (5 questionnaires) may be attributed to factors such as respondent unavailability, incomplete responses, or inability to retrieve some instruments at the point of collection. However, the 172 usable responses (97.2% response rate) are considered adequate for robust statistical analysis and generalization within the scope of the study. The data collected was analyzed descriptively using frequency counts, percentage and charts.

Data Presentation and Analysis

Types of Creative Library Programs Available in Public Libraries

Creative Library Programs	SA	A	D	SD	Mean	Decision
Reading clubs	68	62	25	17	3.06	Accepted
Digital literacy workshops	72	55	28	17	3.06	Accepted
Makerspaces/innovation hubs	40	50	45	37	2.68	Accepted
Storytelling/cultural events	75	60	20	17	3.13	Accepted

The result shows that reading clubs and storytelling programs are the most available creative programs in public libraries, while makerspaces are less developed. This suggests that traditional programs are still dominant compared to innovation-based services. This aligns with Osuigwe (2020), who observed that many Nigerian public libraries still rely more on conventional outreach programs than advanced creative infrastructures due to resource constraints.

Extent of Community Participation in Creative Library Programs

Participation Indicators	SA	A	D	SD	Mean	Decision
Attendance at library programs	60	70	25	17	2.99	Accepted
Participation in reading clubs	55	68	30	19	2.89	Accepted
Involvement in planning activities	35	50	55	32	2.56	Accepted
Volunteer participation	30	45	60	37	2.43	Accepted

Findings reveal moderate community participation, especially in attendance and reading activities, while volunteerism is relatively low. This implies that participation is mostly passive rather than active. Aabø and Audunson (2021) similarly noted that community participation in libraries is often high in attendance but weak in decision-making involvement, particularly in developing contexts.

Impact of Creative Library Programs on Community Participation

Impact Statements	SA	A	D	SD	Mean	Decision
Increase in library patronage	80	65	15	12	3.30	Accepted
Improved social interaction	70	60	25	17	3.06	Accepted
Enhanced community engagement	65	55	30	22	2.93	Accepted
Strengthened library relevance	50	60	40	22	2.79	Accepted

The findings indicate that creative library programs positively influence community participation by increasing patronage and improving social interaction. This supports Klinenberg (2018), who emphasized that libraries function as strong social infrastructure that promotes civic engagement. However, the moderate mean scores suggest that the impact is present but not fully maximized, likely due to infrastructural limitations.

Challenges Affecting Implementation of Creative Library Programs

Challenges	SA	A	D	SD	Mean	Decision
Inadequate funding	80	60	15	12	3.31	Accepted
Poor ICT infrastructure	78	58	20	16	3.14	Accepted
Lack of trained staff	70	55	25	22	2.93	Accepted
Low community awareness	60	50	35	27	2.79	Accepted

The data shows that inadequate funding and poor ICT infrastructure are the most critical challenges affecting creative library programs. This confirms findings by Nwokocha and Okeke (2021), who reported that Nigerian public libraries face severe infrastructural and financial constraints that limit innovation. The relatively lower score for awareness suggests that while users are somewhat informed, structural challenges remain the major barrier.

Conclusion

The study examined the impact of creative library programs on community participation in public libraries in Katsina State, with focus on Katsina Metropolis, Funtua, and Daura. Findings from the study reveal that public libraries in the area offer a range of creative programs such as reading clubs, storytelling sessions, and digital literacy activities, although advanced innovation-based services like makerspaces remain limited.

The study also established that community participation in library programs is moderate, with higher involvement in attendance-based activities than in participatory roles such as volunteering or program planning. Furthermore, creative library programs were found to have a positive influence on community participation by improving patronage, strengthening social interaction, and enhancing the relevance of public libraries as community spaces.

However, the study also revealed significant challenges hindering effective implementation of creative programs. These include inadequate funding, poor ICT infrastructure, shortage of trained personnel, and low community awareness. These constraints limit the full potential of public libraries in Katsina State to function as modern community

engagement centres. Overall, the study concludes that while creative library programs exist and have positive effects, their impact is still constrained by structural and institutional challenges.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Increased Government Funding: Government and relevant stakeholders should increase financial allocation to public libraries in Katsina State to support the development and sustainability of creative programs such as makerspaces, ICT hubs, and innovation labs.
2. Improvement of ICT Infrastructure: Library management and funding agencies should invest in modern ICT facilities, including computers, internet access, and digital tools, to enhance the delivery of creative and technology-driven library services.
3. Capacity Building for Library Staff: Regular training and professional development programs should be organized for librarians to equip them with the skills required to design and manage innovative and participatory library programs.
4. Community Awareness Campaigns: Public libraries should intensify outreach and awareness programs through schools, community leaders, and local media to increase public knowledge and encourage greater participation in library activities.
5. Strengthening Community Engagement Strategies: Libraries should adopt more inclusive and participatory approaches by involving community members in planning and decision-making processes of library programs to enhance ownership and sustained engagement.
6. Collaboration with Stakeholders: Public libraries should establish partnerships with educational institutions, NGOs, and private organizations to support resource mobilization and expansion of creative library services.

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IMPACT OF MEDICAL LIBRARY ON THE PROVISION OF HEALTH INFORMATION SERVICES TO USERS IN TEACHING HOSPITALS IN KEBBI STATE, NIGERIA

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Abstract

Access to accurate and timely health information is essential for effective healthcare delivery, yet disparities persist in many developing regions. This study empirically examined the impact of medical libraries in promoting health information services in Kebbi State, Nigeria. A descriptive survey research design was adopted. The study population comprised medical librarians, healthcare professionals, and library users in selected tertiary and secondary healthcare institutions across the state. Using stratified random sampling, a total of 180 questionnaires were distributed, out of which 154 were duly completed and returned, yielding a response rate of 85.6%. Data were analyzed using descriptive statistics (frequency counts, percentages with the aid of SPSS. Findings revealed that medical libraries significantly support clinical decision-making, medical education, patient care, and public health awareness through access to print and electronic health information resources. Despite these contributions, challenges such as inadequate funding, poor ICT infrastructure, limited staffing, and low awareness of library services were identified. The study concludes that medical libraries play a crucial role in promoting health information services in Kebbi State but require improved funding, infrastructure, and professional capacity development to maximize their impact on healthcare delivery.

Keywords: Medical libraries, Health information services, Healthcare delivery, Kebbi State, Nigeria, Information access

1. Introduction

Health information services are essential components of modern healthcare systems because they provide healthcare professionals, researchers, students, and patients with timely, accurate, current, and evidence-based information needed for effective healthcare delivery. The quality of healthcare services largely depends on the availability and accessibility of reliable health information for diagnosis, treatment, disease prevention, patient management, health education, and policy formulation (Abels, Cogdill, & Zach, 2004). Inadequate access to relevant health information may negatively affect clinical decisions and reduce the quality of healthcare outcomes.

Health information services involve the collection, organization, storage, retrieval, dissemination, and provision of medical and health-related information to users through various formats and channels. These services include current awareness services, selective dissemination of information, reference services, database searching, internet services, patient education information, bibliographic services, and access to electronic medical resources (Aina, 2004). Effective health information services support evidence-based medical practice and continuous professional development among healthcare workers.

Medical libraries play a critical role in the provision and promotion of health information services in healthcare institutions. Medical libraries are specialized libraries established to acquire, organize, preserve, and disseminate health and medical information resources in support of healthcare delivery, teaching, learning, and research (Bandyopadhyay & Boyd-Byrnes, 2016). They provide access to textbooks, medical journals, electronic databases, research reports, audiovisual materials, and digital information resources in medicine, nursing, pharmacy, public health, and allied health sciences.

Through their resources and professional services, medical libraries facilitate access to relevant health information required by doctors, nurses, pharmacists, laboratory scientists, students, researchers, and other healthcare personnel. Medical librarians also assist users in locating accurate information, conducting literature searches, accessing electronic databases, and utilizing digital health information resources effectively (Marshall, 2014). Consequently, medical libraries contribute significantly to the efficiency and quality of health information services in hospitals and other healthcare institutions.

Globally, health information services have increasingly become technology-driven, with medical libraries evolving into digital knowledge centers integrated into healthcare and academic systems. In developed countries, medical libraries provide extensive electronic information services through online databases, institutional repositories, telemedicine support systems, and digital libraries (Luo & Park, 2013). However, in many developing countries, including Nigeria, the provision of effective health information services is still confronted with numerous challenges such as inadequate funding, poor information infrastructure, shortage of skilled personnel, inadequate information resources, poor internet connectivity, and low awareness and utilization of library services (Issa, Amusan, & Daura, 2009).

In Kebbi State, Nigeria, General Hospitals serve as important healthcare institutions responsible for providing medical services to the population. Healthcare professionals in these hospitals require adequate and current health information to support effective clinical practice and decision-making. Despite the importance of health information services in healthcare delivery, there appears to be limited attention given to the role of medical libraries in supporting and enhancing these services within General Hospitals in Kebbi State. In many cases, healthcare workers may experience difficulties in accessing current medical information due to inadequate library facilities, outdated resources, limited electronic services, and poor information dissemination mechanisms.

Although studies have examined medical libraries and healthcare information services in some parts of Nigeria, there is still limited empirical evidence regarding the impact of medical libraries on the provision of health information services to users in General Hospitals in Kebbi State. This gap necessitates further investigation into how medical libraries contribute to the accessibility, dissemination, and utilization of health information services in the state.

Therefore, this study investigates the impact of medical libraries on the provision of health information services to users in General Hospitals in Kebbi State, Nigeria, with a view to determining the extent to which medical libraries support effective healthcare information delivery and identifying the challenges affecting the provision of such services.

Statement of the Problem

Health information services are fundamental to effective healthcare delivery because healthcare professionals rely on current, accurate, and evidence-based information for diagnosis, treatment, disease prevention, patient management, research, and continuing professional development. The quality of healthcare services provided in hospitals largely depends on the accessibility and utilization of reliable health information resources and services. Effective health information services also contribute to improved patient safety, reduced medical errors, informed clinical decision-making, and enhanced healthcare outcomes.

Medical libraries play a vital role in supporting health information services in healthcare institutions. They are expected to provide healthcare workers with access to relevant medical books, journals, electronic databases, internet services, research findings, and other information resources necessary for evidence-based medical practice. Medical librarians equally support healthcare personnel through information retrieval services, literature searches, current awareness services, and dissemination of medical information required for effective healthcare delivery.

Despite the importance of health information services and the role of medical libraries in healthcare institutions, many hospitals in Nigeria still experience challenges in accessing current and reliable health information resources. In many healthcare institutions, medical libraries are inadequately funded, poorly equipped, understaffed, and unable to provide modern electronic information services. Consequently, healthcare professionals often depend on outdated textbooks, informal consultations, or internet sources of questionable reliability for clinical and research purposes.

In Kebbi State, General Hospitals serve a large population requiring quality healthcare services. However, observations indicate that many of these hospitals experience inadequate medical library facilities, insufficient information resources, limited access to electronic databases, poor internet connectivity, and inadequate professional library personnel. These deficiencies may hinder the effective provision and utilization of health information services among healthcare workers and other users in the hospitals. The inadequacy of medical library services may negatively affect clinical decision-making, research productivity, continuing medical education, patient care, and the overall quality of healthcare delivery in General Hospitals in Kebbi State. Furthermore, poor access to reliable health information may contribute to delays in treatment decisions, reduced efficiency of healthcare personnel, and increased risk of medical errors. Although several studies have examined medical libraries and information services in some parts of Nigeria, there is limited empirical evidence on the impact of medical libraries on the provision of health information services to users in General Hospitals in Kebbi State. This existing gap in knowledge creates the need for a focused study to examine the extent to which medical libraries contribute to health information services, the challenges affecting their effectiveness, and possible strategies for improving health information delivery in the hospitals.

It is against this background that this study seeks to investigate the impact of medical libraries on the provision of health information services to users in General Hospitals in Kebbi State, Nigeria.

Objectives of the Study

The study aimed to:

- To examine the health information services provided by medical libraries in Kebbi State, Nigeria
- To determine the extent to which users utilize health information services provided by medical libraries in Kebbi State
- To identify the challenges affecting the provision of health information services in medical libraries in Kebbi State
- To suggest strategies for improving the effectiveness of medical libraries in promoting health information services in Kebbi State

Research Questions

1. What are the health information services provided by medical libraries in Kebbi State, Nigeria

2. To What extent do users utilize health information services provided by medical libraries in Kebbi State
3. What are the challenges affecting the provision of health information services in medical libraries in Kebbi State
4. What are strategies that can improving the effectiveness of medical libraries in promoting health information services in Kebbi State

2. Literature Review

Concept of Medical Libraries and Health Information Services

Medical libraries are specialized information centers established to support healthcare delivery, medical education, research, and evidence-based practice through the provision of relevant health information resources and services. They serve healthcare professionals, students, researchers, administrators, and patients by providing access to books, journals, databases, clinical guidelines, institutional repositories, and electronic information resources. Modern medical libraries have evolved beyond traditional collections to become knowledge hubs that facilitate access to digital information, research support services, and health informatics resources (Aina, 2021).

Health information services refer to organized activities aimed at providing users with timely, accurate, relevant, and evidence-based health information to support clinical practice, research, learning, and decision-making. Such services include reference services, literature searching, current awareness services (CAS), selective dissemination of information (SDI), user education, online database services, internet services, bibliographic services, and patient information services (Ibegwam & Aina, 2022). The effectiveness of healthcare delivery largely depends on the availability and accessibility of quality health information services.

Medical libraries therefore play a strategic role in bridging the information gap between healthcare knowledge producers and healthcare practitioners. Through the provision of health information services, medical libraries support evidence-based medicine, continuing professional education, research productivity, and improved patient care.

Health Information Services Provided by Medical Libraries

Health information services constitute the core functions of medical libraries. These services are designed to facilitate access to reliable health information resources required by healthcare professionals and other users. Among the major health information services provided by medical libraries are reference services, literature searching, current awareness services, selective dissemination of information, database searching, internet services, bibliographic services, indexing and abstracting services, document delivery services, and information literacy training.

According to Ezeani and Igwesi (2021), reference services remain one of the most utilized services in medical libraries because they assist users in locating relevant medical information efficiently. Similarly, health professionals increasingly depend on literature search services and electronic databases such as PubMed, Medline, HINARI, Scopus, and Cochrane Library for clinical decision-making and research activities.

A study by Nwabueze and Anunobi (2023) revealed that electronic health information services have significantly enhanced access to medical knowledge among healthcare workers in teaching hospitals. The study found that online database services, electronic journals, institutional repositories, and internet-based information services were among the most frequently provided services in medical libraries.

Furthermore, current awareness services and selective dissemination of information help healthcare professionals remain updated on emerging diseases, treatment protocols, research findings, and medical innovations. These services are particularly important because medical knowledge continues to expand rapidly. Therefore, the provision of diverse health information services remains essential for effective healthcare delivery.

Utilization of Health Information Services by Users

The utilization of health information services refers to the extent to which users access and apply information resources and services provided by medical libraries. Users of medical libraries include doctors, nurses, pharmacists, laboratory scientists, researchers, students, and other healthcare professionals.

Research findings indicate that utilization of health information services is influenced by factors such as availability of resources, accessibility, awareness, digital literacy skills, relevance of information, and quality of library services. A study conducted by Okiki and Mabawonku (2021) found that healthcare professionals who regularly utilized medical library services demonstrated better evidence-based clinical practices and improved research productivity.

Similarly, Ibrahim and Mohammed (2022) reported that electronic information resources are increasingly utilized by healthcare professionals because of their convenience, accessibility, and ability to provide current information. However, the study also found that inadequate awareness and poor information literacy skills contributed to underutilization of available resources.

In another study conducted among healthcare workers in Nigerian teaching hospitals, Adeyemi and Popoola (2024) observed that internet services, online journals, and database searching services recorded high usage levels, while selective dissemination services and bibliographic services were relatively underutilized. These findings suggest that although users recognize the importance of health information services, utilization patterns vary according to user needs and institutional support.

Challenges Affecting the Provision of Health Information Services in Medical Libraries

Despite their importance, medical libraries face several challenges that hinder the effective provision of health information services. One of the most significant challenges is inadequate funding. Medical libraries require substantial financial resources to acquire current information materials, subscribe to electronic databases, maintain ICT infrastructure, and train staff.

Adeniran and Emeka-Ugwuoke (2021) identified inadequate funding as the major constraint affecting medical libraries in Nigeria. The study revealed that many medical libraries struggle to maintain subscriptions to essential medical databases and journals due to financial limitations.

Poor information and communication technology infrastructure also affects service delivery. Unreliable internet connectivity, insufficient computers, lack of automation systems, and unstable electricity supply limit access to electronic information resources. Olatokun and Tiamiyu (2022) reported that ICT-related challenges continue to affect the quality of information services in many Nigerian health institutions.

Another challenge is the shortage of professionally trained medical librarians. Medical librarians require specialized knowledge in both librarianship and health information management. According to Nwalo and Chukwudi (2023), many healthcare institutions experience shortages of qualified personnel capable of managing digital health information resources effectively.

Low awareness and underutilization of available services also constitute significant challenges. Some healthcare professionals rely on informal sources of information, general internet searches, or personal collections instead of utilizing library services. This limits the overall impact of medical libraries on healthcare delivery.

Strategies for Improving the Effectiveness of Medical Libraries in Promoting Health Information Services

Improving the effectiveness of medical libraries requires a combination of financial, technological, managerial, and professional interventions. Adequate funding remains critical for the acquisition of current information resources, subscription to electronic databases, infrastructure development, and staff training.

According to Yusuf and Salisu (2024), increased government funding and institutional support can significantly improve the quality of health information services in medical libraries. Investment in modern ICT infrastructure is also essential for expanding access to electronic information resources.

Regular training and capacity-building programmes for medical librarians can enhance service delivery and improve user support services. Eze and Nnadozie (2023) emphasized the importance of continuous professional development in enabling librarians to manage emerging technologies and digital information resources effectively.

User education programmes are equally important. Information literacy training can improve users' ability to locate, evaluate, and utilize health information resources efficiently. Medical libraries should also intensify awareness campaigns, current awareness services, and outreach programmes to encourage greater utilization of available services.

Collaboration among medical libraries, healthcare institutions, professional associations, and international health information organizations can further improve resource sharing and access to global medical knowledge. Such partnerships can strengthen the role of medical libraries in promoting evidence-based healthcare practices in Kebbi State and Nigeria as a whole.

3. Research Methodology

The population of the study comprised healthcare professionals, medical librarians, and registered users of the medical libraries in Federal Medical Centre (FMC), Birnin Kebbi, and Sir Yahaya Memorial Hospital (SYMH), Birnin Kebbi. The total population was 360 respondents. A sample size of 180 respondents was selected using stratified random sampling to ensure adequate representation of all categories of respondents.

Table 1: Population and Sample Distribution by Institution and Category of Respondents

Institution	Healthcare Professionals	Registered Users	Medical Librarians	Total Population	Sample Size
Federal Medical Centre, Birnin Kebbi	120	50	10	180	90
Sir Yahaya Memorial Hospital, Birnin Kebbi	112	60	8	180	90
Total	232	110	18	360	180

Source: Field Survey, 2026.

Table 2: Proportionate Sample Distribution by Category of Respondents

Category of Respondents	Population (N)	Percentage (%)	Sample Size (n)
Healthcare Professionals	232	65.1	117
Registered Users	110	30.6	55

Medical Librarians	18	4.3	8
Total	360	100	180

Source: Field Survey, 2026.

The sample was proportionately distributed among the respondent categories using stratified random sampling. This ensured that healthcare professionals, registered users, and medical librarians were adequately represented in the study, thereby enhancing the reliability and validity of the findings.

4. Data Presentation and Analysis

Table 1: Response Rate

SN	Questionnaires	Frequency
1	Distributed	180
2	Returned	154
3	Not Returned	26

Source: Field Survey, 2026

Table 1 shows that out of 180 questionnaires distributed to respondents, 154 were completed and returned, representing an 85.6% response rate, while 26 questionnaires representing 14.4% were not returned. This response rate is considered high and adequate for social science and library research because it provides sufficient data for valid analysis and generalization.

The high return rate may be attributed to the relevance of the study topic to respondents, proper administration of questionnaires, and follow-up efforts during data collection. According to survey research standards, response rates above 70% are generally regarded as strong and reliable for empirical studies. This strengthens the credibility of the present findings.

The result aligns with Popoola, Uzoagba, and Rabiu (2020), who recorded strong participation in their study of Nigerian medical libraries through a mixed-method survey approach, indicating that professionals in health information environments often show willingness to participate in studies affecting service improvement.

Table 2: Availability of Library Resources

SN	Resources	Available	%
1	Textbooks	145	94.2
2	Medical Journals	132	85.7
3	E-resources	118	76.6
4	Internet Access	101	65.6
5	Databases	89	57.8

Source: Field Survey, 2026

Table 2 indicates that textbooks (94.2%) were the most available resources in medical libraries studied, followed by medical journals (85.7%), electronic resources (76.6%), internet access (65.6%), and databases (57.8%).

The dominance of textbooks suggests that traditional print resources remain the foundation of many medical libraries in Kebbi State. Textbooks are widely used because they provide foundational knowledge for students, nurses, and clinicians. The substantial availability of medical journals also suggests an effort to support current medical knowledge and research activities. However, the lower availability of internet facilities and databases reveals limitations in digital health information infrastructure. This may hinder access to evidence-based medicine, online indexing tools, and recent global medical literature. This finding aligns with Popoola et al. (2020), who reported that monographs were the major collections in Nigerian medical libraries, while access to electronic information resources remained comparatively limited. Similarly, Ikolo, Kolawole, and Ekoko (2025) found that textbooks remained the most common information resources in Nigerian hospital libraries, though digital resources were gradually increasing.

Table 3: Health Information Services Provided

SN	Services	Frequency	%
1	Reference Services	140	90.9
2	Literature Search	128	83.1
3	User Education	121	78.6
4	Current Awareness	110	71.4
5	SDI	96	62.3

Source: Field Survey, 2026

Table 3 reveals that reference services (90.9%) were the most common services rendered by medical libraries, followed by literature search services (83.1%), user education (78.6%), current awareness services (71.4%), and SDI (62.3%).

The high provision of reference services indicates that users depend heavily on librarians for locating medical information, clinical materials, and research documents. Literature searching is also highly significant because healthcare professionals increasingly require current evidence for diagnosis and treatment decisions. User education services imply that libraries are assisting users to develop information literacy skills, including database use, citation management, and searching techniques. However, the relatively lower score for SDI suggests that proactive personalized information delivery is not yet fully developed. This finding supports previous Nigerian evidence showing that reference, literature search, and awareness services are among the major specialized services in medical libraries, though many institutions are still evolving in advanced services. The finding is also consistent with modern medical librarianship practice where librarians serve as information intermediaries for clinicians and researchers.

Table 4: Impact on Healthcare Delivery

SN	Impact Area	Agree	%
1	Better Clinical Decisions	136	88.3
2	Improved Research	129	83.8
3	Better Patient Care	124	80.5
4	Public Health Awareness	117	76.0

Source: Field Survey, 2026

Table 4 shows that respondents strongly agreed that medical libraries contribute to healthcare delivery through better clinical decisions (88.3%), improved research productivity (83.8%), better patient care (80.5%), and public health awareness (76.0%).

The highest score for better clinical decisions indicates that access to accurate medical information supports doctors, nurses, pharmacists, and other health workers in selecting appropriate treatment options. This demonstrates the role of libraries in evidence-based practice.

Improved research productivity suggests that libraries support scholarly communication, literature review, proposal writing, and publication. Better patient care results when practitioners apply updated knowledge in treatment and case management.

This finding strongly aligns with the study on Nigerian university teaching hospitals which found that information supplied by medical libraries was useful for managing patients, evaluating drugs, and supporting diagnosis. It also agrees with global health information systems literature that timely access to quality information improves healthcare efficiency and outcomes.

Table 5: Challenges Affecting Medical Libraries

SN	Challenges	Frequency	%
1	Poor Funding	143	92.9
2	Inadequate ICT	137	89.0
3	Staff Shortage	121	78.6
4	Low Awareness	118	76.6
5	Power Supply	126	81.8

Source: Field Survey, 2026

Table 5 indicates that the major challenge affecting medical libraries in Kebbi State was poor funding (92.9%), followed by inadequate ICT facilities (89.0%), unstable power supply (81.8%), staff shortage (78.6%), and low awareness of services (76.6%).

Poor funding affects acquisition of current textbooks, journal subscriptions, internet bandwidth, computers, and staff development. Inadequate ICT facilities reduce access to electronic databases, telemedicine support tools, and online journals. Irregular power supply further weakens automation and digital service delivery.

Staff shortages may lead to reduced service hours and weak user support, while low awareness means many healthcare workers may not fully utilize available resources.

These findings align with Popoola et al. (2020), who identified budget deficiencies, inadequate internet access, low usage, and training gaps as major constraints facing Nigerian medical libraries. Ikolo et al. (2025) also found insufficient funds as a major challenge in Nigerian hospital libraries and recommended collaboration and consortia models to improve access to resources. However, contrary to findings in more developed settings where digital integration is stronger, many institutions in Nigeria still face infrastructural barriers that slow innovation.

Discussion of Findings

The study revealed that medical libraries significantly contribute to healthcare delivery through access to information resources. This agrees with Aina (2014), who emphasized that libraries are indispensable to knowledge-based professions. The availability of textbooks and journals suggests that traditional resources remain dominant. However, lower availability of databases and internet access indicates digital limitations. This aligns with Issa and Uzuegbu (2019), who found inadequate ICT as a major challenge in Nigerian libraries. Respondents acknowledged the importance of library services in clinical decisions, patient care, and research productivity. This supports Okiki (2018), who found that health information access improves professional efficiency.

Summary of major Findings

The study found that:

xi. Medical libraries in Kebbi State possess useful traditional resources, especially textbooks and journals.

xii. Core services such as reference, literature searching, and user education are actively provided.

xiii. Medical libraries significantly enhance clinical decisions, research, patient care, and health awareness.

xiv. Major challenges include poor funding, ICT deficiencies, power supply issues, staffing shortage, and low awareness.

xv. Conclusion

Medical libraries in Kebbi State play a vital role in promoting health information services. They support healthcare professionals through access to relevant resources and information services. However, inadequate funding, weak ICT infrastructure, staffing shortages, and poor awareness reduce their effectiveness. Strengthening medical libraries will improve evidence-based healthcare delivery, research, and patient outcomes in Kebbi State.

xvi. Recommendations

The study recommends as follows:

- Government should increase funding for medical libraries.
- Healthcare institutions should invest in digital resources and databases.
- Stable internet and electricity should be provided.
- More qualified medical librarians should be employed.
- Awareness campaigns should be conducted to improve utilization.
- Partnerships with national and international library bodies should be encouraged.

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INDIGENOUS KNOWLEDGE SYSTEMS AND COMMUNITY-BASED INFORMATION SERVICES FOR SUSTAINABLE DEVELOPMENT: THE ROLE OF KWARA STATE PUBLIC LIBRARY

By

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Abstract

This study examined Indigenous Knowledge (IK) systems and community-based information services for sustainable development, focusing on the role of the Kwara State Public Library, Nigeria. The study identified the types of indigenous knowledge resources available in the library, examined the extent of their documentation and preservation; assessed the community-based information services provided; determined the level of community participation; and identified the challenges affecting indigenous knowledge management. A descriptive survey research design was adopted. The study population comprised all librarians in the Kwara State Public Library, and a total enumeration sampling technique was employed. Data were collected using a structured questionnaire from all the 13 librarians, with all questionnaires successfully retrieved and analyzed using descriptive statistics. The findings revealed that indigenous knowledge resources were moderately available, particularly in agriculture, traditional medicine, and cultural heritage, while local language materials and indigenous crafts were inadequately represented. Documentation and preservation practices were found to be weak due to limited ICT infrastructure, inadequate policy support, and insufficient digitization initiatives. Community-based information services were moderately provided, although rural outreach programmes and community engagement remained limited. Community participation in indigenous knowledge activities was also low. The major challenges identified included inadequate funding, shortage of trained personnel, poor ICT facilities, weak institutional policies, and limited collaboration with indigenous communities. The study concluded that although the Kwara State Public Library possesses considerable potential to promote indigenous knowledge for sustainable development, its current practices require significant improvement. The study recommended increased funding, improved ICT infrastructure, comprehensive policy development, continuous staff capacity building, and stronger partnerships with local communities to enhance the preservation, accessibility, and utilization of indigenous knowledge.

Keywords: Community-based information services, Indigenous knowledge, Kwara State, Public library, Sustainable development.

Introduction

Sustainable development has become a central concern for governments, development agencies, and knowledge institutions globally, particularly in developing countries such as Nigeria, where local realities strongly shape development outcomes. Sustainable development cannot be achieved solely through top-down policy interventions but must incorporate grassroots knowledge and locally embedded practices that reflect the lived realities of communities (Biermann et al., 2022). However, in recent decades, increasing attention has been given to Indigenous Knowledge

Systems (IKS) as valuable resources for addressing socio-economic, environmental, and cultural challenges at the grassroots level. Dasgupta, Dhyani and Basu (2023) stated that in the dynamic landscape of sustainable development, the use of indigenous knowledge (IK) fosters resilient livelihoods, especially in regions rich with cultural diversity and multi-culture. IKS are locally developed bodies of knowledge, practices, and beliefs that are rooted in the cultural and environmental experiences of communities and passed down through generations. According to Gómez-Baggethun (2021), IKS refer to the unique cultures, languages, values, histories, governance and legal systems of indigenous people. Kugara and Mokgoatšana (2022) stated that historically, IKS has been regarded as one of the indispensable assets rural people own and utilised for transforming and developing communities.

Indigenous knowledge, developed through long-term interaction between communities and their environment, has proven effective in areas such as agriculture, healthcare, environmental management, conflict resolution, and cultural preservation. According to Sarkhel (2016), IK finds practical application in various aspects of daily life, including agriculture, healthcare, education, household management, and other community-based activities. IK is a common ability of a particular group of people in a society mostly in rural areas who have a common history that forms basis of their local level decision making of their everyday affair including occupation, healthcare, agriculture, food preparation and social life (Aboyade & Adeyemo, 2019). IK encompasses areas such as agriculture, health, natural resource management, social organization, conflict resolution, and cultural expression, making it a significant resource for community well-being and resilience. Ezeanya-Esiobu (2019) stated that IK covers all fields of human endeavour including, but not limited to, agriculture, environment, pharmacology, health, trade and economics, and political systems. Furthermore, IK is increasingly recognized as a critical contributor to sustainable development, particularly in rural and local contexts where formal scientific knowledge may be inaccessible or inappropriate without contextual adaptation. IK has helped to fuel innovation and development in industries, ranging from agriculture and pharmaceuticals to chemicals, paper products, energy and others (Mdhluli, Mokgoatšana, Kugara & Vuma, 2021).

IK gained formal international recognition as a valuable resource for sustainable development during the global environmental debates of the late twentieth century. The landmark report of the World Commission on Environment and Development (WCED), titled "Our Common Future", emphasized the importance of integrating local knowledge and community participation into development planning. The report highlighted that sustainable development strategies must reflect the experiences, practices, and environmental understandings of local communities, particularly in developing countries (WCED, 1987). This recognition was further reinforced at the United Nations Conference on Environment and Development (UNCED), titled "Rio Earth Summit" in Rio de Janeiro, where Agenda 21 explicitly acknowledged the critical role of indigenous people and their knowledge systems in environmental management and sustainable resource use (United Nations, 1992). Since then, international development discourse has increasingly affirmed that indigenous knowledge contributes to biodiversity conservation, climate adaptation, food security, and community resilience. Consequently, IK is now widely regarded as an essential component of sustainable development frameworks, particularly in contexts where local communities rely heavily on traditional practices for their livelihoods and environmental stewardship.

Despite this recognition, IK remains largely unrecorded and informally transmitted, often confined to oral tradition and community practices. Indigenous knowledge, though sometimes clearly articulated, is vulnerable to loss because it is primarily transmitted orally and lacks proper documentation (Lwoga, Ngulube & Stilwell, 2016). The lack of systematic documentation and integration into formal information systems risks the gradual loss of these valuable knowledge resources as older generations pass on and younger ones adopt more globalized cultural values. Sarkhel (2016) noted that IK are traditionally transmitted orally across generations, faces the risk of disappearance if deliberate efforts are not made to document and preserve it formally. Furthermore, if adequate measures are not taken to preserve and share them, invaluable indigenous knowledge systems may gradually weaken, become diluted, or disappear entirely (Cámara-Leret & Bascompte, 2021). The occurrence of urban migration, modernization, and evolving lifestyles have further disrupted the transmission of indigenous knowledge across generations, limiting opportunities for traditional apprenticeships and communal storytelling that have historically maintained these knowledge systems. Dei (2008) argued that younger generations increasingly prioritize Western education systems and digital media cultures, which often undervalue traditional knowledge systems.

Public libraries are increasingly recognized as strategic information institutions for bridging the gap between indigenous knowledge and modern information systems. They function as community knowledge centres, facilitators of lifelong learning, and agents of social inclusion beyond their conventional role of providing access to printed materials (IFLA, 2020). Public libraries bear a responsibility to safeguard the traditions of the communities they serve by actively preserving and conserving indigenous knowledge. This helps prevent its loss and ensures that an accurate record of cultural heritage is maintained, given that such knowledge is unique to a particular culture or society (Osuchukwu & Udeze, 2021). Through community-based information services, libraries collaborate closely with indigenous communities to identify knowledge needs, engage local knowledge holders, and ensure ethical and participatory knowledge acquisition and dissemination processes (Chigwada & Ngulube, 2023). Community-based information services emphasize local participation, relevance, and accessibility. They focus on delivering information that responds directly to community needs while respecting local values and cultural contexts. Dei (2008) highlighted that integrating

indigenous knowledge into library services not only strengthens cultural preservation but also contributes to sustainable development by empowering communities with information relevant to agriculture, health, environmental management, and education. In this regard, such services enhance community ownership of development initiatives and support sustainable solutions that are culturally appropriate and environmentally sound.

The Kwara State Public Library (KSPL) in Nigeria, serves a diverse population including urban and rural residents, farmers, artisans, students, and professionals. The cultural landscape of the state is rich with indigenous practices such as traditional medicine, local agricultural techniques, community festivals, and oral histories. However, based on personal observation, there have been limited efforts to systematically document and incorporate this indigenous knowledge into the formal collections and services of KSPL. This gap reflects a broader challenge within library systems, where indigenous knowledge management may face obstacles such as limited institutional policy support, inadequate ICT infrastructure, and insufficient collaboration with local knowledge holders. Given the potential of public libraries to support sustainable development through community-based information services, it is important to understand how KSPL engages with indigenous knowledge systems. This includes examining both the extent to which indigenous knowledge is integrated into its collections and services and the impact of these efforts on community access to culturally relevant information. Investigating these dynamics provides insight into the roles that public libraries play in promoting inclusiveness, context-sensitive information environments that contribute to local sustainable development objectives.

Research Questions

The following research questions are tailored for this study:

1. What are the types of indigenous knowledge resources available in Kwara State Public Library?
2. What is the extent to which indigenous knowledge is documented and preserved in Kwara State Public Library?
3. What are the community-based information services provided in support of indigenous knowledge and sustainable development by Kwara State Public Library?
4. What is the level of community participation and engagement related to indigenous knowledge systems facilitated by the Kwara State Public Library? and
5. What are the challenges encountered in managing and promoting indigenous knowledge systems for sustainable development in Kwara State Public Library?

Literature Review

Indigenous knowledge is increasingly acknowledged as essential to sustainable development because it embodies community-based understandings of local environments, cultural practices, and social organization. There is an increasing and widespread agreement that indigenous knowledge is vital to the everyday functioning of indigenous communities, particularly in areas of development, governance, and health (Mdhluli, Mokgoatšana, Kugara & Vuma, 2021). Studies demonstrate that IKS reflects sophisticated ecological and social insights that contribute to sustainable resource management, health practices, and community resilience (e.g., in areas such as agriculture and water management) due to its context-specific and adaptive nature. According to the World Health Organization (WHO, 2019), approximately 40% of contemporary medicines are derived from plant sources that were traditionally used by local communities based on indigenous knowledge. This underscores the growing recognition of indigenous knowledge as a significant contributor to the advancement of global healthcare. However, IK is predominantly oral and tacit, making it difficult to document, codify, and integrate into formal information systems without intentional strategies. These knowledge systems originate within communities rather than from formal scientific processes, and they are typically transmitted across generations through oral traditions (Ncube, Chigwada, Ngulube & Maluleka, 2025). This tacit character limits accessibility and institutional representation of IK in documented collections, which has implications for knowledge preservation and sustainable development planning. Sarkhel (2016) noted that IK is often passed down through generations orally and seldom in any form of documentation.

Public libraries are strategically positioned to serve as community knowledge centres that support the documentation, preservation, and dissemination of IK through community-based information services. Community-based information services involve tailored information access and dissemination mechanisms designed to meet the specific needs of local populations. Consequently, acknowledging the contribution of IK to national development should encourage formal information management institutions, such as public libraries in Nigeria, to take greater interest in its preservation and effective management (Ogunkeyede, Ndukwe, Akinola & Olaseigbe, 2023). Similarly, library is expected to serve its community by documenting local histories, showcasing IK through visual displays, and creating platforms that encourage community participation in IK activities. Furthermore, existing library infrastructure particularly ICT facilities can be effectively utilized to conserve and preserve indigenous knowledge resources for access and use by the general public (Ilori, Imam, Adesanya & Adeyemi, 2021). Ogunkeyede et al. (2023) argued that public libraries should take responsibility for identifying, collating, and organizing indigenous knowledge, particularly in sectors like agriculture and health where local practices are relevant to wider development goals. However, evidence from existing literature suggests that many public libraries in Nigeria continue to focus primarily on conventional print and digital resources, with limited attention given to IK materials and local content development. As a result, IK remains

marginalized within library collections and services, reducing its accessibility and relevance to community development initiatives.

Empirical studies have increasingly examined the intersection between Indigenous Knowledge Systems (IKS), public library services, and sustainable development, highlighting both the potentials and limitations of formal information institutions, particularly public libraries in preserving and promoting local knowledge. These studies provide evidence-based insights into how libraries document indigenous knowledge, engage communities, integrate local content into their collections, and contribute to development outcomes, particularly within developing country contexts. For instance, Ogunkeyede et al. (2023) wrote a paper on "Indigenous Knowledge and Public Library System for National Development in Nigeria". They focused on IK and the public library system for national development in Nigeria. They began with introducing the concept of IKS and articulates the definitions for IK. They went further to explore the relevance of IK, especially in agriculture and medicine and recognizing the unique value embedded in local traditions and practices. They also investigated how public libraries can serve as dynamic platforms for preserving, disseminating, and utilising IK. They concluded that to enhance the propagation of IK, and aid it in taking its place in nation-building, the public library must hold itself responsible for identifying, collating, and sorting IK.

Similarly, Ilori et al. (2021) conducted a study on "Indigenous Knowledge Management in the Modern-Day Library and Information Services". They examined IK management process in four academic libraries in Lagos State, Nigeria. They used purposive sampling method to select four government owned tertiary institutional libraries in Lagos State. They used Cochran (1963) sample size table formula to determine sample size of 115 respondents from the total population (135). They adopted descriptive survey design and make used of questionnaire and interview for data collection. Their findings revealed that IK was available in the selected academic libraries and health information was the main reason for using IK in the selected academic libraries. They further revealed that all the four academic libraries have no IK policy and the challenges facing the management of IK in the selected academic libraries are the lack of relevant ICT resources that can be used to preserve IK in the libraries. They recommended that library management should make fund available for the libraries to acquire necessary ICT tools that can be used to preserve IK.

Furthermore, Faboyede and Simpson (2025) conducted a on "Indigenous Ecological Knowledge of Nigerian Communities on Plant Responses to Environmental Stressors". They examined how indigenous communities in Nigeria perceive plant behavioral patterns through local knowledge, observations, and beliefs. They used an ethnobotanical approach to explores oral traditions, folklore, and practical applications of plant behavior in indigenous settings. They highlighted how traditional knowledge informs sustainable environmental management, conservation, and the use of plants in medicine, agriculture, and cultural rituals. Their study underscores the relevance of traditional ecological wisdom in contemporary botanical and environmental research and recognizing these perspectives preserves cultural heritage while fostering an inclusive understanding of plant-environment interactions. They recommended that this approach advocates for integrating indigenous perspectives into scientific discourse, policy-making, and conservation efforts to achieve a more holistic view of plant adaptation and ecology.

Beyond Nigeria, Singh-Pillay and Madlala (2026) conducted a study on "Legitimising Indigenous Knowledge Systems as a Pathway to Sustainable Development". They used a qualitative case study to examines the integration of IKS into Grade 8 Natural Sciences ecosystem teaching in KwaZulu-Natal, South Africa. Their research addressed two questions: what IK is integrated into ecosystem teaching, and how teachers accomplish this integration. They collected data through interviews, classroom observations, and document analysis from six Natural Sciences teachers across three schools in the Pinetown district during 2024. Their findings revealed that teachers successfully integrated indigenous agricultural practices, including controlled burning, rotational cropping, organic fertilization, and polyculture systems, positioning this as legitimate scientific knowledge that provides empirically validated environmental solutions. Their research extends cultural border-crossing theory and collateral learning approaches by demonstrating practical classroom applications that enable students to navigate multiple knowledge systems without cognitive conflict. Their findings contribute to decolonising environmental science education by providing transferable frameworks for authentic IKS integration, demonstrating connections to Sustainable Development Goals (2, 4, 12, 13,15), and documenting pathways toward cognitive justice.

Similarly, Kom and Nethengwe (2024) conducted a study on "Indigenous and Local Knowledge: Instruments Towards Achieving SDG2: A Review in an African Context". Their study seeks to review African indigenous and local knowledge in farming systems that are used as instruments for the achievement of sustainable development. Their study envisioned the idea of sustainable development in the context of indigenous and local knowledge as a potential for achievement of Sustainable Development Goal 2. They also emphasize the necessity of a radical investigation of IK practices for a more effective local farming system in the African setting that is inclusive and driven by the indigenous community to harness the untapped riches of IK. They stated that Local and Indigenous knowledge are regarded as knowledge systems possessed by cultural groups and, based on their experience and adaptability to local culture and environment, it is important for development, particularly in food security. They concluded that by urging further potential investigation into whether indigenous and traditional knowledge systems as tools can be used to accomplish Sustainable Development Goals in practice.

Furthermore, Chigwada and Ngulube (2023) conducted a study on "Librarians' Role in the Preservation and Dissemination of Indigenous Knowledge". They used a qualitative study with 20 librarians in Zimbabwe, who were purposively selected. Interviews and observation were used to collect data, which was analysed using thematic content analysis. Their findings revealed that libraries preserved IK in the form of poetry, folklore, drama and artefacts; demonstrated traditional dances; and sometimes recorded live sessions and special collections. They identified ethical issues as the major challenge being faced when documenting IK. They recommended that librarians actively work with indigenous communities in IK projects to avoid resistance from knowledge holders.

Also, Ncube et al. (2025) conducted a study on "Government support for indigenous knowledge for sustainability in Southern Africa". They assessed how the governments of South Africa and Zimbabwe support the use of IK to sustain livelihoods. They used a qualitative case study approach and gathered data through interviews and document analysis. Also conducted interviews with government officials and chose two from each department or ministry using purposive sampling, and a total of 10 participants were used for the study by the researchers. They analysed National Development Plans (NDPs) and IKS policies to gather information on government support for the use of IK for sustainable livelihoods. They used thematic analysis and content analysis approaches for data analysis. Their findings show that the South African government had implemented various mechanisms to support the use of IK for sustainable livelihoods while little efforts were made in Zimbabwe. They concluded that South African government formulated policies that support the use of IK to sustain livelihoods, while IK policy formulation and implementation in Zimbabwe was not evident.

Lwoga, Ngulube and Stilwell (2017) conducted an empirical study in Tanzania on "Managing Indigenous Knowledge in Selected Communities". They found that while IK was widely practiced in agriculture and health, there were weak institutional frameworks for documentation and preservation. They also revealed that oral transmission remained the dominant mode of knowledge sharing, thereby increasing the risk of knowledge loss. They recommended stronger collaboration between libraries and local knowledge holders to enhance systematic preservation. Mhlongo and Ngulube (2020) examined the "Role of Libraries in the Preservation of Indigenous Knowledge in African Contexts". They found that although librarians recognized the importance of IK, limited funding, inadequate ICT infrastructure, and lack of policy guidelines constrained effective management. Their findings emphasized the need for institutional policies and digital repositories to safeguard indigenous resources. Mapara (2009) explored "Indigenous Knowledge Preservation Strategies in Zimbabwe". The study found that community participation was critical for successful knowledge documentation initiatives. The study highlighted that participatory approaches improved trust between communities and information institutions, thereby enhancing knowledge sharing.

Beyond Africa, Joshi (2021) investigated "Indigenous Environmental Knowledge and Sustainable Development: A Case Study of Traditional Ecological Practices in India". The research explores the pivotal role of Indigenous Environmental Knowledge (IEK) in promoting sustainable development, with a specific focus on traditional ecological practices in India. It investigates the profound wisdom and time-tested practices of indigenous communities in India, highlighting their significance in addressing contemporary environmental challenges. Through a comprehensive analysis of case studies, ethnographic research, and ecological data, it also elucidates the holistic nature of IEK and its potential to contribute to global sustainability goals. The research underscores the need for cultural preservation, environmental conservation, and the synergy between indigenous wisdom and scientific advancements by examining the integration of traditional knowledge systems into modern environmental policies and practices. The findings emphasize the importance of recognizing and respecting IEK as a valuable resource for achieving sustainable development.

Also, Sarkhel (2016) conducted a study on "Strategies of Indigenous Knowledge Management in Libraries". The study explores how the indigenous knowledge can best be managed in the libraries in order to contribute positively to the community. The paper answers what roles the library professionals can play in the management and preservation of IK? While highlighting the IFLA mandate towards the management and preservation of IK, different activities associated with the management of IK such as, collection, recording and documentation, organization, preservation and storage, dissemination and networking are discussed. It concluded that library professionals need to be proactive in devising strategies for the management and preservation of IK with the help of their professional knowledge and skills in order to ensure access to this valuable resource.

Collectively, these empirical studies indicate that while IK plays a pivotal role in sustainable development, its preservation within formal institutions such as public libraries remains limited. Common challenges include inadequate documentation, weak policy support, limited ICT infrastructure, and insufficient collaboration with indigenous communities. However, the literature consistently suggests that strengthening community-based information services in public libraries can enhance IK preservation and contribute meaningfully to sustainable development outcomes. These also provide verified research evidence showing how IK contributes to community resilience, sustainable natural resource management, adaptive strategies, and development outcomes across multiple contexts.

Methodology

This study employed a descriptive survey research design to investigate the use of Indigenous Knowledge (IK) in promoting sustainable development, as well as the role of the Kwara State Public Library in its documentation and dissemination. The population consisted of librarians working in the public library, and a total enumeration sampling technique was adopted. Data were collected using a self-developed questionnaire to generate quantitative insights. The

instrument included sections on the types of indigenous knowledge resources available, the extent of their documentation and preservation, the community-based information services provided, the level of community participation and engagement, and the challenges associated with managing and promoting indigenous knowledge systems for sustainable development. The questionnaire was validated by experts in Library and Information Science and tested for reliability using Cronbach's alpha to ensure internal consistency. It was administered personally by the researcher, which allowed for proper clarification of the study's purpose to respondents. A total of 13 valid responses were obtained and used for analysis. Data collected were analyzed using descriptive statistics, including frequency counts, percentages, mean, and standard deviation. Ethical standards such as informed consent, confidentiality, and voluntary participation were strictly upheld throughout the study.

Data Analyses and Presentation

Table 1: *What are the types of indigenous knowledge resources available?*

Statements	**SA** F (%)	**A** F (%)	**D** F (%)	**SD** F (%)	**Mean ($\bar{x}$)**	**Std. Dev. (σ)**
The library has adequate materials on traditional agricultural practices.	4 (30.8)	6 (46.2)	2 (15.4)	1 (7.7)	3.00	0.88
Oral histories and folklore are documented and accessible in the library.	3 (23.1)	4 (30.8)	4 (30.8)	2 (15.4)	2.62	0.96
Materials on indigenous crafts, skills, and technologies are available in the library.	2 (15.4)	5 (38.5)	4 (30.8)	2 (15.4)	2.54	0.94
Indigenous health and herbal medicine resources are available in the library.	4 (30.8)	4 (30.8)	3 (23.1)	2 (15.4)	2.77	1.01
The library holds resources on indigenous environmental and natural resource management practices.	3 (23.1)	5 (38.5)	3 (23.1)	2 (15.4)	2.69	0.98
The library collects and preserves local language materials related to indigenous knowledge.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
The library provides access to materials on local cultural heritage and traditions.	4 (30.8)	5 (38.5)	3 (23.1)	1 (7.7)	2.92	0.89
The library collects and preserves religious scripture/materials related to indigenous knowledge.	3 (23.1)	4 (30.8)	4 (30.8)	2 (15.4)	2.62	0.96
Grand Mean = 2.70						

The data presented in Table 1 reveal the extent to which different types of indigenous knowledge (IK) resources are available in the Kwara State Public Library. The grand mean of 2.70 indicates a moderate level of availability of indigenous knowledge materials in the library. Specifically, the statement *"The library has adequate materials on traditional agricultural practices"* recorded the highest mean score ($\bar{x}$ = 3.00), suggesting that respondents generally agree that agricultural-related indigenous knowledge resources are relatively available. Similarly, *materials on local cultural heritage and traditions* also recorded a relatively high mean ($\bar{x}$ = 2.92), indicating that cultural resources are fairly accessible within the library. However, other areas show lower levels of availability. For instance, *local language materials related to indigenous knowledge* recorded the lowest mean ($\bar{x}$ = 2.46), implying that such resources are insufficiently collected and preserved. Likewise, *materials on indigenous crafts, skills, and technologies* ($\bar{x}$ = 2.54) and *oral histories and folklore* ($\bar{x}$ = 2.62) suggest only moderate availability, indicating gaps in documenting and preserving these forms of knowledge. Furthermore, *indigenous health and herbal medicine resources* ($\bar{x}$ = 2.77) and *environmental and natural resource management materials* ($\bar{x}$ = 2.69) show moderate presence, reflecting partial inclusion of these important knowledge domains in the library's collection. The availability of *religious or spiritual materials related to indigenous knowledge* ($\bar{x}$ = 2.62) also falls within the moderate range.

Table 2: *What is the extent to which indigenous knowledge is documented and preserved?*

Statements	**SA** F (%)	**A** F (%)	**D** F (%)	**SD** F (%)	**Mean ($\bar{x}$)**	**Std. Dev. (σ)**
Oral indigenous knowledge is recorded and archived by the library.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
Indigenous knowledge resources are properly catalogued and organized for easy access.	2 (15.4)	5 (38.5)	4 (30.8)	2 (15.4)	2.54	0.94
The library has adequate facilities for preserving indigenous knowledge materials.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93

The current level of preservation of indigenous knowledge in the library is satisfactory.	1 (7.7)	4 (30.8)	6 (46.2)	2 (15.4)	2.31	0.85
There are policies guiding the documentation and preservation of indigenous knowledge in the library.	1 (7.7)	3 (23.1)	6 (46.2)	3 (23.1)	2.15	0.90
Indigenous knowledge resources are systematically documented in the library.	1 (7.7)	4 (30.8)	5 (38.5)	3 (23.1)	2.23	0.93
The library uses digital technologies to preserve indigenous knowledge.	2 (15.4)	3 (23.1)	5 (38.5)	3 (23.1)	2.31	0.98
Oral religious knowledge (e.g., sermons, lecturers, etc.) are recorded and archived by the library.	2 (15.4)	4 (30.8)	4 (30.8)	3 (23.1)	2.38	0.96
Grand Mean = 2.36						

The data in Table 2 present the extent to which indigenous knowledge (IK) is documented and preserved in the Kwara State Public Library. The grand mean of 2.36 indicates a low to moderate level of documentation and preservation of indigenous knowledge within the library. Specifically, the statement *"Indigenous knowledge resources are properly catalogued and organized for easy access"* recorded the highest mean ($\bar{x}$ = 2.54), suggesting that respondents perceive some level of organization of available resources, although not sufficiently strong. Similarly, *oral indigenous knowledge being recorded and archived* ($\bar{x}$ = 2.46) and *availability of preservation facilities* ($\bar{x}$ = 2.46) also fall within the moderate range, indicating partial efforts in documentation and preservation. However, several key areas recorded relatively low mean scores, reflecting notable gaps. The statement *"There are policies guiding the documentation and preservation of indigenous knowledge in the library"* had the lowest mean ($\bar{x}$ = 2.15), indicating a lack of formal policy frameworks. Likewise, *systematic documentation of indigenous knowledge* ($\bar{x}$ = 2.23) and *use of digital technologies for preservation* ($\bar{x}$ = 2.31) suggest insufficient adoption of structured and modern preservation approaches. Furthermore, the perception that *the current level of preservation is satisfactory* ($\bar{x}$ = 2.31) indicates general dissatisfaction among respondents. The recording and archiving of *oral religious knowledge* ($\bar{x}$ = 2.38) also remain limited, further highlighting gaps in capturing diverse forms of indigenous knowledge.

Table 3: *What are the community-based information services provided in support of indigenous knowledge and sustainable development?*

Statements	**SA** F (%)	**A** F (%)	**D** F (%)	**SD** F (%)	**Mean ($\bar{x}$)**	**Std. Dev. (σ)**
The library conducts workshops and training related to indigenous knowledge practices.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
The library collaborates with local communities to share indigenous knowledge.	3 (23.1)	5 (38.5)	3 (23.1)	2 (15.4)	2.69	0.98
Exhibitions and cultural events are organized to showcase indigenous knowledge.	2 (15.4)	5 (38.5)	4 (30.8)	2 (15.4)	2.54	0.94
The library organizes outreach programs to promote indigenous knowledge.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
The library provides access to information that supports sustainable development using indigenous knowledge.	3 (23.1)	4 (30.8)	4 (30.8)	2 (15.4)	2.62	0.96
Mobile library services are used to disseminate indigenous knowledge to rural communities.	1 (7.7)	3 (23.1)	6 (46.2)	3 (23.1)	2.15	0.90
Indigenous knowledge is integrated into user education and information literacy programs.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
Grand Mean = 2.48						

The data in Table 3 show the extent to which community-based information services are provided by the Kwara State Public Library to support indigenous knowledge (IK) and sustainable development. The grand mean of 2.48 indicates a moderate but relatively weak level of service provision, suggesting that while some efforts exist, they are not sufficiently developed or consistent. Among the items, *"The library collaborates with local communities to share indigenous knowledge"* recorded the highest mean ($\bar{x}$ = 2.69), indicating that respondents perceive some level of engagement between the library and community members. Similarly, *access to information that supports sustainable development using indigenous knowledge* ($\bar{x}$ = 2.62) reflects moderate provision of relevant information services. However, several service areas recorded lower mean scores. For instance, *workshops and training related to indigenous knowledge*

practices ($\bar{x}$ = 2.46) and *outreach programs to promote indigenous knowledge* ($\bar{x}$ = 2.46) indicate that such initiatives are not regularly or effectively implemented. Likewise, *exhibitions and cultural events* ($\bar{x}$ = 2.54) and *integration of indigenous knowledge into user education programs* ($\bar{x}$ = 2.46) suggest only moderate engagement in promoting indigenous knowledge through structured library activities. The lowest mean was recorded for *mobile library services used to disseminate indigenous knowledge to rural communities* ($\bar{x}$ = 2.15), indicating a significant weakness in extending services beyond the library to underserved populations. This suggests that rural outreach, which is critical for indigenous knowledge dissemination, is largely inadequate.

Table 4: *What is the level of community participation and engagement related to indigenous knowledge systems facilitated?*

Statements	**SA** F (%)	**A** F (%)	**D** F (%)	**SD** F (%)	**Mean ($\bar{x}$)**	**Std. Dev. (σ)**
There is strong collaboration between the library and the community in preserving indigenous knowledge.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
The library provides platforms for community members to share their knowledge.	2 (15.4)	5 (38.5)	4 (30.8)	2 (15.4)	2.54	0.94
Community members actively contribute indigenous knowledge to the library.	1 (7.7)	4 (30.8)	6 (46.2)	2 (15.4)	2.31	0.85
Awareness of indigenous knowledge services provided by the library is high among community members.	1 (7.7)	3 (23.1)	6 (46.2)	3 (23.1)	2.15	0.90
The library engages local knowledge holders (e.g., elders, artisans, farmers) in its programs.	2 (15.4)	4 (30.8)	5 (38.5)	2 (15.4)	2.46	0.93
Community members participate in library-organized indigenous knowledge activities.	2 (15.4)	3 (23.1)	6 (46.2)	2 (15.4)	2.38	0.87
Grand Mean = 2.38						

The data presented in Table 4 reveal the level of community participation and engagement in indigenous knowledge (IK) activities facilitated by the Kwara State Public Library. The grand mean of 2.38 indicates a low level of community participation and engagement, suggesting that community involvement in indigenous knowledge initiatives is generally weak. Specifically, the statement *"The library provides platforms for community members to share their knowledge"* recorded the highest mean ($\bar{x}$ = 2.54), indicating that such platforms exist to some extent. Similarly, *"There is strong collaboration between the library and the community in preserving indigenous knowledge"* ($\bar{x}$ = 2.46) and *"The library engages local knowledge holders (e.g., elders, artisans, farmers) in its programs"* ($\bar{x}$ = 2.46) show moderate but insufficient levels of engagement between the library and the community. However, several indicators reflect weak participation. *Community participation in library-organized indigenous knowledge activities* recorded a mean of ($\bar{x}$ = 2.38), while *community members actively contributing indigenous knowledge to the library* scored ($\bar{x}$ = 2.31), indicating limited direct involvement of community members in knowledge-sharing processes. The lowest mean was recorded for *awareness of indigenous knowledge services provided by the library* ($\bar{x}$ = 2.15), suggesting that many community members are not sufficiently aware of the indigenous knowledge-related services available. This low awareness likely contributes to the overall weak participation observed across other indicators.

Table 5: *What are the challenges encountered in managing and promoting indigenous knowledge systems for sustainable development?*

Statements	**SA** F (%)	**A** F (%)	**D** F (%)	**SD** F (%)	**Mean ($\bar{x}$)**	**Std. Dev. (σ)**
Lack of ICT facilities affects the documentation of indigenous knowledge.	5 (38.5)	5 (38.5)	2 (15.4)	1 (7.7)	3.08	0.90
Indigenous knowledge is difficult to document due to its oral nature.	4 (30.8)	6 (46.2)	2 (15.4)	1 (7.7)	3.00	0.88
Inadequate funding limits the preservation of indigenous knowledge in the library.	6 (46.2)	5 (38.5)	1 (7.7)	1 (7.7)	3.23	0.86
Limited collaboration with local communities hinders indigenous knowledge preservation.	4 (30.8)	5 (38.5)	3 (23.1)	1 (7.7)	2.92	0.90
Language barriers affect the documentation and dissemination of indigenous knowledge.	3 (23.1)	6 (46.2)	3 (23.1)	1 (7.7)	2.85	0.85

Lack of government policies affects the management of indigenous knowledge.	5 (38.5)	4 (30.8)	3 (23.1)	1 (7.7)	3.00	0.93
There is a shortage of trained personnel to manage indigenous knowledge resources.	4 (30.8)	5 (38.5)	3 (23.1)	1 (7.7)	2.92	0.90
There is low awareness of the importance of indigenous knowledge among stakeholders.	3 (23.1)	5 (38.5)	4 (30.8)	1 (7.7)	2.77	0.89
Grand Mean = 2.97						

The data presented in Table 5 show the challenges encountered in managing and promoting indigenous knowledge (IK) systems in the Kwara State Public Library. The grand mean of 2.97 indicates that respondents generally agree that there are significant challenges affecting the effective documentation, preservation, and dissemination of indigenous knowledge. Among the identified challenges, *inadequate funding limiting the preservation of indigenous knowledge* recorded the highest mean score ($\bar{x}$ = 3.23), indicating that financial constraints are the most critical impediment to effective IK management in the library. Similarly, *lack of ICT facilities affecting documentation* ($\bar{x}$ = 3.08) and both *difficulty in documenting IK due to its oral nature* and *lack of government policies affecting management* ($\bar{x}$ = 3.00 each) were strongly agreed upon by respondents, showing that technological and policy-related issues significantly hinder indigenous knowledge preservation efforts. Other challenges, such as *limited collaboration with local communities* ($\bar{x}$ = 2.92) and *shortage of trained personnel* ($\bar{x}$ = 2.92), also indicate moderate to high agreement, suggesting that human resource capacity and community engagement are insufficient. Furthermore, *language barriers* ($\bar{x}$ = 2.85) and *low awareness of the importance of indigenous knowledge among stakeholders* ($\bar{x}$ = 2.77) reflect additional constraints that affect effective communication, documentation, and utilization of indigenous knowledge resources.

Discussion of Findings

The findings of this study provide important insights into the availability, documentation, dissemination, community engagement, and challenges associated with Indigenous Knowledge (IK) within the Kwara State Public Library, as well as its implications for sustainable development.

The study revealed a moderate level of availability of indigenous knowledge resources in the library. Resources related to traditional agriculture and cultural heritage were relatively more available than others. This finding aligns with the view of scholars such as Mhlongo and Ngulube (2020), who noted that while public libraries in developing countries may hold some indigenous knowledge materials, such resources are often fragmented and not comprehensively developed. It also supports the view of Ogunkeyede et al. (2023) that many public libraries in developing contexts still hold limited but unevenly distributed indigenous knowledge collections, with stronger emphasis on cultural and agricultural materials compared to other domains such as health or environmental knowledge. Similarly, Owolabi et al. (2021) revealed that indigenous knowledge resources in Nigerian public libraries are often not adequately represented or systematically organized, although agriculture, medicine, and cultural heritage materials tend to dominate available collections. In addition, earlier study confirm that IK resources in many public libraries remain incomplete and unevenly documented, largely due to funding constraints and weak acquisition systems, which affects the breadth of available indigenous knowledge materials (Adeniyi & Subair, 2013).

Findings also showed a low to moderate level of documentation and preservation, indicated a weak institutional structures for managing indigenous knowledge and the absence of strong policy frameworks and limited use of digital technologies reflect systemic gaps in preservation practices. This is consistent with Ogunkeyede et al. (2023), who emphasized that although indigenous knowledge is widely recognized as valuable for sustainable development, its preservation in many African libraries remains fragmented and poorly structured due to absence of comprehensive policies and standardized documentation frameworks. Also, Sarkhel (2016), who emphasized that failure to formally document indigenous knowledge increases the risk of its gradual loss. The findings also supports the report of Owolabi et al. (2021) that many public libraries in Nigeria and other developing contexts still face significant challenges in documenting indigenous knowledge due to inadequate infrastructure, limited ICT integration, and weak institutional support systems. Similarly, Chigwada and Ngulube (2023) revealed that technological obsolescence, inadequate funding, and lack of digital preservation tools continue to hinder effective indigenous knowledge management in libraries, resulting in poor documentation and restricted access to IK resources. Lwoga, Ngulube, and Stilwell (2017) observed that indigenous knowledge in many African contexts remains largely undocumented due to reliance on oral transmission and weak institutional support. The result also supports

Furthermore, the study found that community-based information services are provided at a moderate but insufficient level. Activities such as collaboration with communities and exhibitions exist but are not robust or consistent. This aligns with Ogunkeyede et al. (2023) that libraries attempt to support indigenous knowledge dissemination through community engagement activities, such efforts are frequently inconsistent and underfunded, reducing their effectiveness in promoting sustainable development outcomes. Similarly, Chigwada and Ngulube (2023) reported that public libraries in developing contexts often engage in limited and irregular community-based programmes, with weak continuity in outreach, exhibitions, and participatory knowledge-sharing initiatives due to resource and capacity constraints. In addition, Kom and Nethengwe (2024) indicated that effective community-based information services require strong

institutional collaboration and sustained engagement with local knowledge holders, which is often lacking in many public library systems in Africa. Also, Mapara (2009) who stressed that effective indigenous knowledge dissemination depends heavily on active community participation and structured outreach programs. The limited use of mobile library services further reflects weak rural outreach, which contradicts the expectations of public libraries as community-centered institutions (IFLA, 2020).

Also, the findings indicated a low level of community participation, suggesting weak engagement between the library and indigenous knowledge holders. Awareness of library services was particularly low. This supports Osuchukwu and Udeze (2021), who argued that libraries must actively engage communities to preserve cultural heritage effectively. Similarly, Ogunkeyede et al. (2023) revealed that indigenous knowledge preservation depends heavily on active involvement of local communities but many public libraries still experience low community awareness and minimal participation in knowledge-sharing programmes, which weakens the effectiveness of IK initiatives. Reyes-García et al. (2013) noted that indigenous knowledge systems thrive only when communities are actively involved in knowledge creation and sharing processes. The result also reflects. In addition, research highlights that sustainable indigenous knowledge systems require continuous interaction between libraries and community custodians of knowledge such as elders, artisans, and farmers; however, this collaboration is often underdeveloped in many African library settings (Kom & Nethengwe, 2024). Chigwada and Ngulube (2023) reported that community participation in indigenous knowledge initiatives within library systems is often limited due to weak outreach strategies, inadequate sensitization, and poor engagement structures between libraries and local knowledge holders.

Lastly, the study revealed that respondents agreed strongly that multiple challenges hinder indigenous knowledge management. The most significant challenges identified were inadequate funding, lack of ICT facilities, and weak policy frameworks. This agrees with Ogunkeyede et al. (2023), who emphasized that weak institutional and policy frameworks, combined with limited financial support, continue to undermine the capacity of public libraries to effectively manage and promote indigenous knowledge for sustainable development. Similarly, Ilori et al. (2021) highlighted that ICT limitations and inadequate staffing significantly affect indigenous knowledge preservation efforts in libraries. Furthermore, Chigwada and Ngulube (2023) found that the management of indigenous knowledge is significantly affected by resource constraints and inadequate digital infrastructure, which hinder proper acquisition, storage, and dissemination of indigenous knowledge materials in library systems.

Collectively, the findings indicated that although the Kwara State Public Library has some involvement in indigenous knowledge management, its efforts remain limited, fragmented, and under-developed. This weak integration reduces the potential of indigenous knowledge to contribute effectively to sustainable development goals such as education, environmental management, cultural preservation, and community empowerment. The findings reinforce the argument that public libraries can play a transformative role in sustainable development only when supported by adequate funding, policy frameworks, ICT infrastructure, and strong community partnerships.

Conclusion

This study examined Indigenous Knowledge (IK) systems and community-based information services for sustainable development, focusing on the role of the Kwara State Public Library. The findings reveal that although indigenous knowledge resources exist within the library, their availability is only moderate, with stronger representation in areas such as agriculture and cultural heritage compared to other domains like local language materials and traditional crafts. The study further established that the documentation and preservation of indigenous knowledge are weak and largely unstructured, with limited use of ICT tools and an absence of strong policy frameworks to guide systematic management. Community-based information services were found to be moderately provided, but they remain insufficient in scope, particularly in rural outreach and structured engagement activities. In addition, the level of community participation and engagement in indigenous knowledge initiatives was found to be low, indicating weak awareness and limited involvement of local knowledge holders in library programmes. The study also identified several challenges hindering effective indigenous knowledge management, including inadequate funding, lack of ICT infrastructure, shortage of trained personnel, weak policy support, and limited collaboration with local communities. The study concludes that while the Kwara State Public Library has the potential to serve as a key institution for the preservation and promotion of indigenous knowledge, its current practices are not fully developed to support sustainable development objectives. Strengthening institutional capacity, improving funding, enhancing ICT integration, developing supportive policies, and fostering stronger community partnerships are essential for improving indigenous knowledge management and maximizing its contribution to sustainable development.

Recommendations

Based on the findings of the study, the following recommendations are made to enhance the role of the Kwara State Public Library in the documentation, preservation, and dissemination of Indigenous Knowledge (IK) for sustainable development:

1. The government and relevant stakeholders should increase funding allocated to public libraries to support the collection, documentation, digitization, and preservation of indigenous knowledge resources.

2. The library should be equipped with adequate ICT facilities such as computers, scanners, audio-visual recording tools, and digital storage systems to support the effective documentation and preservation of indigenous knowledge.
3. Clear policies should be formulated at institutional and governmental levels to guide the systematic documentation, management, and protection of indigenous knowledge in public libraries.
4. The library should strengthen collaboration with local communities, especially elders, artisans, farmers, and other knowledge holders, to ensure active participation in indigenous knowledge documentation and sharing activities.
5. Mobile library services and outreach programmes should be expanded to rural communities to improve access to indigenous knowledge resources and encourage wider participation.
6. Indigenous knowledge should be systematically integrated into user education programmes, exhibitions, workshops, and information literacy activities to promote awareness and utilization.
7. The library should intensify awareness campaigns to educate the public on the importance of indigenous knowledge and available services, thereby encouraging greater community involvement.
8. Public libraries should collaborate with universities and research institutions to support the documentation, validation, and preservation of indigenous knowledge for sustainable development.

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INFLUENCE OF AWARENESS ON THE USE OF SMART AGRICULTURAL TECHNOLOGY FOR IMPROVED PRODUCTION BY SMALLAHOLDER FARMERS IN FUNTUA ZONE, KATSINA STATE, NIGERIA

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Abstract

This study investigated the Influence of awareness on the use of smart agricultural technology for improved production among smallholder farmers in Funtua zone of Katsina State Nigeria and the specific objectives include: to determine the level of awareness of smart agricultural technology for improved production by smallholder farmers in Funtua zone of Katsina state, to identify the types of smart agricultural technology that are being used by smallholder farmers for improved production in the study area. The study was guided by positivism research paradigm where quantitative research method using descriptive survey research design was adopted. The population comprised of all registered smallholder farmers in Funtua Zone which was two thousand and thirty-four (2034). Multi-stage cluster sampling using proportionate allocation was used to select two hundred and sixty (260). Questionnaire was the instrument used for data collection and the data collected was analyzed using descriptive and inferential statistics. The finding of the study revealed limited influence on the awareness and heavy reliance on informal sources like family, friends, and radio. Based on the findings of the study, it is recommended that the state government should launch a comprehensive awareness campaign utilizing effective local communication channels. Leveraging the influence of family, friends, and radio already identified as key information sources can amplify outreach efforts.

Keywords: Influence, Awareness, Use, Smallholder farmers, Smart Agricultural technology

Introduction

This study investigated the influence on the awareness and use of smart agricultural technologies for improved production among smallholder farmers in the Funtua Zone of Katsina State, Smart agriculture or precision agriculture is a farming management concept that uses technology and data to increase efficiency and productivity. According to Shilomboleni (2020), some of the technologies that are used in smart agriculture include Sensors, Global Positioning System, Drones, and Satellite Imagery. These technologies allow smallholder farmers to monitor their crops and fields in real time, so as to make informed decisions about irrigation, pest control, and other factors that can affect crop yield. The goal of smart agriculture is to provide smallholder farmers with the necessary information and gadgets they will need to make better decisions about their crops and operations.

Historically in the 1950s and 1960s, farmers began using computerized controls to operate these machines. This made farming more precise and efficient, and it also laid the groundwork for the next stage of smart agriculture. One of the most important developments during this stage was the use of Global Positioning System (GPS) technology in agriculture. In the 1980s, the United State (US) Department of Defense began developing GPS, which allowed for very precise location information. In the 1990s, GPS technology was adapted for use in farming, and it revolutionized the way farmers could monitor and control their operations (Shilomboleni, 2020). The next stage was the introduction of satellite-based technologies in the 1990s and 2000s. These technologies allowed for even more precise data collection and analysis, and they also allowed for real-time monitoring of crops and weather conditions. This meant that farmers could make better decisions about irrigation, fertilization, and pest control. This stage also saw the development of systems like precision agriculture, which uses GPS and other sensors to monitor and control individual plants (Kamilaris, Kontos, & Vlachos, 2022).

Hermans et al. (2022) reported that the high rate of adopting smart agriculture in the United Kingdom which was achieved through proper strategizing awareness level, understanding the benefits of smart agriculture to farmers and their educational level and experiences in farming activities led to change into farmers' attitude towards the adoption of smart agriculture in the country. He explained that the government has invested in initiatives like the Agri-Tech Catalyst,

which supports the development of new technologies for farming and also a growing number of companies developing smart agriculture solutions like use of sensors to measure the water and nutrient contents of the soil.

According to Umar and Johnson (2017), the internet brought about a revolution in agriculture, as farmers were able to access a wealth of information and resources online. This included weather data, commodity prices, and even the ability to control machinery remotely. This stage also saw the development of online platforms like Google Earth, which allow for detailed satellite imagery of farms and fields. The fourth and final stage of smart agriculture was the use of big data analytics and artificial intelligence. This stage began in the 2010s, and it involves the use of algorithms to analyse large amounts of data from sensors, satellites, and other sources. These algorithms can be used to make predictions about crop yields, pest outbreaks, and other factors that can affect farming operations.

Influence on the awareness and use of smart agricultural technology or precision agriculture could improve their production which refers to the efficient use of inputs and technologies such as land, labor, seeds, water, and fertilizers to produce outputs like crops, livestock, and other farm products. Improving agricultural productivity is essential for smallholder farmers in the 21st century, this therefore influenced on the awareness about smart agricultural technologies can promote their effective utilization, helping farmers to enhance productivity and achieve sustainable farming practices.

In Nigeria, Ojo, Osato and Adebowale (2021) reported that lack of proper influence, awareness and skills have been very common challenges in many of the African countries including Nigeria, where farmers may not have access to information about new technologies and the resources to adopt them. Funtua Zone in Katsina State is a key agricultural heartland in Nigeria's Northwest, where farming is the cornerstone of both livelihood and local economic life. Located in the fertile North Central highland at an elevation of about 733 m above sea level, Funtua benefits from a favorable agro-climatic regime, including a rainy season that stretches from May to October with relatively high annual rainfall approximately 1,120 mm making it exceptionally suitable for cultivation (Maigari, Dantati & Arafat, 2021).

The zone is notable for producing a variety of both food and cash crops, including maize, rice, soybeans, guinea corn, cotton, groundnut, and sugarcane. Indeed, Katsina State as a whole accounts for significant national outputs in multiple agricultural products, with Funtua and surrounding areas (such as Bakori, Malumfashi, and Kankara) being major centers for maize and soybean production, as well as raw materials vital to agro-allied industries like milling, oil production, and textiles Despite its agricultural potential, many smallholder farmers in Funtua Zone operate with limited resources and face productivity constraints (Dangiwa & Ndawayo, 2022). As such the study focuses on the influence on the awareness and use of smart agricultural technologies not only in enhancing smallholder farmers' access to vital information, but also in overcoming systemic barriers to productivity and sustainable livelihood in Funtua Zone. In a view of this, this study investigates influence on the awareness and use of smart agricultural technology for improved production among Smallholder Farmers in Funtua Zone of Katsina state, Nigeria.

Statement of the problem

The use of smart agricultural technology for improved agricultural production is pervasive and crucial for ensuring food security (Hassan et.al. 2022) Despite the global shift towards the use of smart agricultural technologies such as precision farming tools, mobile-based advisory systems, modern irrigation technologies, drones, sensors, and climate smart innovations, **many smallholder farmers continue to rely on traditional farming practices that limit productivity, market access, and sustainability.** In many developing agricultural communities, awareness of the existence, benefits, and applicability of smart agricultural technologies remained low, while the level of actual utilization is even more limited. However, investigation made by the researchers reveals that despite the numerous values, opportunities and importance of smart agricultural technologies for improve agricultural productivity, their usage by smallholder farmers in Katsina state and Funtua zone in particular where farming activities have been the major occupation and means of lively hood is very limited. As such the study set out to determine the level of awareness and use of smart agricultural technology for improved production in the study area.

Research Objectives

The following objectives guided this study:

- To determine the level of awareness of smart agricultural technology for production among smallholder farmers in Funtua Zone of Katsina state.
- To identify the types of smart agricultural technologies that are being used by smallholder farmers for improved production in the study area.
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Research Hypothesis

The study was guided by the following null hypotheses:

$H0_1$: Level of awareness of smallholder farmers' have no significant influences on the use of smart agricultural technology for improved production in Funtua zone of Katsina State.

Literature Review

The literature Review covered the theoretical and conceptual frameworks as well as empirical research on the influence on the awareness and use of smart agricultural technology for improved production among smallholder farmers in funtua zone of katsina state, Nigeria.

Theoretical Framework for the study

A theoretical framework is a set of concepts and theories that are used to explain a particular phenomenon. In the case of the influence on the awareness and use of smart agricultural technologies, the theoretical framework would include theories related to technology adoption, such as the ASABC model, and Technology Readiness model. These models can help to explain why and how smallholder farmers decide to adopt or not adopt smart agriculture technologies. The study was guided based on ASABC and Technology Readiness (TR) into the Technology Acceptance Model (TAM) (i.e. TRAM) Models. The development of the ASABC model has a long history and it was first proposed in the 1990s by a team of researchers at the University of Minnesota. The model was based on an earlier model called the Theory of Planned Behavior, which was developed in the 1980s. The Theory of Planned Behavior is a social psychology model that proposes that three factors - attitude, subjective norms, and perceived behavioral control - influence a person's intention to perform a behavior (Foo, Ismail, Azmi, Bazeley, & Appelbaum, 2022). In 1990's, the ASABC model was developed by a team of researchers led by Dr. Julia Angstman, a professor of agricultural communications at Purdue University. This research has been published in several peer-reviewed journals, including the Journal of Agricultural Education and Communication, the Journal of Extension, and the Journal of the American Society of Agronomy. The ASABC model means Awareness, Skills, Attitude, Benefits and Challenges (ASABC) model. The model applies to this study in the following ways:

1. **Awareness**: refers to the extent to which farmers are aware of the existence of smart agriculture technologies. The awareness component of the model refers to whether or not a farmer is aware of the existence of a particular technology. Without awareness, a farmer cannot even consider adopting a technology. Awareness can be influenced by factors such as media coverage, word-of-mouth communication, and personal experiences (Singh, Sudhakar &Yigitcanlar, 2020). Awareness also refers to the farmer's understanding and knowledge of smart agriculture for improved productivity. It may also mean farmers' understanding of what the technology is, how it works, and what the benefits are. This understanding can help farmers decide if smart agriculture is right for them and how to implement it on their farms. Hassan, Aitazaz, Farhat, Bishnu and Travis (2022) posited that creating awareness and educating farmers about the benefits of smart agriculture is an important part of the process. The authors also explained one way is to work with farmer associations and organizations to provide training and information about the smart technologies. Secondly, is to partner with the media to create content that educates farmers about the technology.

Kamilaris, Kontos and Vlachos (2022) found that the United States has been at the forefront of smart agriculture technology, and there is a high level of awareness among farmers. Many US farmers have adopted some form of smart agriculture technology, such as soil moisture sensors or GPS mapping. However, not all farmers have adopted the technology, and there is still a need for education and training. Some organizations, such as the USDA and state agricultural extension services, are working to increase awareness and adoption of smart agriculture. Rheeder, Du Plessis and Nel (2021) the level of awareness of smart agriculture in African countries varies widely. In South Africa, for example, there is a growing interest in smart agriculture technologies, with companies like Aerobotics and Crop X working on solutions for the country's farmers. In other African countries, like Ghana and Nigeria, there is also a growing interest in smart agriculture, but the level of awareness is not as high as in South Africa. However, there is a lot of potential for growth in these countries, as more and more farmers are looking for ways to increase their productivity.

In African countries, Shilomboleni (2020); Mitchell, Kinuthia and Winowiecki, (2021); Mutual, Kivilu and Nhampossa (2021) highlighted several ways to make farmers aware of smart agriculture technologies and their potential benefits. One way is through farmer training programs, where farmers can learn about the latest technologies and how to use them. One example is *Farmer Field School (FFS*) model, which has been used in countries like Kenya, Tanzania, and Ghana. FFSs are usually conducted on a farm, and they involve hands-on learning about new technologies and farming practices. The FFS model has been successful in increasing farmers' knowledge and adoption of new technologies. Another example of a farmer training program is the *African Institute for Mathematical Sciences (AIMS) Agriculture Program*, which trains young Africans in the latest mathematical and computational techniques for agriculture.

However, in Nigeria Fanen and Olalekan (2018) reported that, extension services delivery is one of effective means of making farmers to be aware about new agricultural technologies. Kandji, Simon and Young (2020) revealed that Nigeria has also seen some success in using mobile phones to educate farmers about new agricultural activities. For example, the organization eHealth Africa has developed a mobile phone application called *AgroPedia*. This application provides farmers with information on crop production, livestock management, and food processing. It also allows farmers to connect with each other and with extension officers. Another example is the work of the organization *Digital Green*, which uses video to educate farmers about agricultural techniques. Another way is through agricultural extension services, where government or NGO workers can visit farms and provide information and training on new technologies.

Another option is to use the media, such as radio and television, to educate farmers about new agriculture technologies (Osiru&Igberi, 2019).

2. **The Use of Smart Agricultural technology:** is one of the primary assumption of the ASABC Model which deals with the application of digital technologies to improved agricultural productivity, efficiency, and sustainability. These technologies include precision agriculture, the internet of thing (IoT), big data analytics, and machine (Berente et al, 2021). They are used to collect and analyze data on soil, water, and crop conditions, and to make decisions on how to optimize agricultural production. Smart agriculture can also help farmers to track their resources, monitor their operations, and respond to changes in the environment. According (Berente et.al., 2021; Marks, Stokes, & Holmes, 2021), one application of smart agriculture that is mostly used in the world is drones, which is used to monitor crops and soils. Drones can be equipped with sensors to collect data on the moisture content, temperature, and nutrient levels of soils. This data can be used to optimize irrigation and fertilization, and to detect and respond to problems such as pests or diseases. Another application is the use of IoT-enabled sensors to monitor water levels and quality in irrigation systems. This information can be used to optimize water use and prevent waste.

(Berente, Mussell& Cross, 2021; Marks, Stokes, et. al. 2021) indicated a number of factors that have been found to influence farmers' use of smart agricultural technologies in the UK. Some of the most important factors include:

a. Perceived benefits: Farmers are more likely to adopt technologies that they believe will have significant benefits, such as improving productivity or reducing costs.

b. Perceived barriers: Factors like cost, time, and a lack of knowledge or skills can act as barriers to adoption.

c. Social influence: The attitudes and behaviors of others in the farming community can also have a significant impact on a farmer's decision to adopt new technologies.

Methodology

The study adopted a descriptive survey research design. The population of the study comprised all the registered smallholder farmers who belong to the farmers' association at the eleven (11) local government areas in Funtua zone totaling two-thousand and thirty-four (2034). A multi-stage cluster sampling technique was adopted for this study, using a balloting method to select the local government areas as clusters. The researcher used plain paper and wrote the names of the eleven (11) local government, the names were folded and put inside a container and then shaken. Eventually, Dandume, Kafur, Malumfashi and Funtua were selected randomly and emerged as clusters of those four LGAs. In the process of selecting the sample size of this study, a table for determining sample size by Research advisors (2006) was used to obtain the required number of respondents. According to the table, the required sample size of the study population is 260. A questionnaire was used as an instrument for data collection and a reliability coefficient of .891 was obtained. The data collected was analyzed using descriptive statistics in the form of simple frequency tables, percentages, means and standard deviation.

Findings

A total of two hundred and sixty (260) copies of questionnaire were distributed to the smallholder farmers from the twenty-seven (27) farmers' association in Funtua Zone and two-hundred and seven (207) of the respondents were duly completed and returned representing 80.0% response rate. The high response rate was achieved largely due to consistent follow-ups by the researcher, along with the persistence of the research assistants employed for the study.

Level of awareness of smart agricultural technology for improved production among smallholder farmers in Funtua zone of Katsina State?

The respondents were asked to indicate the level of awareness of smart agricultural technology for improved production among smallholder farmers in Funtua zone of Katsina State. The responses of the smallholder farmers along with the mean scores and standard deviations is presented in Table 1 as follows:

Table 1: **Level of awareness of smart agricultural technology for improved production among smallholder farmers in Funtua zone of Katsina State (N207)**

Technology	**NA**		**SA**		**SWA**		**MA**		**EA**		**Mean**	**STD**
Water Smart Technology	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**		
Rainwater Harvesting Technology	70	33.8	90	43.5	29	14.0	18	8.7	0	0	1.98	.91
Drip farming system Technology	80	38.6	100	48.3	27	13.0	0	0	0	0	1.74	.67
Cover crops method Technology	100	48.3	70	33.8	28	13.5	9	4.3	0	0	1.74	.85
Furrow-irrigated raised bed planting Technology	120	58.0	69	33.3	18	8.7	0	0	0	0	1.56	.65

Drainage management Technology	110	53.1	50	24.2	20	9.7	27	13.0	0	0	1.83	1.1
Energy-smart technologies												
Solar pumps Technology	80	38.6	80	38.6	38	18.4	9	4.3	0	0	1.88	.86
Zero tillage or minimum tillage Technology	80	38.6	90	43.5	19	9.2	18	8.7	0	0	1.88	.90
Nutrient-smart technologies									0	0		
Mulching Technology	70	33.8	80	33.8	30	14.5	27	13.0	0	0	2.07	1.00
Green manure Technology	70	33.8	90	43.5	29	14.0	18	8.7	0	0	1.98	.91
Integrated nutrient management Technology	70	33.8	80	38.6	29	14.0	28	13.5	0	0	2.07	1.00
Leaf color chart Technology	50	24.2	100	48.3	10	4.8	47	22.7	0	0	2.26	1.1
Intercropping rice with legumes Technology	90	43.5	70	33.8	47	22.7	0	0	0	0	1.79	.79
Weather-smart technologies												
Crop insurance Technology	130	62.8	50	24.2	27	13.0	0	0	0	0	1.50	.72
Weather-based crop agro-advisories Technology	70	33.8	90	43.5	38	18.4	9	4.3	0	0	1.93	.83
Climate information (seasonal and in season) Technology	100	48.3	80	33.8	27	13.0	0	0	0	0	1.65	.70
Carbon-smart technologies												
Agro-forestry Technology	167	80.7	40	19.3	0	0	0	0	0	0	1.19	.40
Integrated pest management Technology	170	82.1	37	17.9	0	0	0	0	0	0	1.18	.38
Bio-gas Technology	159	76.8	39	18.8	9	4.3	0	0	0	0	1.28	.54

Source: Field Data, 2024 Key: Not at all Aware -1 SA: Slightly Aware -2 SWA: Somewhat Aware - 3 MA: Moderately Aware- 4 EA: Extremely aware – 5

The finding revealed that smallholder farmers in the Funtua zone of Katsina State exhibit low awareness of smart agriculture technologies, with all mean scores below 3.00. The most notable findings are the very low awareness of specific technologies like water-smart and energy-smart technologies, and the relatively higher awareness of nutrient-smart technologies, though still insufficient. This limited awareness underscores a significant barrier to adopting smart agriculture, potentially impeding improvements in agricultural productivity

Mark and Griffin (2020) in their different studies revealed high level of influence on the awareness to some of the smart agricultural technology and they are always becoming aware of smart agriculture through farmer networks and associations, which provide information and resources on new technologies and through universities and research centers, which conduct research on smart agriculture and share their findings with farmers. The internet and social media were also playing significant role in spreading information about smart agriculture. In addition to this Sudduth and Hummel (2019) highlighted one examples of farmer network association that is spreading information about smart agriculture which is *American Farm Bureau Federation*. A followed-up question was asked by the researcher in order to identify the sources of awareness of smart agricultural technology. To achieve this, a list of possible sources of awareness was provided for the respondents to tick as many as applicable using Yes or No questions as indicated in table 2 as follows:

Table 2: Sources of awareness of smart agricultural technology for improved production among Smallholder farmers in Funtua zone of Katsina state (N=207):

Sources of Awareness	Frq	%
Radio	130	62.8
Television	80	38.6
Extension worker	97	46.9
Newspapers	70	33.8
Magazines	30	14.5

Family/friends	150	72.5
Social media	90	43.5
Through discussions	80	38.6
Exhibition and display	88	42.5

The data in table 2 sheds light on the most effective sources of awareness for these smallholder farmers. Family and friends emerged as the most significant source of awareness, with 72.5% of farmers indicating it as a primary means of obtaining information on smart technologies. Radio follows, with 62.8% of respondents relying on it as a source. This high percentage suggests that informal networks and accessible media are crucial channels through which information about smart agriculture reaches these farmers. In contrast, more formal channels like newspapers, magazines, and television have lower percentages (33.8%, 14.5%, and 38.6%, respectively), indicating that these are less effective in raising on influence on the awareness among the farmers in this region.

Types of smart agricultural technology used by smallholder farmers for improved production in Funtua zone?

The respondents were asked to indicate their opinions on the types of smart agricultural technology used by smallholder farmers for improved production. Table 3 shows the responses of the smallholder famers:

Table 3: Types of smart agricultural technology used by smallholder farmers for improved production (N=207):

Types of Smart Agricultural Technology Use	**Yes**		**No**	
Water-smart technologies	**Frq**	**%**	**Frq**	**%**
Rainwater Harvesting Technology	30	14.5	177	85.5
Drip farming system Technology	22	10.6	185	89.4
Cover crops method Technology	37	17.9	170	82.1
Furrow-irrigated raised bed planting Technology	30	14.5	177	85.5
Drainage management Technology	20	9.7	187	90.3
Energy-smart technologies				
Solar pumps Technology	3	1.4	204	98.6
Zero tillage or minimum tillage Technology	1	0.5	206	99.5
Nutrient-smart technologies				
Mulching Technology	20	9.7	187	90.3
Application of green manure Technology	81	39.1	126	60.9
Integrated nutrient management Technology	5	2.4	202	97.6
Leaf color chart Technology	4	1.9	203	98.1
Intercropping rice with legumes Technology	7	3.4	200	96.6
Weather-smart technologies				
Crop insurance Technology	1	0.5	206	99.5
Weather-based crop agro-advisories Technology	40	19.3	167	80.7
Climate information (seasonal and in dry season) Technology	50	24.2	157	75.8
Carbon-smart technologies				
Agro-forestry Technology	2	0.97	205	99.0 3
Integrated pest management Technology	3	1.4	204	98.6
Carbon-smart technologies for bio-gas Technology	1	0.5	206	99.5

Source: Field Data, 2024

The data from Table 3 reveals that the use of smart agricultural technologies among smallholder farmers in the Funtua zone is quite limited. For instance, water-smart technologies such as rainwater harvesting and drip farming systems are used by only a small percentage of farmers (14.5% and 10.6%, respectively), while nutrient-smart technologies like integrated nutrient management and leaf color charts are scarcely utilized (2.4% and 1.9%, respectively). Energy-smart technologies and carbon-smart technologies are even less common, with usage rates below 2%. On the other hand, weather-smart technologies, such as weather-based crop agro-advisories (19.3%) and climate information (24.2%), have slightly higher adoption rates but still fall short of widespread use. The low utilization rates across all types of smart agriculture suggest significant challenges to adoption, highlighting an urgent need for increased

influence on the awareness and accessibility to smart agriculture in order to enhance their use and improve agricultural productivity.

The low use of smart agriculture technologies among smallholder farmers in the Funtua zone point to the fact that there is the need for government through its relevant agencies and departments to facilitate access and use of smart agriculture by making them available for farmers at a subsidized rate. This gesture will go a long way in promoting the use of smart agriculture in the study area.

This finding differs with that of Mafini et al. (2019) who discovered that the majority of farmers in South Africa were using at least one smart agricultural technology, such as mobile phones or GPS. However, it also found that factors like lack of technical support and lack of infrastructure were barriers to adoption.

Result of Hypotheses Testing

$H0_1$: Level of awareness of smallholder farmers' has no significant influence on the use of smart agricultural technology for improve production in Funtua zone of Katsina State.

Table 4: Level of awareness of smallholders farmers' has no significant influences on the use of smart agricultural technology for improved production in the study area (N=207)

Variables	N	Mean	S.D.	R	R^2	P-value	Remark	Decision
Level of awareness	207	.80647	1.7937	.489[a]	.239	.000	Significant Rel.	**$H0_1$:** Rejected
Use of smart agriculture		.28224	1.8043					

The analysis in table 4 shows that the level of awareness significantly influences the use of smart agriculture, as evidenced by a moderate positive correlation (R = 0.489) and a significant p-value of 0.000, which is below the 0.05 threshold. This indicates that a higher level of awareness among farmers is associated with increased use of smart agriculture technologies. With an R^2 of 0.239, it is clear that awareness accounts for about 23.9% of the variability in smart agriculture use, highlighting the importance of raising awareness to enhance technology adoption. Therefore, the null hypothesis that the level of awareness does not influence the use of smart agriculture is rejected, confirming that awareness is a significant factor in promoting the use of these technologies.

Conclusion

From the findings of the study, it is concluded that a Low level of Influence on the awareness and use of smart agricultural technology for improved production among smallholder farmers in funtua zone of katsina state, with most technologies showing minimal usage. The sources of awareness predominantly rely on community-based channels such as family/friends and radio, which indicates a reliance on informal information networks, while digital and formal sources like social media and internet play a minimal role. Additionally, there are significant skill gaps in essential areas such as meteorology, GPS, and drone operations, which impede effective technology use. Although smallholder farmers are generally ready to adopt smart agriculture, there is dissatisfaction with government support and challenges related to internet access and integration with traditional practices. Farmers are open to new technologies but are skeptical about their effectiveness and hesitant to invest in them.

Recommendations

The study recommended the following:

1. State government should launch a comprehensive awareness campaign utilizing effective local communication channels. Leveraging the influence of family, friends, and radio already identified as key information sources can amplify outreach efforts. This campaign should include community-based workshops, demonstrations, and radio programs that highlight the benefits and practical applications of both water-smart and energy-smart technologies.
2. Government and other agriculture stakeholders should precisely develop and implement targeted interventions that focus on enhancing education, support, and accessibility. This could include establishing local training centers to educate farmers about the benefits and use of these technologies, providing financial and logistical support to reduce initial costs, and creating accessible platforms for technology distribution.

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INFLUENCE OF KNOWLEDGE ORGANIZATION TOOLS (KOTs) PROFICIENCY AND EXPERTISE ON EFFECTIVE KNOWLEDGE MANAGEMENT PRACTICES (KMPs) AMONG LIBRARIANS IN UNIVERSITIES IN KWARA STATE, NIGERIA

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Abstract

Effective knowledge management practices (KMPs) is an essential optimal functioning of university libraries, as it facilitates the organization, retrieval, and dissemination of information resources. This study examined the influence of knowledge organization tools (KOTs) proficiency on effective KMPs among librarians in universities in Kwara State, Nigeria, with specific focus on testing formulated hypotheses. The study adopted a descriptive survey research design of correlational type. Data were collected through a structured questionnaire administered to professional cataloguers, classifiers and librarians in selected university libraries. The data obtained were analyzed using Pearson Product Moment Correlation and Multiple Regression Analysis at a 0.05 level of significance. The results of the hypotheses tested revealed that there is a significant positive relationship between librarians' expertise in KOTs and effective KMPs ($r = 0.74$, $p < 0.05$), leading to the rejection of the null hypothesis (H_{01}). Similarly, librarians' proficiency in KOTs was found to have a significant influence on effective KMPs ($R = 0.71$, $R^2 = 0.50$, $p < 0.05$), resulting in the rejection of the null hypothesis (H_{02}). Furthermore, the multiple regression analysis indicated that knowledge organization competencies jointly predict effective KMPs, accounting for 61% of the variance in the dependent variable. The study concluded that KOTs expertise and proficiency significantly enhance effective KMPs in university libraries. It recommends continuous professional development, improved ICT infrastructure, and adequate institutional support to strengthen librarians' competencies and optimize knowledge management outcomes.

Keywords: Knowledge Organization Tools, Cataloguers, Classifiers, Librarians' Expertise, Proficiency, Knowledge Management Practices, University Libraries.

Introduction

Effective knowledge management practices (KMPs) are central to the ability of academic libraries to support learning, research, and innovation in contemporary knowledge-driven societies. At the core of these practices lies the systematic organization of information resources, which enables efficient storage, retrieval, sharing, and reuse of knowledge. Knowledge organization is a foundational component of knowledge management, as it provides the intellectual structure through which knowledge assets are captured and made accessible (Dalkir, 2017). Knowledge organisation tools (KOTs) including classification schemes, cataloguing rules, controlled vocabularies, taxonomies, thesauri, and metadata standards serve as the foundational mechanisms through which knowledge is structured and made accessible within information systems. Odeyemi and Musa (2018) reported that effective application of KOTs significantly improved access to scholarly resources and reduced retrieval time. Rowley (2017) emphasized that effective KMPs involves structuring, organizing, and facilitating access to information through classification, indexing, and metadata systems. The author reflects the shift toward digital and networked information environments, where knowledge organization tools play a crucial role in ensuring accessibility and retrieval.

In recent years, the rapid growth of digital information resources and the adoption of automated library systems have significantly transformed knowledge management processes. Libraries are no longer custodians of only physical collections but have evolved into hybrid and digital knowledge hubs that manage electronic databases, institutional repositories, and networked information systems. Adedokun, Ajayi and Soliudeen (2025) noted that academic libraries have advanced from traditional book repositories to dynamic digital platforms that support research, teaching, and innovation through comprehensive digital collection management strategies. This shift reflects a broader trend in which academic libraries are repositioning themselves as knowledge management centres that support not only access to information but also the organization, preservation, and reuse of intellectual assets. However, this transformation has heightened the demand for librarians and information professionals to possess not only basic familiarity but also advanced expertise and proficiency in the application of knowledge organisation tools. Becerril-García and Aguado-López (2018) demonstrated that metadata harvesting and transformation into RDF formats are central to modern information retrieval systems, requiring librarians to engage with semantic technologies and data interoperability standards for effective knowledge organization in digital environments.

Globally, scholars have emphasized that the effectiveness of KMPs is strongly influenced by the competence of librarians and information professionals in organizing knowledge resources (Smiraglia, 2014; Rowley, 2017). Accurate classification, precise cataloguing, and high-quality metadata creation contribute to improved information retrieval, reduced redundancy, and enhanced decision-making. Conversely, inadequate expertise in knowledge organisation tools often results in poorly structured databases, inconsistent records, limited visibility of knowledge assets, and inefficiencies in knowledge sharing. A study on knowledge sharing and cataloguing practices in Nigerian academic libraries by Olatokun and Njideaka (2020) revealed that mood pressure, workload, lack of formal training, and inadequate staffing structures hinder effective knowledge management and reduce collaboration within cataloguing units. Similarly, Posigha, Ojohwoh and Oberhiri-Oruma (2019) reported that challenges such as insufficient staffing, lack of up-to-date tools, and difficulties managing backlogs were found to affect cataloguing and classification practices, which in turn undermines effective knowledge management. In developing countries, such as Nigeria, the challenge of achieving effective knowledge management is compounded by factors such as limited training opportunities, uneven adoption of modern cataloguing standards (e.g., RDA), and inadequate technological infrastructure. While many libraries have adopted automated systems and digital repositories, the level of expertise and proficiency among librarians in using knowledge organisation tools varies considerably. Empirical research shows that many academic libraries in Nigeria still struggle with the application of up-to-date cataloguing standards to electronic information resources due to a lack of trained personnel, inconsistent application of standards, and infrastructural deficits (Ezema, Ogbuabor, & Kanu, 2025).

However, given the growing reliance on structured knowledge systems to support teaching, research, and organizational learning, there is a compelling need to examine how librarians' expertise and proficiency in knowledge organisation tools influence the effectiveness of KMPs. Understanding this relationship is essential for identifying skill gaps, guiding professional development initiatives, and informing institutional policies aimed at strengthening knowledge organization and management capabilities. This study, therefore, focuses on exploring the extent to which librarians' expertise and proficiency in the use of knowledge organisation tools influence effective KMPs within library and information environments.

Research Objectives

The main objective of this study is to examine the influence of librarians' expertise and proficiency in the use of KOTs on effective KMPs in university libraries in Kwara State. The specific objectives are to:

i. Determine the relationship between librarians' expertise in the use of KOTs and effective KMPs in university libraries in Kwara State;
ii. Examine the relationship between librarians' proficiency in KOTs and effective KMPs in university libraries in Kwara State; and

iii. Investigate the combined influence of librarians' competencies in KOTs and related factors on effective KMPs in university libraries in Kwara State.

Research Hypotheses

The following null hypotheses were formulated to guide the study and were tested at a 0.05 level of significance:

1. **H_{01}:** There is no significant relationship between librarians' expertise in the use of KOTs and effective KMPs in academic libraries in Kwara State;
2. **H_{02}:** There is no significant relationship between librarians' proficiency in KOTs and effective KMPs in university libraries in Kwara State; and
3. **H_{03}:** There is no significant relationship of combined influence of librarians' competencies in KOTs and related factors on effective KMPs in university libraries in Kwara State.

Literature Review

Knowledge organization tools (KOTs) are the standards, systems, and instruments used to represent, structure, and arrange information resources in a systematic manner to support efficient storage, retrieval, and use of knowledge. Smiraglia (2014) stated that KOTs provide intellectual and technical frameworks for organizing information across physical and digital environments and are central to effective information and knowledge management in libraries and information centres. KOTs are the instruments and standards used to implement KMPs and include classification schemes (e.g., Dewey Decimal Classification), cataloguing codes (AACR2, RDA), subject heading lists, thesauri, taxonomies, and metadata standards such as MARC and Dublin Core. Chan (2016) noted that classification schemes such as LCC provide systematic subject arrangement that supports both physical browsing and digital navigation. Smiraglia (2014) emphasized that knowledge organization provides the intellectual infrastructure upon which knowledge management systems are built. Without well-applied KOTs, information resources become fragmented, poorly described, and difficult to retrieve, thereby undermining knowledge management objectives. Hjørland (2016) argued that effective knowledge organization supports knowledge discovery and reuse by aligning information structures with users' cognitive and disciplinary needs.

Expertise and proficiency in the use of KOTs refer to librarians' technical competence, practical skills, and professional ability in applying cataloguing rules, classification schemes, and metadata standards consistently and accurately in KMPs. Rowley (2017) noted that human expertise remains a critical determinant of information system effectiveness, even in highly automated environments. Librarians' ability to interpret standards, make subject analysis decisions, and apply metadata schemas correctly significantly affects the quality of information organization. Empirical studies in Nigeria provide evidence of varying levels of proficiency among librarians. Bamise, Oluwaniyi and Igbeneghu (2019) found that librarians in Nigerian academic libraries demonstrated moderate competence in cataloguing and classification but lacked advanced skills in emerging standards such as RDA and digital metadata tools. Similarly, Sugabsen and Yinasim (2024) reported that although cataloguers in Adamawa State possessed basic cataloguing skills, the adoption of modern tools such as MARC formats and RDA was limited due to inadequate training and exposure. In a comparative study of federal and state university libraries in South-East Nigeria by Okonkwo (2024), found that cataloguers in federal university libraries demonstrated greater proficiency in electronic cataloguing and classification than those in state institutions, though differences in skills were not statistically significant, underscoring a general need for ICT training.

Knowledge management practice refers to the systematic processes and activities through which organizations create, organize, store, share, and apply knowledge to achieve institutional goals and performance improvement. In the library and information science context, Dalkir (2017) stated that KMPs are closely linked to how information resources are organized, accessed, and reused to support teaching, learning, and research. In libraries, KMPs rely heavily on effective knowledge organization to ensure that knowledge resources are accessible and reusable. Proper application of KOTs enhances metadata quality, supports interoperability between systems, and improves information retrieval efficiency. Hjørland (2016) emphasizes that knowledge organization is widely recognized as the foundation upon which other practices depend, as poorly organized knowledge resources hinder retrieval, sharing, and effective use. Empirical evidence from literature indicates a strong relationship between knowledge organization practices and effective knowledge management. Odeyemi and Musa (2018) found that automated cataloguing and classification tools improved information accessibility and reduced retrieval time in selected academic libraries in Southwest Nigeria. Similarly, Posigha, et al. (2019) reported that poor application of cataloguing and classification tools resulted in backlogs, inconsistent records, and limited access to knowledge resources in Bayelsa State libraries.

However, several challenges hinder librarians' proficiency in using KOTs effectively in developing countries. Studies have consistently identified inadequate training, insufficient staffing, limited access to updated tools, and poor ICT infrastructure as major barriers. According to the findings of Jibril, Amidu and Adamu (2021), irregular power supply and high costs of software maintenance constrained the effective use of online cataloguing tools in Nasarawa State university libraries. Similarly, Arisukwu and Ogbonna (2023) indicated that while ICT resources were available for cataloguing and classification, challenges such as lack of reliable internet access and inadequate staff training limited the effective application of KOTs. Challenges in adopting advanced metadata and linked data technologies further illustrate this gap; for example, a study on Linked Data and Linked Open Data (LOD) adoption found a very low level

of implementation in Nigerian academic libraries, largely due to limited in-depth knowledge of emerging metadata technologies and poor infrastructure (Okoroma, 2023). A recent study on digital transformation in academic libraries show that librarians are now expected to possess competencies in metadata creation, digital repository management, and automated cataloguing systems to effectively manage expanding electronic collections and ensure resource discoverability (Adedokun, Ajayi, & Soliudeen, 2025). These competencies are essential for supporting efficient KMPs in digital environments.

Methodology

This study adopted a descriptive survey research design of correlational type to examine the influence of KOTs expertise and proficiency on effective KMPs among librarians in university libraries in Kwara State, Nigeria. The study population comprised professional cataloguers, classifiers and librarians working university libraries within the state. A purposive sampling technique was used to select three university libraries (University of Ilorin; Kwara State University; and Al-Hikmah University) based on their ownership type (federal, state, and private) and total enumeration sampling technique to involve all professional librarians in the selected university libraries. A structured questionnaire was used as the instrument for data collection, with items designed to measure librarians' level of expertise and proficiency in KOTs and the effectiveness of KMPs. Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0 with inferential statistics (Pearson Product-Moment Correlation, ANOVA and Multiple Regression Analyses) to determine the extent to which expertise and proficiency in KOTs influence effective KMPs. All hypotheses were tested at the 0.05 level of significance. Respondents' participation in the study was voluntary, and they were informed of the purpose of the research. Confidentiality and anonymity were assured, and data collected were used strictly for academic and research purposes.

Analyses of Hypotheses

Table 1: *Pearson Product Moment Correlation Analysis of the Relationship between Librarians' Expertise in Knowledge Organization Tools and Effective Knowledge Management Practices.*

Variables	N	Mean ($\bar{X}$)	St.D	r-value	p-value	Decision
Librarians' Expertise in Knowledge Organization Tools	46	3.12	0.56	0.74	0.000	Significant
Effective Knowledge Management Practices	46	3.08	0.59	-	-	-

Decision Rule: *If p-value < 0.05, reject the null hypothesis. If p-value ≥ 0.05, fail to reject the null hypothesis.*

The result of hypothesis analysis in table 1 indicates that librarians' expertise in the use of KOTs is positively associated with effective KMPs in university libraries in Kwara State. The mean score for librarians' expertise ($\bar{X}$ = 3.12, SD = 0.56) suggests that respondents generally demonstrated a moderate to high level of competence in the use of KOTs. Similarly, the mean score for effective KMPs ($\bar{X}$ = 3.08, SD = 0.59) shows that knowledge management activities in the libraries were also rated relatively high by the respondents. The correlation coefficient (r = 0.74) reveals a strong positive relationship between the two variables, implying that as librarians' expertise in KOTs increases, the effectiveness of KMPs also improves. The standard deviation values indicate a moderate level of dispersion in responses, suggesting that while there is general agreement among respondents, slight variations exist in their perceptions.

Table 2: *Pearson Product Moment Correlation Analysis of the Relationship between Librarians' Proficiency in Knowledge Organization Tools and Effective Knowledge Management Practices.*

Variables	N	Mean ($\bar{X}$)	St.D	R	R^2	p-value	Decision
Librarians' Proficiency in Knowledge Organization Tools.	46	3.05	0.58	0.71	0.50	0.000	Significant
Effective Knowledge Management Practices	46	3.08	0.59	-	-	-	-

Decision Rule: *If p-value < 0.05, reject the null hypothesis. If p-value ≥ 0.05, fail to reject the null hypothesis.*

The result of hypothesis analysis in table 2 indicates that librarians' proficiency in KOTs is relatively high and has a notable influence on effective KMPs in university libraries in Kwara State. The mean score for librarians' proficiency ($\bar{X}$ = 3.05, SD = 0.58) suggests that respondents generally possess a moderate to high level of practical ability in applying KOTs in their daily library operations. Likewise, the mean score for effective KMPs ($\bar{X}$ = 3.08, SD = 0.59) shows that knowledge management activities in the libraries are also perceived to be moderately high. The regression result (R = 0.71; R^2 = 0.50) indicates a strong positive relationship between librarians' proficiency in KOTs and effective KMPs. The coefficient of determination (R^2 = 0.50) implies that approximately 50% of the variation in KMPs can be explained by librarians' proficiency in KOTs, while the remaining percentage is influenced by other factors not captured in this model. The standard deviation values further reveal a moderate level of variation in responses among the librarians, suggesting a generally consistent perception with slight differences in individual proficiency levels and experiences.

Multiple Regression Analysis showing the combined influence of librarians' competencies in knowledge organization tools and related factors on effective knowledge management practices in university libraries in Kwara State.

Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.78	0.61	0.59	0.38

ANOVA (Model Significance)

Source	Sum of Squares	Df	Mean Square	F	Significant
Regression	18.42	3	6.14	41.27	0.000
Residual	11.78	42	0.28	-	-
Total	**30.20**	**45**	**-**	**-**	**-**

Regression Coefficients

Variables	B	Std. Error	Beta	t	Significant
(Constant)	0.84	0.31	-	2.71	0.010
Expertise in KOTs	0.32	0.08	0.41	4.00	0.000
Proficiency in KOTs	0.29	0.09	0.36	3.22	0.003
Challenges affecting KOT use	-0.21	0.07	-0.28	-3.00	0.004

The multiple regression results indicate a strong combined relationship between librarians' competencies in KOTs and effective KMPs in university libraries in Kwara State. The model summary shows an R value of 0.78, suggesting a strong positive relationship between the independent variables (expertise in knowledge organization tools, proficiency in their application, and challenges affecting their use) and the dependent variable (effective knowledge management practices). The coefficient of determination ($R^2 = 0.61$) reveals that approximately 61% of the variation in effective KMPs is jointly explained by the predictors in the model. This implies that a substantial proportion of knowledge management effectiveness in the selected university libraries is influenced by librarians' competencies in KOTs and the challenges they encounter, while the remaining 39% is explained by other factors not captured in the study. The adjusted R^2 value (0.59) further confirms the stability and reliability of the model in explaining the relationship between the variables. The standard error of estimate (0.38) indicates a relatively low level of deviation between the observed and predicted values, suggesting that the model provides a good fit for the data.

Discussion

The hypotheses tested in this study revealed important insights into the influence of knowledge organization tools (KOTs) proficiency and expertise on effective knowledge management practices (KMPs) among librarians in universities in Kwara State, Nigeria.

The first hypothesis (H_{01}) tested the relationship between librarians' expertise in KOTs and effective KMPs. The result showed a strong positive and significant relationship ($r = 0.74$, $p < 0.05$), leading to the rejection of the null hypothesis. This finding implies that librarians with higher levels of expertise in tools such as classification schemes, cataloguing rules, and metadata standards are more likely to contribute to effective KMPs. This supports Smiraglia (2014), who emphasized that knowledge organization forms the intellectual foundation of knowledge management systems, and Hjørland (2016), who noted that subject expertise significantly enhances information accessibility and usability. It also aligns with Okonkwo (2024), who reported that librarians with stronger cataloguing and electronic classification skills demonstrated better information organization outcomes in Nigerian academic libraries.

The second hypothesis (H_{02}) examined the relationship between librarians' proficiency in KOTs on effective KMPs. The result revealed a significant positive influence ($R = 0.71$, $R^2 = 0.50$, $p < 0.05$), leading to the rejection of the null hypothesis. This finding indicates that proficiency in applying KOTs accounts for a substantial proportion of the effectiveness of KMPs. It suggests that practical skills in cataloguing, classification, and metadata creation are critical for efficient organization and retrieval of information resources. This finding is consistent with Abah, Asiedu, and Dei (2022), who found that librarians' competencies in knowledge organization systems significantly determine the effectiveness of knowledge creation, storage, sharing, and application in academic libraries. Similarly, Onifade, Oyelude, and Uthman (2023) reported that knowledge management practices in university libraries are strongly influenced by librarians' ability to apply cataloguing, classification, and metadata tools effectively, which enhances information retrieval and service delivery outcomes. Furthermore, Kathmanna and Lee (2024) noted that digital library environments increasingly require librarians to integrate advanced metadata standards and automated cataloguing tools, and that proficiency in these areas is a key predictor of effective knowledge management performance.

The multiple regression analysis investigate the combined influence of librarians' competencies in KOTs and related factors on effective KMPs, further strengthened these findings by showing that librarians' expertise, proficiency, and challenges collectively explain a significant proportion of the variation in KMPs ($R^2 = 0.61$, $p < 0.05$). Specifically,

expertise and proficiency had positive and significant effects, while challenges such as inadequate ICT infrastructure, lack of training, and poor funding had a negative influence on knowledge management effectiveness. This implies that while human capacity is crucial, environmental and institutional factors also play a major role in determining the success of KMPs. This finding supports Jibril, et al. (2021), who identified infrastructural deficiencies and poor training as major barriers to effective cataloguing and classification in Nigerian university libraries, and Yusuf, et al. (2025) who found that although KMPs enhance librarians' competencies, lack of training and insufficient professional development opportunities remain key challenges, leading to skill gaps that affect effective service delivery and knowledge organization in academic libraries.

Conclusion

Based on the tested hypotheses, the study concludes that librarians' expertise and proficiency in KOTs significantly influence effective KMPs in academic libraries in Kwara State. The findings from Hypotheses H_{01} and H_{02} revealed strong positive and statistically significant relationships between the variables, leading to the rejection of the null hypotheses. This indicates that librarians who possess higher levels of expertise and practical proficiency in the use of KOTs are more likely to enhance the effectiveness of KMPs in their libraries. Furthermore, the multiple regression analysis confirmed that knowledge organization competencies jointly have a significant predictive effect on KMPs, while institutional and infrastructural challenges negatively affect outcomes. This implies that although librarians' skills are central to effective knowledge management, their impact is influenced by the availability of enabling environments such as adequate ICT infrastructure, training opportunities, and institutional support. In summary, the hypothesis testing concludes that KOTs proficiency is a significant determinant of effective KMPs in academic libraries.

Recommendations

Based on the results of the hypothesis testing, the following recommendations are made:

1. Since librarians' expertise in KOTs was found to significantly influence KMPs, university libraries should prioritize continuous training programmes to strengthen librarians' theoretical and practical understanding of classification schemes, cataloguing rules, and metadata standards.
2. In view of the significant influence of librarians' proficiency on KMPs, regular hands-on training and re-skilling workshops should be organized to improve librarians' ability to apply KOTs effectively in both print and digital environments.
3. Library management should support librarians in developing advanced proficiency in modern KOTs such as RDA, MARC, Dublin Core, and integrated library systems, as these were identified as areas of relative weakness.

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INFORMATION HOARDING IN DIGITAL ERA: IDENTIFYING THE FACTORS AMONG LIS POSTGRADUATES IN KWARA STATE

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Abstract

This study examined information hoarding behaviour among Library and Information Science (LIS) postgraduate students in Kwara State, with emphasis on the contribution of cognitive, emotional/psychological, and technological factors. The study was guided by four research questions and employed a descriptive survey research design. There are three LIS postgraduate schools (University of Ilorin, Kwara State University, and Al-Hikmah University) in Kwara State, with a total population of 243 postgraduate students comprising Ph.D., Master's, and M.Phil. candidates. To ensure adequate representation of each programme across the three universities, proportionate stratified random sampling was employed to select 136 respondents for the study. A structured questionnaire was used to collect data from 136 LIS postgraduate students, and data were analysed using descriptive statistics (frequency, percentage, mean, and standard deviation). Findings revealed that information hoarding behaviour exists at a moderate level among the respondents, with a strong tendency to save digital materials for future use, retain unused files, and delay deletion decisions. The study further established that cognitive factors such as information overload, decision fatigue, and difficulty in determining relevance contribute to hoarding behaviour. Emotional and psychological factors, including anxiety about deleting files, fear of future need, and emotional attachment to digital materials, were also found to contribute to retention behaviour. In addition, technological factors such as unlimited storage capacity, ease of cloud storage, and accessibility of multiple digital platforms emerged as the strongest contributors of information hoarding behaviour. The study concludes that information hoarding is a multidimensional behaviour driven by the interaction of cognitive, emotional, and technological factors. It recommends the strengthening of information literacy training, promotion of effective personal information management practices, and integration of digital curation skills into LIS curricula to reduce excessive accumulation of digital information and enhance efficient information use among postgraduate students.

Keywords: Digital information behaviour, Information hoarding, Library and Information Science, Personal information management, Postgraduate students.

Introduction

In the contemporary digital era, the rapid proliferation of information technologies has transformed how individuals seek, store, and manage information. The rapid expansion of digital platforms, cloud storage, and online information systems has transformed information ecosystems by increasing accessibility, speed, and volume of information and while this enhances academic and professional engagement, it also intensifies information overload and reshapes

personal information management behaviours, often leading to increased retention, reduced deletion, and accumulation of digital materials (Marsh et al., 2024). As digital platforms proliferate and data becomes increasingly accessible, users are faced with unprecedented volumes of information leading to challenges such as information overload and new behavioural patterns in personal information management. Wang (2024) emphasized that information overload has become a pervasive issue in the modern digital era, where individuals are continuously exposed to large volumes of information from multiple digital platforms. Similarly, Roetzel (2019) stated that information overload arises when the amount of available information surpasses an individual's cognitive capacity to process it effectively, often resulting in stress, anxiety, or suboptimal decision-making. However, new behavioural patterns in personal information management such as information hoarding, delayed deletion, indiscriminate saving of digital files, reliance on search over organisation, and fragmented storage across multiple platforms have become increasingly common in the digital era. Fu and Sun (2023) suggested that fear of information loss, emotional attachment to digital content, and the perceived low cost of digital storage significantly reinforce personal information management behaviours, particularly among students and knowledge workers who engage intensively with digital information environments.

Behavioural patterns in personal information management have evolved significantly in response to the growing complexity of digital information environments. Studies indicate that information hoarding has become an increasingly common personal information management behaviour in digital environments, where individuals retain large volumes of digital content because of perceived future usefulness, anxiety about discarding information, emotional attachment, and limited time to evaluate or organise stored materials (Zaremohzzabieh et al., 2024; Bawden & Robinson, 2020; Liu & Liu, 2025). Furthermore, information hoarding is a subset of digital hoarding characterized by the excessive accumulation of digital materials such as files, articles, research data, and other resources beyond one's immediate needs. Bawden and Robinson (2020) stated that information hoarding in the digital era commonly manifests as the uncontrolled saving of electronic documents, emails, articles, multimedia files, and online resources due to factors such as fear of losing information, uncertainty about future usefulness, emotional attachment, information overload, and the ease of digital storage. Information hoarding has been identified as a maladaptive personal information management behaviour that can lead to digital clutter, reduced retrieval efficiency, and cognitive strain, particularly among students and knowledge workers operating in information-intensive digital environments (Liu and Liu, 2025). Information hoarding is the excessive acquisition and retention of information beyond immediate or realistic needs. Fu and Sun (2023) indicated that information overload acts as a catalyst for such behaviours, as users overwhelmed by large volumes of information often avoid deletion decisions and instead retain information as a coping mechanism.

Postgraduate students in Library and Information Science (LIS) programs, particularly in regions such as Kwara State, Nigeria, are immersed in digital information environments for research and academic purposes. As future information professionals, their interaction with digital information ecosystems is both extensive and intensive. Prior studies Afolayan (2022), Adewole-Odeshi and Jumba (2023), and Olaiya et al. (2024) on information behaviour among postgraduate students in Nigerian universities highlight challenges related to digital resource use such as anxiety in information seeking, underutilization of electronic databases, and varying levels of information literacy which shape how students engage with digital materials. Afolayan (2022) investigated information seeking anxiety and electronic resource use among postgraduate students at the University of Ilorin, which found that anxiety, lack of search skills, and barriers such as poor technological competence influenced how students engage with digital materials. Adewole-Odeshi and Jumba (2023) reveal that limited digital literacy, lack of training, and poor search competencies significantly hinder effective access and use of electronic resources. Similarly, Olaiya et al. (2024) reported that despite institutional access to electronic resources, many students are unable to retrieve relevant academic materials due to limited digital literacy, weak search strategies, and insufficient training in database use. However, there is a paucity of research specifically investigating the factors that contribute to information hoarding tendencies among LIS postgraduates; a gap with theoretical and practical implications for understanding how postgraduate students manage, retain, and organise digital information. Identifying the factors influencing information hoarding behaviours among LIS postgraduates in Kwara State is therefore essential. It provided insights into the cognitive, emotional, and technological contributors to digital information hoarding.

Research Questions

The following research questions are tailored for this study:

1. What is the extent of information hoarding among LIS postgraduate students in Kwara State?
2. What are the cognitive factors contributing to information hoarding among LIS postgraduate students in Kwara State?
3. What are the emotional and psychological factors contributing to information hoarding among LIS postgraduate students Kwara State? and
4. What are the technological factors contributing to information hoarding among LIS postgraduate students in Kwara State?

Literature Review

The increasing prevalence of digital technologies has transformed how individuals acquire, store, and manage information, giving rise to digital hoarding; a behaviour characterized by the excessive accumulation and reluctance to delete digital materials beyond immediate utility. Digital hoarding is an emerging phenomenon that reflects complex interactions between psychological, cognitive, and technological factors in personal information management. Digital hoarding is driven by psychological factors such as emotional attachment to digital content, anxiety, and fear of losing potentially useful information; cognitive factors including information overload, decision fatigue, and limited processing capacity; and technological factors such as the ease of digital storage, low cost of data retention, and ubiquitous access to cloud platforms, all of which collectively encourage excessive accumulation of digital materials (Yu & Chang, 2025). Scholars have noted that digital hoarding can impair decision-making, categorization, and attention due to the volume of retained digital files and reduced cognitive clarity. Such as, Bawden and Robinson (2020), they argued that persistent information overload and excessive retention diminish users' ability to focus, evaluate relevance, and organise information effectively. While, Fu and Sun (2023) found that digital hoarding behaviour among students was associated with cognitive strain and difficulties in prioritising and categorising information. Furthermore, Liu and Liu (2025) reported that excessive digital accumulation has been shown to negatively affect attention, increase cognitive fatigue, and impair efficient personal information management, as individuals struggle to process and organise large volumes of stored digital content in information-rich environments.

Digital hoarding is closely linked to information hoarding, as both behaviours involve the excessive acquisition and retention of information beyond immediate or practical needs, coupled with difficulty discarding stored content. While digital hoarding represents contemporary manifestation within electronic environments, enabled by the affordances of digital technologies, information hoarding broadly refers to the accumulation of information in any format print or digital. Bawden and Robinson (2020) argued that digital hoarding is essentially a subset of information hoarding, distinguished by the use of digital platforms, cloud storage, and electronic devices that lower the cost of retention and encourage indiscriminate saving. Thus, digital hoarding extends the concept of information hoarding into the digital domain, reflecting how technological affordances intensify traditional information accumulation behaviours. Information hoarding refers to the excessive accumulation and retention of digital content, often coupled with reluctance to delete or organise it, even when it hinders effective use and management. Zaremohzzabieh et al. (2024) described information hoarding is widely described in recent literature as a maladaptive personal information management behaviour driven by cognitive overload, emotional attachment, and the low cost and ease of digital storage, which together encourage indiscriminate saving and reduce retrieval efficiency in digital environments. Also, Bawden and Robinson (2020) explain that information hoarding is closely associated with information overload, uncertainty, and fear of losing potentially valuable information.

Information hoarding overlaps with traditional hoarding behaviours but is uniquely shaped by the affordances of digital environments such as limitless storage and ease of acquisition which reduce immediate costs of accumulation yet lead to cluttered information spaces. Bawden and Robinson (2020) argued that the low cost of digital storage and the abundance of information foster excessive retention, intensifying information overload and complicating effective personal information management. Similarly, Whittaker (2011) emphasized that digital environments encourage users to retain information "just in case" it may be needed in the future, thereby postponing decisions about relevance and deletion. Digital information hoarders often retain files without evaluative filtering, which may be driven by emotional attachment or fear of loss. These behaviours not only clutter digital spaces but can also exacerbate cognitive overload and disorganization in information management. Empirical evidence further suggests that these factors collectively encourage individuals to adopt "save-everything" behaviours as coping mechanisms in information-intensive digital environments, often resulting in digital clutter, cognitive overload, and reduced information retrieval efficiency (Sillence et al., 2023; Zaremohzzabieh et al., 2024; Liu & Liu, 2025). In this context, hoarded information is often perceived as an extension of an individual's self-identity, with personal and academic value attached to stored digital materials. This perception strengthens selective retention biases, as individuals become increasingly reluctant to discard information they associate with past efforts, achievements, or future aspirations.

Empirical studies highlight that digital information hoarding is strongly influenced by psychological and emotional motivators. For instance, Fu and Sun (2023) revealed that digital hoarding behaviour is strongly influenced by emotional factors such as anxiety, fear of information loss, and attachment to digital content, which encourage individuals to retain large volumes of information as a coping strategy. These factors reflect a deeper emotional and cognitive entanglement with digital possessions, where individuals hoard in anticipation of future needs or emotional reassurance related to past experiences of loss. Furthermore, cognitive factors, such as information overload and decision fatigue, also play a critical role in digital hoarding. Research in information behaviour has demonstrated that when individuals are exposed to excessive volumes of information, their capacity to evaluate, categorise, and discard information diminishes, leading to postponement of deletion decisions and indiscriminate retention. Baumeister et al. (2018) argued that repeated decision-making in information-rich environments results in decision fatigue, which encourages avoidance behaviours such as saving information without critical appraisal. This burden can lead individuals to resort to simpler strategies, such as retaining information, even at the cost of increased clutter. Also, technological enablers represent another dimension

that facilitates digital information hoarding. The widespread availability of vast, inexpensive digital storage and multiple cloud services reduces the perceived cost of retaining information, lowering the barriers to accumulation. Bawden and Robinson (2020) noted that seamless access across devices, unlimited storage capacity, and easy retrieval options reinforce hoarding tendencies, as individuals perceive minimal effort or risk in retaining files. The ease of access to multiple digital devices and platforms supports habitual accumulation and storage of information that may never be actively used.

However, while the literature on digital and information hoarding includes studies on general student populations and psychological profiles, research specifically targeting Library and Information Science (LIS) postgraduate students is limited. Given that LIS graduates are trained in information organisation and management, their actual behaviour in digital environments presents an intriguing paradox worth empirical investigation. The intersection of professional knowledge and personal information management behaviour, particularly under academic stress and digital overload, remains under-explored and highly relevant to both theory and practice. This gap highlighted the need for context-specific inquiry into the factors contributing to information hoarding among LIS postgraduate students in Kwara State.

Methodology

This study adopted a descriptive survey design to investigate the factors contributing to information hoarding among Library and Information Science (LIS) postgraduate students in Kwara State. The population comprised all LIS postgraduate students in universities within the state which are University of Ilorin; Kwara State University and Al-Hikmah University. A stratified random sampling technique was used to select a representative sample across PGD, MSc, and PhD levels. Data was collected using a well-structured questionnaire covering demographic information; extent of information hoarding; cognitive; emotional and psychology; and technological factors. The instrument was validated by experts in the field of Library and Information Science and was tested for reliability using Cronbach's Alpha. The questionnaire was prepared with online survey (Google Form) and the link was shared electronically to the respondents via Direct Message on WhatsApp platform and it was left active for the period of 20 days. Respondents were informed about the purpose of the study and assured of the confidentiality of their responses and reminders were sent to ensure a satisfactory response rate. After the 20 days of the questionnaire being-active, 136 responses were gotten and used for this study. Data was analysed using descriptive statistics (frequency, percentage, mean, and standard deviation) with the use of SPSS, while ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly observed in this study.

Data Analyses and Presentation

Table 1: *What is the extent of information hoarding behaviour among LIS postgraduate students?*

Extent of Information Hoarding Behaviour	SA	A	D	SD	Mean ($\bar{x}$)	St.D (σ)
I save digital files even when I do not have an immediate need for them.	52(38.2%)	46(33.8%)	24(17.6%)	14(10.3%)	3.00	1.01
I store large volumes of academic materials that I rarely use.	49(36.0%)	48(35.3%)	25(18.4%)	14(10.3%)	2.97	1.00
I find it difficult to delete digital materials once they are stored.	45(33.1%)	47(34.6%)	26(19.1%)	18(13.2%)	2.87	1.04
I rarely organise or review stored digital files.	42(30.9%)	44(32.4%)	30(22.1%)	20(14.7%)	2.79	1.06
My digital storage (laptop, phone, cloud) is filled with unused files.	47(34.6%)	46(33.8%)	27(19.9%)	16(11.8%)	2.91	1.02
I keep multiple copies of the same digital files unnecessarily.	40(29.4%)	42(30.9%)	32(23.5%)	22(16.2%)	2.72	1.09
I download and save information "just in case" I may need it in the future.	55(40.4%)	47(34.6%)	22(16.2%)	12(8.8%)	3.06	0.97
Grand Mean = 2.90						

The results in Table 1 reveal that information hoarding behaviour exists to a moderate extent among the respondents, as indicated by the grand mean of 2.90. This suggests that respondents generally exhibit a tendency to retain digital information beyond immediate needs, though not at an extreme level. Specifically, the item *"I download and save information 'just in case' I may need it in the future"* recorded the highest mean ($\bar{x}$ = 3.06), indicating that many respondents intentionally accumulate information for potential future use. Similarly, *"I save digital files even when I do not have an immediate need for them"* ($\bar{x}$ = 3.00) and *"I store large volumes of academic materials that I rarely use"* ($\bar{x}$ = 2.97) also show relatively high agreement, suggesting a strong inclination toward proactive saving and

accumulation of digital content. On the other hand, items such as *"I keep multiple copies of the same digital files unnecessarily"* ($\bar{x}$ = 2.72) and *"I rarely organise or review stored digital files"* ($\bar{x}$ = 2.79) recorded comparatively lower means, indicating that while duplication and dis-organisation exist, they are less pronounced behaviours among the respondents. The findings imply that respondents demonstrate moderate information hoarding tendencies, primarily driven by precautionary saving behaviours rather than excessive duplication or complete neglect of organisation. This pattern reflects a "save-for-future-use" approach, which, although useful in some cases, may contribute to digital clutter and reduced efficiency in information retrieval over time.

Table 2: *What are the cognitive factors contributing to information hoarding among LIS postgraduate students?*

Cognitive Factors Contributing to Information Hoarding	**SA**	**A**	**D**	**SD**	**Mean ($\bar{x}$)**	**St.D (σ)**
I postpone organising or deleting files due to lack of time.	50(36.8%)	48(35.3%)	24(17.6%)	14(10.3%)	2.99	0.99
I feel overwhelmed by the amount of digital information available to me.	52(38.2%)	46(33.8%)	25(18.4%)	13(9.6%)	3.00	0.98
I find it hard to determine the relevance of some digital materials.	45(33.1%)	47(34.6%)	27(19.9%)	17(12.5%)	2.88	1.03
I prefer to keep information rather than risk losing something important.	55(40.4%)	48(35.3%)	20(14.7%)	13(9.6%)	3.06	0.96
I save information to avoid the stress of making decisions about it.	47(34.6%)	46(33.8%)	28(20.6%)	15(11.0%)	2.91	1.02
I find it difficult to decide which digital files to delete.	49(36.0%)	45(33.1%)	26(19.1%)	16(11.8%)	2.93	1.01
Grand Mean = 2.96						

The findings in Table 2 indicate that cognitive factors moderately contribute to information hoarding among the respondents, as reflected by the grand mean of 2.96. This suggests that respondents experience noticeable cognitive challenges that contribute to their tendency to retain digital information. Notably, the item *"I prefer to keep information rather than risk losing something important"* recorded the highest mean ($\bar{x}$ = 3.06), indicating that fear of losing valuable information is the most prominent cognitive factor driving information hoarding. Similarly, *"I feel overwhelmed by the amount of digital information available to me"* ($\bar{x}$ = 3.00) and *"I postpone organising or deleting files due to lack of time"* ($\bar{x}$ = 2.99) also show high levels of agreement, suggesting that information overload and time constraints contribute to retention behaviour. Furthermore, items such as *"I find it difficult to decide which digital files to delete"* ($\bar{x}$ = 2.93) and *"I save information to avoid the stress of making decisions about it"* ($\bar{x}$ = 2.91) indicate that decision-making difficulties and avoidance behaviour contribute to the accumulation of digital information. The item *"I find it hard to determine the relevance of some digital materials"* ($\bar{x}$ = 2.88), although slightly lower, still reflects a considerable challenge in evaluating information usefulness. The results imply that cognitive overload, fear of information loss, and decision fatigue are key contributors of information hoarding behaviour among the respondents. These factors encourage a tendency to retain information as a coping strategy, which may ultimately lead to digital clutter and reduced efficiency in information management.

Table 3: *What are the emotional and psychological factors contributing to information hoarding among LIS postgraduate students?*

Emotional and Psychological Factors Contributing to Information Hoarding	**SA**	**A**	**D**	**SD**	**Mean ($\bar{x}$)**	**St.D (σ)**
I feel anxious about deleting digital files.	48(35.3%)	46(33.8%)	26(19.1%)	16(11.8%)	2.93	1.02
I feel uncomfortable when I try to discard stored digital files.	45(33.1%)	44(32.4%)	29(21.3%)	18(13.2%)	2.85	1.05
I am emotionally attached to some of my digital materials.	50(36.8%)	47(34.6%)	25(18.4%)	14(10.3%)	2.98	1.00
I feel satisfied when I accumulate large amounts of information.	42(30.9%)	43(31.6%)	30(22.1%)	21(15.4%)	2.78	1.08

I keep information because it reminds me of past academic work or experiences.	49(36.0%)	46(33.8%)	26(19.1%)	15(11.0%)	2.95	1.01
I worry that I might need deleted information in the future.	54(39.7%)	48(35.3%)	21(15.4%)	13(9.6%)	3.05	0.97
Grand Mean = 2.92						

The results in Table 3 reveal that emotional and psychological factors moderately contribute to information hoarding behaviour among the respondents, as indicated by the grand mean of 2.92. This suggests that respondents experience a noticeable emotional attachment to digital information, which contributes to their tendency to retain rather than discard digital materials. Specifically, the item *"I worry that I might need deleted information in the future"* recorded the highest mean ($\bar{x}$ = 3.05), indicating that fear of future need is the most dominant emotional factor contributing to information hoarding behaviour. Similarly, *"I am emotionally attached to some of my digital materials"* ($\bar{x}$ = 2.98) and *"I keep information because it reminds me of past academic work or experiences"* ($\bar{x}$ = 2.95) also show relatively high agreement, suggesting that emotional attachment and personal memory association contribute to retention behaviour. Furthermore, items such as *"I feel anxious about deleting digital files"* ($\bar{x}$ = 2.93) and *"I feel uncomfortable when I try to discard stored digital files"* ($\bar{x}$ = 2.85) indicate that anxiety and discomfort associated with deletion decisions play a role in sustaining hoarding tendencies. The item *"I feel satisfied when I accumulate large amounts of information"* ($\bar{x}$ = 2.78), although the lowest, still reflects a moderate level of satisfaction derived from accumulation behaviour. The findings suggest that fear of loss, emotional attachment, anxiety, and positive feelings toward accumulation collectively drive information hoarding behaviour. These emotional and psychological encourage respondents to retain digital information beyond immediate need, potentially leading to digital clutter and reduced efficiency in information management practices.

Table 4: *What are the technological factors contributing to information hoarding among LIS postgraduate students?*

Technological Factors Contributing to Information Hoarding	SA	A	D	SD	Mean ($\bar{x}$)	St.D (σ)
I use multiple devices/platforms that encourage storing information in different places.	47(34.6%)	45(33.1%)	28(20.6%)	16(11.8%)	2.90	1.03
It is easier to save information than to organise or delete it.	55(40.4%)	46(33.8%)	22(16.2%)	13(9.6%)	3.05	0.97
I rarely delete files because storage space is not a problem.	49(36.0%)	44(32.4%)	26(19.1%)	17(12.5%)	2.92	1.02
The large storage capacity of my devices encourages me to keep more files.	52(38.2%)	45(33.1%)	24(17.6%)	15(11.0%)	2.99	1.00
Availability of internet access encourages me to download and store more information.	50(36.8%)	47(34.6%)	25(18.4%)	14(10.3%)	3.01	0.99
Easy access to cloud storage makes me save more digital materials.	53(39.0%)	46(33.8%)	23(16.9%)	14(10.3%)	3.03	0.98
Grand Mean = 2.98						

The results in Table 4 indicate that technological factors strongly contribute to information hoarding behaviour among the respondents, as reflected in the grand mean of 2.98. This suggests that features of digital environments significantly encourage the retention of large volumes of information. Specifically, the item *"It is easier to save information than to organise or delete it"* recorded the highest mean ($\bar{x}$ = 3.05), showing that ease of saving and low effort in storage management is the most dominant technological driver of information hoarding. Similarly, *"Easy access to cloud storage makes me save more digital materials"* ($\bar{x}$ = 3.03) and *"Availability of internet access encourages me to download and store more information"* ($\bar{x}$ = 3.01) indicate that cloud services and constant connectivity promote accumulation behaviour. Furthermore, *"The large storage capacity of my devices encourages me to keep more files"* ($\bar{x}$ = 2.99) and *"I rarely delete files because storage space is not a problem"* ($\bar{x}$ = 2.92) show that abundant storage capacity reduces the motivation to delete information, thereby encouraging hoarding tendencies. The item *"I use multiple devices/platforms that encourage storing information in different places"* ($\bar{x}$ = 2.90), although slightly lower, still reflects a moderate contribute to multi-platform usage on fragmented storage behaviour. The findings suggest that technological convenience, unlimited storage capacity, cloud accessibility, and ease of saving information collectively reinforce information hoarding behaviour. These technological affordances reduce the perceived cost of storage and

encourage a "save now, organise later" approach, which may eventually lead to digital clutter and inefficiencies in personal information management.

Discussion of Findings

This study examined information hoarding behaviour among LIS postgraduate students in Kwara State, focusing on the extent of the behaviour and the contribution of cognitive, emotional/psychological, and technological factors. The findings revealed that information hoarding exists at a moderate level, as shown by the overall grand mean across the constructs. This suggests that while respondents are not excessively hoarding information, they consistently engage in behaviours such as saving files for future use, retaining unused materials, and delaying deletion decisions. The study revealed a moderate level of information hoarding behaviour, with respondents showing strong tendencies to save digital information "just in case" it may be needed later. This aligns with the findings of Skulmowski (2023), which indicated that individuals commonly adopt "save-for-later" or "just-in-case" strategies in digital environments, leading to gradual accumulation of digital content and reduced retrieval efficiency over time. Similarly, Wang et al. (2023) showed that fear of missing out (FoMO) and perceived future usefulness drive continuous saving and retention of digital content. Furthermore, Whittaker (2011) noted that digital users often retain information due to anticipated future relevance, even when immediate use is absent. Also, Bawden and Robinson (2020) argued that the ease of digital storage encourages accumulation behaviours and contributes to information overload and clutter.

Regarding cognitive factors, the findings showed that information overload, difficulty in decision-making, and fear of losing valuable information contribute to hoarding behaviour. This is consistent with study of Zaremohzzabieh et al. (2024), which indicate that cognitive overload and decision fatigue reduce individuals' ability to evaluate and discard digital information, thereby encouraging excessive retention and accumulation behaviours. Similarly, Liu and Liu (2025) reported that cognitive strain leads to impaired decision-making and increased retention of unnecessary digital content and demonstrated that cognitive overload and decision fatigue weaken individuals' capacity to evaluate and discard digital information, thereby promoting indiscriminate retention and accumulation of digital materials. Furthermore, Bawden and Robinson (2020) revealed that information overload reduces **c**ognitive processing capacity, resulting in poor information organisation and retention behaviour. In addition, Eppler and Mengis (2004) found that information overload reduces individuals' ability to process and evaluate information effectively, leading to delayed decisions and retention of unnecessary data. The prominence of fear of deletion and decision fatigue suggests that students adopt retention as a coping strategy to reduce cognitive stress.

The study also found that emotional and psychological factors such as anxiety, emotional attachment, and fear of future need contribute to information hoarding. This supports the findings of Wu et al. (2024), which show that emotional attachment to digital content, fear of missing out, and anxiety about losing valuable information significantly drive digital hoarding behaviour and excessive retention of digital materials. Also supports Fu and Sun (2023), who reported that emotional attachment and fear of missing out are strong predictors of digital hoarding behaviour among students. Similarly, Yu and Chang (2025) demonstrated that individuals tend to retain digital materials due to emotional attachment, fear of missing out, and anxiety about losing potentially useful information, which collectively reinforce excessive accumulation and reduce effective information management. Also, Zaremohzzabieh et al. (2024) identified emotional attachment, fear of missing out, and psychological pressure as key predictors of digital hoarding behaviour among students.

Furthermore, technological factors were found to have the strongest contribution on information hoarding behaviour. The ease of cloud storage, large device capacity, and accessibility of multiple platforms encourage continuous saving of information. This finding aligns with Sedera et al., 2022), which revealed that the availability of low-cost and virtually unlimited digital storage, coupled with seamless cloud synchronization and multi-device access, significantly promotes excessive accumulation of digital content and reduces users' motivation to delete or organise information. Similarly, Whittaker (2011) emphasized that low-cost and unlimited storage environments reduce the perceived need to delete information, thereby promoting accumulation behaviour. Furthermore, Bravo-Adasme et al. (2026) indicated that the affordability, scalability, and seamless accessibility of digital storage technologies lower the perceived cost of retaining information, thereby reinforcing accumulation behaviours and reducing users' inclination to delete or organise digital content. Also supports Bawden and Robinson (2020), who noted that technological affordances in digital environments make information retention effortless, thereby reinforcing hoarding tendencies.

Generally, the findings suggest that information hoarding among LIS postgraduate students is a multi-dimensional behaviour driven by the interaction of cognitive overload, emotional attachment, and technological convenience. While students possess information management training, their behaviour reflects the influence of digital environments that encourage accumulation rather than systematic organisation and deletion. This highlights the need for improved digital information management practices and stronger information literacy interventions to promote balanced personal information management behaviours.

Conclusion

This study investigated information hoarding behaviour among LIS postgraduate students in Kwara State, with particular emphasis on cognitive, emotional/psychological, and technological factors contributing to such behaviour.

The findings revealed that information hoarding exists at a moderate level among the respondents. The study further established that cognitive factors, including information overload, decision fatigue, and difficulty in evaluating relevance, contribute to information hoarding behaviour. In addition, emotional and psychological factors such as anxiety, fear of losing important information, and emotional attachment to digital materials were found to reinforce retention behaviours. More importantly, technological factors particularly the availability of large storage capacities, cloud-based platforms, and ease of saving information emerged as the strongest influence, as they lower the perceived cost of storing information and encourage accumulation. However, the study concludes that information hoarding among LIS postgraduate students is a multidimensional phenomenon driven by the interaction of cognitive limitations, emotional responses, and technological affordances. While digital tools enhance access to information, they also unintentionally promote excessive retention behaviours that may lead to digital clutter and reduced efficiency in personal information management.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. LIS postgraduate programmes should strengthen training on advanced information literacy skills, particularly on digital information evaluation, organisation, and ethical deletion practices. This will help students make informed decisions about what to retain or discard.
2. Students should be guided on structured personal information management strategies such as file categorisation, periodic review of stored materials, and use of digital management tools to reduce unnecessary accumulation of files.
3. Institutions should incorporate awareness programmes that address emotional drivers of information hoarding, such as anxiety, fear of loss, and attachment to digital content, to encourage healthier digital behaviours.
4. Students should be sensitised on the benefits of digital minimalism, including regular deletion of redundant files, reduced duplication, and intentional saving of only relevant academic materials.
5. Universities and libraries should develop guidelines for efficient use of institutional and personal digital storage systems to discourage unnecessary hoarding and promote organised information practices.
6. LIS curricula should include practical modules on digital curation, data management, and cloud storage organisation to equip students with skills for managing large volumes of digital information effectively.

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Information Needs of Internally Displaced Persons (IDPs) for Socio-Economic Development in Selected IDP Camps in Northeast Nigeria

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ABSTRACT

This study examines the information needs of internally displaced persons (IDPs) for socio-economic development in internally displaced person camps in Northeast Nigeria. The objective study includes examination of information needs, information-seeking strategies, challenges faced, and their relationship with socio-economic needs of the IDPs. The study employed a cross-sectional survey design. The population for the study comprised 1,295 household heads in twelve selected government-recognized camps across Adamawa, Borno, Taraba, and Yobe states. A structured questionnaire was used as the instrument for data collection, and a multistage sampling technique was utilized to select a sample of 297 household heads. Of the distributed questionnaires, 275 were retrieved and deemed valid, yielding a response rate of 93%. The findings reveal that IDPs prioritize civil documentation and employment information, reflecting immediate preoccupations with legal recognition and economic survival, while educational information ranks lowest. Furthermore, the study established a significant positive relationship between information-seeking strategies and socio-economic development outcomes. The study concludes that addressing information deficits directly supports displacement recovery. It is recommended that humanitarian actors and policymakers develop differentiated, context-responsive information architectures that prioritize civil documentation and livelihood intelligence, while integrating information services with material assistance to foster sustainable socio-economic development among IDPs.

Keywords: information needs, internally displaced persons, socio-economic development, Northeast Nigeria

INTRODUCTION

Displacement remains a dilemma to both physical and information infrastructure that supports daily life, work, and social identity (Adeyemi & Okafor, 2023; Bello, Yusuf, & Danjuma, 2024; Chukwu & Ibrahim, 2025). For IDPs, forced migration due to conflict destroys established information channels while simultaneously raising the need for accurate and timely information to survive and adapt (Danjuma & Musa, 2023; Eze & Nwosu, 2024; Faronbi, Adeniyi, & Ayandiran, 2025). The lack of access to the right information among IDPs is particularly severe in Northeast Nigeria, where insurgency-related violence since 2009 has displaced millions (Bobbo & Barna, 2023; Adamu & Akuto, 2023; Yakubu, Abubakar, & Haruna, 2025). IDPs attempt to rebuild livelihoods, access services, and secure legal status, and try to avoid institutional bootle-neck, fractured social networks, and hostile environments (Hassan & Aliyu, 2024; Ibrahim, Banda, & Moyo, 2025; Kabir & Suleiman, 2023).

The humanitarian crisis in Northeast Nigeria ranks among the most protracted displacement emergencies globally, characterized by food insecurity, health system collapse, and human rights violations (Adamu & Akuto, 2023; Mohammed, Ekezie, & Timmons, 2024; Okafor & Bello, 2025). Conflict dynamics have included territorial battles, civilian killings, and systematic destruction of schools, health facilities, and administrative centers across Adamawa, Borno, Taraba, and Yobe states (Adeyemi & Okafor, 2023; Bello et al., 2024; Chukwu & Ibrahim, 2025).

Despite growing recognition of information as a humanitarian need, research on how displaced populations conceptualize, prioritize, and access information remains underdeveloped. Existing studies typically treat information needs as derivative of material needs like food, shelter, healthcare (Ibrahim et al., 2025; Kabir & Suleiman, 2023; Sala & Gomina, 2023). This instrumental framing overlooks how information enables agency and decision-making among displaced persons (Umar & Danladi, 2024; Yakubu et al., 2025).

This study addresses these gaps by examining: (1) priority information needs of IDPs in selected camps; (2) information-seeking strategies IDPs employ; (3) barriers to information access; and (4) the relationship between information-seeking strategies and socio-economic development.

LITERATURE REVIEW

Information Needs in Protracted Displacement

Recent studies have redefined information from a secondary good to a primary requirement for survival and socio-economic development among displaced populations (Abolade, Folayan, & Idowu, 2024; Bobbo & Barna, 2023; Kabir & Suleiman, 2023). Three thematic clusters emerge from the literature where legal and livelihood information as

dominant needs. This raises the question of "digital paradox" in information-seeking behaviour and structural barriers to access.

IDPs consistently demand information directly tied to bureaucratic and economic survival (Bello et al., 2024; Danjuma & Musa, 2023; Yakubu et al., 2025). Civil documentation such as ID cards, birth certificates, land deeds, which constitutes the most acute information need. Absence of these phenomena systematically excludes IDPs from humanitarian assistance, formal employment, and school enrollment (Adeyemi & Okafor, 2023; Eze & Nwosu, 2024; Faronbi et al., 2025). Livelihood intelligence such as job vacancies, microfinance access, agricultural extension services, ranks second (Hassan & Aliyu, 2024; Ibrahim et al., 2025; Umar & Danladi, 2024). Contrary to health-centric crisis paradigms, IDPs pragmatically deprioritize health information when healthcare infrastructure and costs appear insurmountable (Kabir & Suleiman, 2023; Mohammed et al., 2024; Okafor & Bello, 2025).

The Digital Paradox in Information-Seeking

The "digital paradox" describes the counterintuitive reality that while digital technologies connect us globally, speed up tasks, and provide massive volumes of data, they frequently result in fragmented human interactions, lower employee or student productivity, and isolation rather than community. It defines IDP information-seeking behaviour in a more amplifying manger (Chukwu & Ibrahim, 2025; Gomina & Wada, 2023; Hassan & Aliyu, 2024), where mobile technology serves as the most frequently used information-seeking tool among IDPs, surpassing interpersonal networks and NGO briefings (Abolade et al., 2024; Bobbo & Barna, 2023; Danjuma & Musa, 2023). However, structural limitations bedevil this reliance. While device ownership is relatively high, functional digital literacy remains low, impeding the ultimate use of online resources that could have provided more direct information (Eze & Nwosu, 2024; Ibrahim et al., 2025; Yakubu et al., 2025). Information-seeking in camps typically proceeds through trial-and-error learning and depends on informal word-of-mouth networks that circulate outdated or inaccurate information, deepening information poverty (Faronbi et al., 2025; Kabir & Suleiman, 2023; Sala & Gomina, 2023).

Challenges to Information Access

Information access faces multidimensional barriers (Adeyemi & Okafor, 2023; Bello et al., 2024; Chukwu & Ibrahim, 2025). Beyond the digital divide, psychosocial trauma impairs cognitive processing and memory retention among displaced populations (Hassan & Aliyu, 2024; Kabir & Suleiman, 2023; Mohammed et al., 2024). Linguistic and cultural mismatches between humanitarian information providers and local IDP communities create communication gaps (Ibrahim et al., 2025; Okafor & Bello, 2025; Umar & Danladi, 2024). Capability approaches emphasize that information provision without accompanying material resources remains ineffective. An IDP may possess complete information about a vocational grant yet lack the social capital or institutional trust to access the resources required to apply (Eze & Nwosu, 2024; Sala & Gomina, 2023; Yakubu et al., 2025).

The foregoing analysis have identified IDPs' information needs and seeking behaviours. However, no study has empirically quantified the direct statistical relationship between specific information-seeking strategies and measurable socio-economic development outcomes in the Northeast. The present study fills this gap by correlating information behaviour variables with socio-economic development indicators among IDPs in Northeast Nigeria.

METHODOLOGY

The study adopted a cross-sectional survey design within the positivist paradigm. This design enables collection of quantifiable data from a population distributed across a large geographical area and facilitates statistical analysis of relationships between variables (Chali et al., 2022; Okoro & Aliyu, 2022). Four states, which includes Adamawa, Borno, Taraba, and Yobe, were selected based on having the highest concentrations of government-recognized IDP camps in the region (Adamu & Akuto, 2023; Danjuma & Musa, 2023; Yakubu et al., 2025). The target population comprised household heads in twelve operational camps: Madagali, Michika, and Gulak (Adamawa); Ran, Bama, Ngala, Mongono, and Bolori (Borno); St. John College and Yelwa (Taraba); Funne and Kasaisa (Yobe). Total household heads numbered 1,295. Household heads were selected because they typically possess detailed knowledge of household information needs and decision-making processes (Bello et al., 2024; Eze & Nwosu, 2024; Faronbi et al., 2025).

The Raosoft sample size calculator yielded a sample of 297 household heads (5% margin of error, 95% confidence level, 50% response distribution) (Okoro & Aliyu, 2022). A multistage sampling technique combined proportionate allocation and simple random sampling, an approach effective in fragile, stratified settings (Chali et al., 2022; Okoro & Aliyu, 2022). Furthermore, a structured questionnaire included sections on demographic characteristics, socio-economic development needs, information needs, information resources, information-seeking strategies, and challenges. The information needs section used a four-point Likert scale. Given the IDP population's primary language (Hausa), questionnaires were translated and back-translated by trained assistants to ensure semantic equivalence, following cross-cultural survey research protocols (Hassan & Aliyu, 2024; Kabir & Suleiman, 2023; Mohammed et al., 2024). Of 297 distributed questionnaires, 275 were returned and valid (93% response rate). Data analyses such as descriptive statistics like frequency count, percentage, mean score, and standard deviation were used to describe the data whereas Pearson Product Moment Correlation was used to test the relationship between information-seeking strategies and socio-economic development. Ethical clearance was obtained from camp administrators. All participants provided informed

consent. Participation was voluntary. Data were fully anonymized (Ibrahim et al., 2025; Okafor & Bello, 2025; Sala & Gomina, 2023).

RESULTS AND DISCUSSION

Response Rate

Table 1: Response Rate by Camp and State (N = 297; n = 275, 93%)

State	Camp	Households	Sample	Administered	Retrieved
Adamawa (244)	Madagali	103	24	24	22
	Michika	79	18	18	18
	Gulak	62	14	14	14
Borno (800)	Ran	186	43	43	39
	Bama	110	25	25	21
	Ngala	123	28	28	26
	Mongono	284	65	65	60
	Bolori	97	22	22	21
Taraba (141)	St. John College	89	20	20	20
	Yelwa	52	12	12	12
Yobe (110)	Funne	61	14	14	12
	Kasaisa	49	11	11	10
TOTAL	12 Camps	1,295	297	297	275 (93%)

Source: Field Survey (2023)

Table presents the 297 distributed questionnaires, and 275 returned and valid (93%) copies. This return rate reflects community-based administration and established researcher-camp leadership rapport (Abolade et al., 2024; Okoro & Aliyu, 2022). Borno State camps contributed the largest respondent share (n = 167), consistent with the state's higher IDP concentration (Adamu & Akuto, 2023; Danjuma & Musa, 2023).

Demographic Profile

Table 2: Demographic Profile of IDP Respondents (N = 275)

Variable	Frequency	Percentage
Age		
20–30 years	9	3.3%
31–40 years	99	36.0%
41–50 years	133	48.4%
51–60 years	34	12.4%
Marital Status (n=272)		
Married	103	37.9%
Divorced	51	18.8%
Widow/Widower	118	43.4%
Education		
Quranic Education	120	43.6%
Primary School	46	16.7%
Secondary School	12	4.4%
Tertiary Education	11	4.0%
Adult Education	13	4.7%
No Formal Education	73	26.5%
Occupation		
Farming	163	59.3%
Arts/Craft Work	81	29.5%
Civil Servant	2	0.7%
Business Activity	29	10.5%

Source: Field Survey (2023)

The modal age group was 41–50 years (48.4%). Widowed respondents comprised 43.4%, reflecting conflict-related male mortality (Bello et al., 2024; Eze & Nwosu, 2024; Mohammed et al., 2024). Educational attainment was predominantly informal: 43.6% Quranic education, 26.5% no formal education. This carries direct implications for information literacy and capacity to navigate formal information systems (Hassan & Aliyu, 2024; Kabir & Suleiman, 2023; Yakubu et al., 2025). Farming dominated occupational activities (59.3%), confirming the agrarian background of the displaced population (Danjuma & Musa, 2023; Umar & Danladi, 2024; Yakubu et al., 2025).

Information Needs of IDPs

Table 3: Information Needs of IDPs in Northeast Nigeria (N = 275)

SN	Information Need	SD	D	A	SA	$\bar{X}$	Std.
1	Civil documentation (ID cards, birth certificates, land deeds)	20 (7.3%)	73 (26.5%)	103 (37.5%)	79 (28.7%)	2.88	0.91
2	Employment: job vacancies, labour markets, income-generating activities	26 (9.5%)	75 (27.3%)	93 (33.8%)	81 (29.5%)	2.83	0.96
3	Financial services: microfinance, bank accounts, mobile banking, remittances	37 (13.5%)	86 (31.3%)	76 (27.6%)	75 (27.3%)	2.84	2.63
4	Vocational training programmes and business grant schemes	33 (12.0%)	71 (25.8%)	103 (37.5%)	68 (24.7%)	2.75	0.96
5	Healthcare facilities, medical services, health insurance, social security	25 (9.1%)	86 (31.3%)	107 (38.9%)	57 (20.7%)	2.71	0.90
6	Land availability, agricultural extension services, livestock programmes	59 (21.5%)	67 (24.4%)	86 (31.3%)	62 (22.5%)	2.70	2.66
7	Educational services: schools, admission, enrollment, scholarships	53 (19.3%)	81 (29.5%)	88 (32.0%)	53 (19.3%)	2.51	1.01

Source: Field Survey (2023)

Civil documentation ranked highest (M = 2.88), followed by financial services (M = 2.84) and employment information (M = 2.83). Displacement transforms documentation from routine to urgent: document loss combined with heightened bureaucratic requirements creates acute vulnerability (Adeyemi & Okafor, 2023; Bello et al., 2024; Faronbi et al., 2025). Educational information received the lowest mean score (M = 2.51), consistent with a needs hierarchy shaped by immediate survival imperatives (Eze & Nwosu, 2024; Kabir & Suleiman, 2023; Sala & Gomina, 2023).

Socio-Economic Development Needs

Table 4: Socio-Economic Development Needs of IDPs (N = 275)

SN	Socio-economic Development Need	SD	D	A	SA	$\bar{X}$	Std.
1	Access to income sources and livelihood opportunities	6 (2.2%)	59 (21.5%)	128 (46.5%)	82 (29.8%)	3.04	0.775
2	Financial services (savings accounts, loans, remittances)	2 (0.7%)	80 (29.1%)	108 (39.3%)	85 (30.9%)	3.00	0.795
3	Official documents (ID card, birth certificate, land deeds)	37 (13.5%)	34 (12.4%)	120 (43.6%)	84 (30.5%)	2.91	0.981
4	Vocational skills training and starting small businesses	10 (3.6%)	72 (26.2%)	137 (49.8%)	56 (20.4%)	2.87	0.772
5	Restarting farm work or livestock rearing for income	29 (10.5%)	69 (25.1%)	99 (36.0%)	78 (28.4%)	2.82	0.963
6	Affordable and accessible healthcare services	28 (10.2%)	77 (28.0%)	96 (34.9%)	74 (26.9%)	2.79	0.956
7	Education for children and adults	30 (10.9%)	79 (28.7%)	97 (35.3%)	69 (25.1%)	2.75	0.956

Source: Field Survey (2023)

Access to income sources ranked highest (M = 3.04), followed by financial services (M = 3.00) and official documents (M = 2.91). These rankings mirror information need priorities, suggesting alignment between informational and material needs (Danjuma & Musa, 2023; Umar & Danladi, 2024; Yakubu et al., 2025).

Information Seeking Strategies

Table 5: Information Seeking Strategies Used by IDPs (N = 275)

SN	Information Seeking Strategy	SD	D	A	SA	$\bar{X}$	Std.
1	Mobile phones to make inquiries	30 (10.9%)	44 (16.0%)	105 (38.2%)	96 (34.9%)	2.97	0.974

2	Listening to radio programmes	26 (9.5%)	55 (20.0%)	102 (37.1%)	92 (33.5%)	2.95	0.956
3	Asking family members and friends	22 (8.0%)	70 (25.5%)	123 (44.7%)	60 (21.8%)	2.80	0.870
4	Observing activities in the local area	19 (6.9%)	93 (33.8%)	86 (31.3%)	76 (27.6%)	2.80	0.926
5	Trial-and-error experimentation	37 (13.5%)	62 (22.5%)	100 (36.4%)	76 (27.6%)	2.78	0.998
6	Approaching NGO/aid agency staff	38 (13.8%)	58 (21.1%)	111 (40.4%)	68 (24.7%)	2.76	0.978
7	Attending community meetings and forums	26 (9.5%)	91 (33.1%)	112 (40.7%)	46 (16.7%)	2.65	0.869

Source: Field Survey (2023)

Mobile phone use (M = 2.97) and radio listening (M = 2.95) were the most frequently employed strategies. This validates the "digital paradox": technology-mediated strategies rank above interpersonal channels despite documented digital literacy deficits (Chukwu & Ibrahim, 2025; Gomina & Wada, 2023; Hassan & Aliyu, 2024).

Challenges in Information Access

Table 6: Challenges in Obtaining Information by IDPs in Northeast Nigeria (N = 275)

SN	Challenge	SD	D	A	SA	$\bar{X}$	Std.
1	Gap in digital access and literacy for online information	26 (9.5%)	38 (13.8%)	104 (37.8%)	107 (38.9%)	3.06	0.951
2	Trauma and psychosocial issues inhibit information processing	22 (8.0%)	83 (30.2%)	80 (29.1%)	90 (32.7%)	2.87	0.967
3	Language barriers between IDPs and information providers	20 (7.3%)	65 (23.6%)	127 (46.2%)	63 (22.9%)	2.85	0.858
4	Lack of awareness about availability of information sources	36 (13.1%)	69 (25.1%)	84 (30.5%)	86 (31.3%)	2.80	1.025
5	Reliance on word-of-mouth from unreliable contacts/rumours	21 (7.6%)	102 (37.1%)	87 (31.6%)	65 (23.6%)	2.71	0.913
6	Mistrust of formal sources (government, aid agencies)	34 (12.4%)	83 (30.2%)	108 (39.3%)	50 (18.2%)	2.63	0.920
7	Mobility restrictions limit access to information points	35 (12.7%)	87 (31.6%)	98 (35.6%)	55 (20.0%)	2.63	0.944

Source: Field Survey (2023)

The digital access gap registered the highest challenge mean score (M = 3.06), reflecting functional digital literacy deficits (Eze & Nwosu, 2024; Hassan & Aliyu, 2024; Ibrahim et al., 2025). Trauma and language barriers followed, confirming the multidimensional barrier landscape documented in displacement research (Kabir & Suleiman, 2023; Mohammed et al., 2024; Okafor & Bello, 2025).

Correlation Analysis

Table 7: Pearson Correlation Matrix, Information Variables and Socio-Economic Development (N = 275)

Relationship	N	r	Sig. (2-tailed)	Interpretation
Information needs & Information resources	275	.250	.000	Positive
Information needs & Seeking strategies	275	.283	.000	Positive
Information needs & Socio-economic development	275	.394	.000	Positive
Information resources & Seeking strategies	275	.384	.000	Positive
Information resources & Socio-economic development	275	.478	.000	Positive
Seeking strategies & Socio-economic development	275	.505	.000	Positive
Sharing strategies & Socio-economic development	275	-.161	.007	Weak negative

$p < .01$, Source: Field Survey (2023)

The strongest positive correlation occurred between information-seeking strategies and socio-economic development (r = .505). This empirically validates capability approach claims: active, diverse behavioural strategies produce superior functional outcomes (Eze & Nwosu, 2024; Sala & Gomina, 2023; Umar & Danladi, 2024). The weak negative correlation between information-sharing strategies and development (r = -.161) suggests that informal, rumor-prone sharing lacks the systematic character required to translate information into development outcomes (Chukwu & Ibrahim, 2025; Faronbi et al., 2025; Ibrahim et al., 2025).

Discussion

IDPs in the Northeast Nigeria have multidimensional information needs resulting from disruption of legal status, economic livelihoods, and social networks of those displaced (Adeyemi & Okafor, 2023; Bello et al., 2024; Danjuma

& Musa, 2023). Xidya and Yawash, (2024) and Kabir & Suleiman, (2023) reported that IDPs prioritize civil documentation and employment information because they view it as opportunities for some sort of action in a context characterised with severe constraints. In the view of IDP, these priorities of civil documentation and employment information are realistic in that it is perceived as offering opportunities for some type of action within the severe limitations as reported by Eze & Nwosu, (2024) and Yakubu et al., (2025). The results contribute to breaking the shackles of the health overview perspective in humanitarian agenda, while reinforcing the different approaches in humanitarian response based on heterogeneous needs (Ibrahim et al., 2025; Hassan & Aliyu, 2024; Faronbi et al., 2025). The correlation between information seeking strategies and socio-economic development stands as a proof of the mediating role of information behaviour between the conditions and recovery results of displacement (Gomina & Wada, 2023; Sala & Gomina, 2023; Umar & Danladi, 2024).

Conclusion

IDPs in Northeast Nigeria prioritize civil documentation and employment information due to severe constraints on legal status and livelihoods. This challenges health-centric humanitarian agendas. The positive correlation between information-seeking strategies and socio-economic development confirms that information behaviour mediates IDPs displacement recovery outcomes.

AND RECOMMENDATIONS

Government should:

1. focus on civil documentation and livelihood information.
2. create differentiated information architectures.
3. use information in an integrated way with support
4. reduce the digital gender gap.
5. formalize information-sharing channels

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INFORMATION SERVICES FOR RURAL COMMUNITY GROWTH IN NIGERIA

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Abstract

Information serves as a critical catalyst for socio-economic transformation, yet rural communities in Nigeria continue to face significant developmental challenges due to inadequate access to timely and relevant data. This paper examines the role of information services in fostering rural community growth, highlighting the current disparities in information dissemination that hinder local empowerment. Despite the strategic importance of knowledge in improving agricultural productivity, healthcare, and educational outcomes, rural dwellers often characterized by high levels of illiteracy and limited infrastructure remain largely marginalized from mainstream information flows. Drawing on existing literature and descriptive analysis, this study identifies the primary information needs of rural inhabitants, ranging from market prices and production technologies to essential social services. The findings reveal that while traditional mechanisms such as village heads and community gatherings remain prevalent, they are often insufficient for meeting modern developmental requirements. Furthermore, the study explores the potential of Information and Communication Technologies (ICTs), such as radio and mobile connectivity, in bridging the digital divide and enhancing local decision-making processes. The paper concludes that there is an urgent need for a more integrated approach to rural information provision, emphasizing the necessity of leveraging public libraries, extension services, and localized digital platforms that respect cultural contexts. Policy way forward include prioritizing infrastructure investment, promoting digital literacy, and adopting participatory communication strategies to ensure that information services effectively support sustainable development and self-reliance in Nigeria's rural sectors.

Keywords: Rural Development, Information Services, Nigeria, Community Growth, Information Dissemination.

Introduction

Information is raw material for development for both urban and rural dwellers. Prosperity, progress, and development of any nation depend upon the nation's ability to acquire, produce, access, and use pertinent information. Diso (2010) reported that, “Access to information and advice is a key resource for local people in maintaining active and independent lives. Access to information is also critical to letting people know their entitlements to welfare benefits and sources of support to overcome social exclusion.”

Information is the lifeblood of any society and vital to the activities of both the government and private sectors. Bell (2004) holds the view that "the dependence upon information to create innovation and change, places a high premium on the ability of (developing countries) nations to access and use information to create advances in society". The development of countries globally cannot be achieved without the development of the rural community. This is because 75 to 80 percent of the people in developing countries live in the rural areas need positive, relevant and prompts attention in their daily activities.

No serious, active, conscious, sensitive, and organized government would want to neglect rural communities. Lack of development has a positive correlation with the neglect of rural areas. Rural neglects brings negative consequences such as exodus of rural dwellers to urban areas, with resulting problems of unemployment, crimes, prostitution, child labour, insecurity, money laundering, bribery, poverty, proliferation of shanty living areas, spread of diseases, and overstretching of the facilities and infrastructures in the urban areas.

Any nation that neglects the development and empowerment of the rural communities should not expect meaningful development. Alegbeleye and Aina (2011) reiterated state that "the third world countries have recently come to realize that unless the rural areas are well developed, hardly would any meaningful development occur in these countries." Development can only be effective if rural dwellers have access to the relevant, diverse information for their activities. Efforts must be made to give access to knowledge and information by non-literates who constitute the majority of rural dwellers. Okiy (2003) says that, “Rural development is a basis for economic development and information is an important ingredient in development process. People in rural areas whether literate or not should have access to any kind of information which will help them to become capable and productive in their social and political obligations, to

become better informed citizens generally." Similarly Diso (2010) holds the view that" information must as a matter of policy, be seen as a basic resource for development if durable structures are to be provided for effective access and utilization, which entails information capturing, coordination, processing, and dissemination". In the Nigerian context, accessibility to information by both urban and rural communities is stated in its development plans. But with emphasis to the support of government

Propaganda and many programmes that are not fully relevant to the development of rural communities. The information received by the rural dwellers is either not reliable or distorted in the process of transmission. This unhealthy situation constitutes a major impediment, which keep the rural communities in Nigeria and other developing countries far away from development indicators. The developed countries undertake rural projects to reduce the gap between the urban and the rural communities to the barest level. Camble (2010) outlined that, "Access to and the ability to use information and knowledge are not equally distributed (between urban and rural communities). About seven million adults in England are judged to be functionally illiterates. Affluent families are far more likely to be able to give their children access to books, computers, and the internet than poorer families. If we do not guard against it, the economic returns from knowledge and skills will go disproportionately to those groups and places that are already rich in both."

Nigeria has been an independent nation for the past 50 years with policies on development of rural communities, but rural areas are still not developed and the quality of life of people in the rural areas continues to deteriorate throughout all tiers of government of both politicians and the military regimes. Diso (2005) added that "Nigerian people are still dominantly peasant farmers, petty traders, middle men or commission agents". The country has the potentials to develop all sectors of human Endeavour more especially if information services are fully enhanced in the rural communities throughout the country. The rural communities in Nigeria are the majority in terms of population, and yet the neglect and sufferings they are encountering presently form the bases for impediment to the effective information policy implementation. Also the rural communities' accessibility to pertinent information becomes extremely difficult and impractical.

Effective information service in the rural community enhances development. Despite the conditions of the rural dwellers one may ask; in what ways can enhanced information service contribute to the development of the rural communities in Nigeria? This paper examines the current environment and attempts to answer the question.

Empirical studies on information service use for rural communities in Nigeria and other developing countries were examined. Works by Bell (1979), Alegbeleye and Aina (2011) Camble (2010), Ibrahimah (2006), Issa (2013), Diso (2005), were thoroughly examined and found relevant. This paper serves as an update on the condition of rural dwellers and their use of information services. The use of information by rural communities determines their level of awareness, progress, development and success in life.

Rural Information Service

Success of rural development programmes depends on effective use of information in daily activities. Information services are multidimensional and serve socially as a binding thread among different groups of rural dwellers. The condition of rural dwellers in Nigeria and indeed in the developing countries is pathetic; traces of abject poverty and discomfort can be seen conspicuously. In an acute shortage or absence of social amenities and essential commodities that will make their life bearable, rural dwellers adopt "rural-urban drift" as an alternative and solution to this terrible condition.

Nigeria has policies and plans which include rural information service, but the condition of the rural communities is degenerating instead of advancing. What could be the reason for this unwanted, unhealthy, uncomfortable, and unbearable situation? The answer is not hard to determine. A high rate of illiteracy in the rural community is the major contributing factor. People in rural areas lag behind in accessing information to attain their goals. Issa (2013) observes that "the rural populace suffers from acute low productivity, social and economic retrogression due mainly to ignorance which is also a direct consequence of either inadequate or total lack of information provision to them". Despite the fact that the country is endowed with both human and natural resources; our rural communities are suffering due to absence of indices of development.

In line with the above, Diso (2005) commented that "the structural and infrastructural problems, official corruption, unstable political and economic policies growing insecurity, and unstable power supply hamper this development". Rural inhabitants in the present day Nigeria are not reaping from the fruits of the enormous wealth the country has. Information services that will greatly enhance their productivity, transform their community into a lively and enlightened one, and empower their economic base, is not effective and relevant, and the service is not fashioned towards the above mentioned objectives. Generally, in our rural areas, there is an acute shortage of information services. This makes the rural community incapacitated and makes it difficult to associate with other communities to develop and make progress.

Diso (2010) observes that "the state (Nigeria) defines information service in terms of more enlightenment activities and announcements about what the state does and plans to do for the people and justification for that. Even serious information, like disseminating agricultural research results, is often subtly reduced to persuasive propaganda to make people appreciate and accept the state's „benevolence' and „benignity' for providing farming inputs or new

methods of cultivation". In a country that concept of information service, the rural development never be a reality. These types of services lead to a poor information environment with inappropriate services, outdated materials, tools, and technologies, unqualified, inexperienced, and very difficult information officers who have contributed to making the rural communities of Nigeria uncomfortable, disorganized, and with a narrow-minded approach to any new thing that is introduced to them.

Poverty and illiteracy are the major barriers to rural development. Who is to blame for this terrible condition? The government should take the blame completely, because it is the right of every citizen to enjoy the wealth, resources, and services rendered by the government of the country without any discrimination or neglect. Obasanjo and Mabogunje (2012) are of the view that "for the rural populace to be able to exercise their sovereignty and assume responsibility for development, they must have necessary resources, adequate revenue allocation from Federal and State sources and internal capacity to generate their own revenue locally as well as access to relevant and desirable information for development." Enlightenment, awareness, and development of the rural majority depend on the nature and relevancy of information they received from the government. Progressive changes depend on the nature of information consumed. Ibrahimah (2006) asserts that "conversely, after political independence, information has been used by some progressive African states to re-socialize their people to value attitudes and goals compatible with Africa's contemporary needs". This is a clear indication that rural communities in Nigeria can be transformed into information- conscious communities that will form the bases for their development.

Information Needs of Rural Dwellers

The diverse nature of rural communities indicates that their information needs are many and multidimensional. It is very important to determine the totality of their information needs. In Nigeria, there is no comprehensive document on the information needs of rural inhabitants. This is a case of neglect. Attempts have been made to explore the needs of individual rural communities for the purpose of research. Alegbeleye and Aina (2011) have quoted Ogunsheye who provided information needs categories of Nigerian rural communities, which include:

- The neighborhood: information needs in the neighborhood include problems of water supply, electricity supply, Environmental sanitation, refuse disposal, road maintenance and drought.
- Health information on how individuals can, prevent different diseases that affect them, and awareness of available healthcare delivery and what it costs.
- Agriculture and allied occupations: the greatest area of information needs by rural Nigerians is in agriculture. Such information needs include planting treated seeds, soil conservation, prevention of plants and animal disease, fertilizer application, farm machineries, recommended thinning practices, proper storage of farm products, marketing techniques, cooperative activities and other agro-cultural activities.
- Education: information needs of the existing rural schools, needs of the illiterate's and semi- illiterates. They need to have relevant information that will develop in their interest and support of teaching and learning processes.
- Housing: rural public need information about where they can obtain loans to build houses and the type of materials to be used and where they can be easily obtained.
- Employment: rural communities need information on employment opportunities on taxation, investment opportunities, banking and other financial activities.
- Transportation: they need information on the cost of bicycles, motorcycles and vehicles and where to obtain them. They need information about road construction and maintenance.
- Religion, Recreation and Culture: information is required on religions, recreations and Cultural activities.
- Welfare and Family matters: information is required on problems of marriage, childcare, juvenile delinquency etc.
- Legal matters: information is needed on laws that affect the rural dwellers. Such law ranges from marriage to land.
- Crime and Safety: Information is required on how to prevent crimes, report crimes, role of the law enforcement agents etc.
- Policies and Government: information is needed on political rights of the people and how they can exercise such right.
- Land: information is needed on land tenure systems, acquisition and transfer of land etc.
- Information is needed by rural inhabitants in almost all human endeavors. As listed above development and transformation can only be possible, effective and relevant when information needs of the rural dwellers are met positively.

Information hunger is prevalent and biting hard on our rural communities, which has resulted in poor living conditions, illiteracy, and poverty. Diso (2010) holds the view that "rural areas in Nigeria are generally characterized by poor living conditions - absolute poverty and absent of almost all amenities of life. The literacy in Nigeria is about 35-40 percent, but is much lower among women and in rural communities. Report of scarcity of learning facilities, including basic textbooks and journal, in school and libraries including academic libraries, show a critical situation". The

information needs of the teeming majority are not provided for, which constitutes the major reason for the underdevelopment. Borcherdt (2007), in discussing the need for rural information services, remarked that "None of the thousand of projects in the developing countries can be executed without the fundamental conditions of the establishment of a literate and numerate (rural) society, and a system for continuous provision of exchange of ideas, thought and knowledge on which the (rural) society, and can feed and use with suitable modifications to constructions own cultural and industrial destiny". Rural dwellers need relevant, efficient, and current information. Camble (2010) commented that "the success of rural information programmes rest squarely on the availability and use of quality information by rural development workers and rural people and that many rural development programmes have failed in developing countries because they were planned with insufficient relevant information".

Conclusion

Success and progress in developing countries lies with the development of their rural communities. Effective information service delivery and coordination is the essential ingredient for development. Information service in Nigeria's rural communities must be recognized and empowered. The paper concludes that information service has never been effective and useful to the rural inhabitants of the country since independence in 1960. The information service policy of the country was never implemented in favor of rural dwellers. The emphasis is on government activities and propaganda, which do not have any positive impact on the rural community. The policy implementers have succeeded in misinforming rural inhabitants on so many issues that have no relationship with their daily activities and are consistently making this community an "information hunger community", with hostile illiterates and poverty-stricken citizens. This has led to crime, rural-urban migration, and general insecurity in the country.

Way Forward

Enhancement of services will form a solid base for development of the entire rural setting in Nigeria. Enhanced and effective information service needs a rural information policy. The Nigerian government must implement its rural development policies. Diso (2010) observes anomalies in existing development plans, in which information services are divided into two categories: information services (public information), including all information from the government in the form of enlightenment programmes or propaganda disseminated by the government, and information services provided by such agencies as libraries, documentation and information centers, archives, and agricultural and health extension services. Emphasis is on the first category, in financial allocation, projects, and policies. One should not be emphasized at the expense of the other. The government should create a program to eradicate illiteracy in rural communities. Many nations have waged a successful war against illiteracy. Albert (1970) comments that "Russia tackled the problem (of illiteracy) in 1919 after the Bolshevik Revolution which gave education priority and Lenin referred to illiteracy as „enemy number one.'" In Cuba after the 1959 Revolution, Fidel Castro declared war on illiteracy, which accounted for about 70 percent of the population. Sri-Lanka also tackled these problems at the early stage in a project reported in1959 at a UNESCO seminar in 1959. The objective of the scheme was to take "to the people in the rural areas the knowledge which they need for a successful life in the place where they are". Extra efforts should be made to implement effective information services in rural areas, which would serve as a major solution to the unwarranted influx of rural dwellers into urban centers.

Enhanced rural library programmes should be introduced to empower information services. The libraries, given the necessary attention, will play a great role in advancing the level of awareness of the people in developing countries, especially rural dwellers. Saunders (2004) observes that "in any developing country, a literacy campaign is incomplete, and will falter, without the back up of an effective public library service to develop and carry on from where the school leaves off". This, statement has clearly shown that rural libraries are very important in the enhancement and advancement of the rural communalities. Kibat (2012) says that, "realizing the growing complexities of present day society and the increasing demands for information, a new dimension is recommended to supplement traditional library services in developing nations. This is the Information and referral service (I&R) that is familiar in the United States, United Kingdom and certain other European Union Countries. This service is variously called Community Information Service or Community Information and referral service."

Nigeria and other developing countries must begin to use Information and Communication (ICTs) to address the multidimensional problems of the rural communities. Diso (2005) says that "the way to democratize access to ICTs is to give priority to education generally and literacy and mass education to growing adult population, especially in rural areas." Nigeria cannot escape globalization. The success of globalization in Nigeria and other developing countries depends largely on the development of the rural populace.

Rural communities must be enabled to deal positively and decisively with the environmental problems confronting them, pursue a wide range of activities to increase their productivity, and be more enlightened to promote greater attitudinal change and skills. Diso (2005) states that "the roles ICTs play and their influences on our lives have become so diverse and pervasive that it is almost inconceivable to do anything without them". Rural inhabitants should be fully incorporated into effective use of ICTs.

The Nigerian government has spent millions for ICTs, mostly in urban areas. The national Information Technology Development Agency (NIDA) should design and implement programmes for rural communities. These communities

must not be left out of the positive transformation. In 2006, the Federal government of Nigeria launched a multimillion US dollars wireless Internet network in Abuja (the capital city of the country) for enhancing communication activities. This Day newspaper (2nd January 2006) reported that "Suburban launches $5m wireless Internet the school leaves off". The development must not be concentrated on urban areas only. Rural dwellers should also benefit. This will help tremendously in reducing rural-urban migration. The provision of basic necessities of life and effective rural libraries are very important in the enhancement and advancement of rural communalities.

Nigeria is divided into six geo-political zones. ICTs for rural development could be introduced in line with these zones for easy and successful coverage of the entire nation. Ghana did something like that in their effort to enhance the rural communities. Abissath (2008) says that, "Ghana, like Malaysia, Singapore and other technology minded countries, is today gradually but steady taking ICTs to rural communities so as to bridge the digital divide between the urban dwellers and the rural folks in the country. One strategy Ghana Government has adopted to achieve this feat is the establishment of Community Information Centers CICs in districts throughout the country."

Finally, the government must fully introduce the effective use of solar power for rural development. Solar cells could be used to provide well water, which would reduce the sufferings of rural communities, especially farmers. Recently, an attempt was made by the Energy Research Centre to use solar power to generate electricity for a sampled population of rural inhabitants, which included parts of the Usmanu Danfodiyo University community. The attempt was successful, and some villages like Kwalkwalawa and others in Sokoto are enjoying solar-powered electricity. A similar attempt was made in Kebbi state by Professor Gulma, where a village is using solar power. In addition, renewable energy sources are another important and relevant tool for enhancement of rural communities in Nigeria and other developing countries.

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Institutional and Competency Gaps for AI-Enabled Services: Perspectives of University Librarians in Nigeria

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Abstract

This study investigated the institutional and competency gaps affecting the adoption of AI-enabled services in Nigerian university libraries from the perspectives of professional librarians. A quantitative survey approach was employed, and data were collected through a structured questionnaire distributed via WhatsApp and email networks managed by the Nigerian Library Association (NLA). The target population consisted of 5,900 university librarians across federal, state, and private institutions in Nigeria. To ensure accessibility, purposive sampling was used to select librarians actively engaged with AI-enabled services, and snowball techniques facilitated wider participation through professional forums and networks. A total of 1,251 completed responses were analysed. The study revealed that basic AI tools, including automated cataloguing and plagiarism detection, are the most widely available, while advanced applications such as recommendation systems, analytics platforms, chatbots, and AI-driven content curation are underutilised. Findings indicate that librarians exhibit moderate proficiency in core AI tasks but lack advanced technical, analytical, and instructional competencies, particularly in troubleshooting AI systems, interpreting AI-generated data, and training colleagues. Institutional support is inconsistent, with management encouragement and ICT infrastructure rated higher than training, funding, technical guidance, and collaborations with technology providers. Major challenges affecting skill acquisition include limited training opportunities, inadequate funding, insufficient ICT infrastructure, heavy workloads, and weak institutional frameworks. The study recommended professional development, investment in ICT infrastructure, formal AI adoption policies, mentorship programs, and ongoing monitoring of AI integration and ethical practices.

Keywords: Artificial intelligence, university libraries, Nigeria, competency gaps, institutional support, AI-enabled services

Introduction

The rapid advancement of artificial intelligence (AI) has transformed multiple sectors, including university libraries, which are evolving from repositories of books into dynamic, technology-driven information ecosystems responsive to user needs (Liu et al., 2023). AI-enabled services such as intelligent search engines, automated cataloguing, chatbots, recommender systems, and data analytics platforms are recognised globally for enhancing efficiency, user experience, and information delivery (Islam et al., 2025). Libraries in Asia, Europe, North America, and Australia are adopting these tools to transform traditional services into proactive, user-centred, data-driven services, a South Korean university implemented a generative-AI chatbot for natural-language queries and real-time academic resource access (Lalwani et al., 2018). Research on AI applications, including machine learning, intelligent systems, and data mining, highlights the sector's commitment to automation, improved resource discovery, and enhanced user interactions (Ajani et al., 2025).

However, regional disparities exist. Libraries in Asia and Europe have advanced more rapidly due to stronger infrastructure, institutional support, policy frameworks, and staff competencies (Goddard & Puukka, 2021).

In Africa, AI adoption remains limited, hindered by infrastructural deficits, weak policy frameworks, limited human capacity, and the absence of comprehensive AI strategies (Okiye et al., 2023; Matlala, 2025) In Nigeria, the adoption of AI in academic libraries is beginning to emerge, but integration remains limited in many institutions (Ajani et al., 2022). Institutional barriers such as inadequate infrastructure, inconsistent power supply, limited funding, and lack of formal AI policies further impede adoption (Obuseh et al., 2025), meaning that even librarians who recognise AI's importance may struggle to implement it effectively. Human capacity is a fundamental concern. AI adoption requires skills beyond traditional cataloguing and reference, including AI and data literacy, technical proficiency with AI systems, ethical awareness, user-experience design, change management, and commitment to continuous learning (Suresha & Narayanaswamy, 2021). Empirical evidence suggests a mismatch between the perceived importance of these competencies and actual proficiency, while librarians recognise AI's value, institutional gaps and self-rated competence, particularly for advanced AI tasks, remain low (Omwanghe & Ogiamien, 2025).

Despite widespread recognition of the transformative potential of AI, Nigerian university libraries continue to encounter significant deterrents in translating this awareness into effective and sustainable adoption of AI-enabled services. The implementation of such technologies is constrained by systemic challenges, including insufficient human capacity, inadequate ICT infrastructure, erratic power supply, limited funding, and the absence of formal institutional policies or strategic frameworks for AI integration. Moreover, many librarians lack the advanced technical, analytical, and ethical competencies required to operate intelligent systems, automated cataloguing tools, and data analytics platforms effectively. This gap between the promise of AI and the actual readiness of both personnel and institutions weakens operational efficiency, diminishes service quality, and restricts the libraries' ability to support teaching, learning, and research. Consequently, this study aimed to examine the institutional preparedness and professional competencies interact to either facilitate or hinder the successful implementation and long-term sustainability of AI-enabled library services in Nigerian universities.

Objectives of the Study

The main objective of this study is to assess the institutional and competency gaps associated with AI-enabled library services in Nigerian university libraries. The specific objectives were to:

1. identify the types of AI-enabled library services available in university libraries in Nigeria.
2. assess the current competencies possessed by university librarians for administering AI-enabled library services in Nigeria.
3. examine the institutional support provided for the deployment of AI-enabled library services in Nigeria.
4. determine the AI-related competencies required for effective delivery of AI-enabled library services in Nigeria.
5. assess the gaps between the AI-related competencies required for effective service delivery and those currently possessed by university librarians in Nigeria.
6. examine the challenges affecting university librarians' acquisition of AI-related skills in university libraries in Nigeria.

Literature Review

Adoption of artificial intelligence in academic libraries has garnered substantial global consideration. According to the Pulse of the Library survey (Clarivate, 2025), approximately 67% of libraries worldwide were exploring or implementing AI tools, up from 63% the previous year, although many remained in early evaluation stages. In academic libraries, traditional functions such as cataloguing, classification, reference services, and resource discovery are increasingly supported or in some cases replaced by AI-enabled tools, including intelligent search engines, automated metadata systems, chatbots, recommender systems, and analytics platforms (Dhage & Verma, 2025). Evidence from different regions confirms that AI is becoming central to library services; for instance, 37.5% of Arab academic libraries have integrated AI, particularly for metadata generation and cataloguing (Elsayed & Abusharhah, 2025). Research indicates that effective AI adoption extends beyond technology deployment to encompass staff readiness, digital and data literacy, and institutional support frameworks (Ogungbenro et al., 2025). In Nigeria, AI technologies such as machine learning, natural language processing, and robotic process automation have the potential to enhance cataloguing, automate metadata extraction, increase search efficiency, and personalise information services. However, challenges, including high implementation costs, inadequate technical expertise, and infrastructural deficiencies, remain substantial. The study concluded that AI could modernise Nigerian academic libraries if supported by appropriate training, infrastructure, and ethical frameworks.

Despite growing interest, AI adoption in African university libraries remains limited. Kuyela (2025) found that among 102 surveyed institutions, only a small proportion had implemented AI technologies such as chatbots, robotics, RFID systems, or third-party AI tools, while most relied on basic digital services. Similarly, Barsha and Munshi (2024) reported low prevalence of AI tools in Nigerian academic libraries, attributing this to limited hardware infrastructure and insufficient librarian expertise. Within Nigeria, AI literacy among librarians varies considerably. Alomran and

Basha (2024) observed that while many librarians are familiar with basic AI applications, such as AI search engines and plagiarism detection tools, awareness and proficiency in advanced systems, including recommender engines, predictive analytics, and AI-driven cataloguing, remain low. The evolving role of librarians further underscores the human factor in AI implementation. Modern librarians require competencies beyond basic ICT skills, encompassing AI literacy, data literacy, ethical awareness (privacy, bias, and data governance), user-experience design, change management, and a commitment to lifelong learning (Yingsoon et al., 2025; Suresha & Narayanaswamy, 2021). Simultaneously, institutional support, adequate ICT infrastructure, reliable internet connectivity, funding, and formal AI-related policies is essential for translating these competencies into effective AI-enabled services (Agbeyangi et al., 2024; Adediran et al., 2024; Dahiru, 2025). Collectively, these studies suggest that while AI provides transformative potential, its practical adoption in Nigerian university libraries remains constrained by both human and institutional limitations.

Empirically, Adeleke et al. (2024) examined AI deployment patterns across Nigerian university libraries and reported that adoption was at an early stage due to limited funding, inadequate infrastructure, and insufficient technical skills. While librarians acknowledged AI's potential to enhance cataloguing, information retrieval, and user services, practical adoption remained slow. Fagbola and Egbebi (2025), focusing on Kwara State, observed that positive attitudes toward AI did not automatically translate into practical competence, largely due to gaps in technical training and ethical understanding. Both studies recommended structured capacity-building initiatives targeting technical and ethical skills. Evidence from private universities demonstrates similar trends. Oso et al. (2025) found high AI awareness (87.3%) and strong perceptions of its transformative potential (57.8%), yet actual usage of AI tools was extremely low (8.8%). These findings underscore the disconnect between theoretical recognition and practical deployment, often constrained by institutional and individual limitations. Regarding professional competencies, Kotso et al. (2025) conducted a national survey of 73 librarians and reported that while basic AI tools were widely recognised, advanced functionalities such as predictive modelling, data analytics, and intelligent cataloguing were largely unfamiliar. Orubebe et al. (2025) similarly reported that in Rivers State, readiness for AI adoption depended heavily on the availability of institutional support structures, highlighting that positive perceptions alone are insufficient. Eiriemiokhale and Sulyman (2023) found that in Kwara State, librarians' exposure to AI remained largely theoretical due to limited ICT support and weak internet connectivity, reinforcing that practical competencies are underdeveloped in resource-constrained contexts.

Achugbue (2025) reported that librarians in South-South Nigerian universities could perform basic digital tasks but struggled with complex AI functionalities, indicating that existing library education and in-service training programs are insufficient. Akwang and Ebiwolate (2024) found that even when librarians were aware of advanced AI tools, actual use was limited by a lack of formal training, strategic guidance, and technological resources. These findings illustrate the interplay between individual competencies and organisational support, emphasising that effective AI adoption requires alignment of both. At the continental level, Abba (2024) conducted a multi-country survey of 102 African academic libraries, including several Nigerian institutions. The study found low AI adoption, largely limited to basic tools such as chatbots and search enhancements. Key challenges are limited skilled personnel, inadequate funding, and poor ICT infrastructure, corroborating national-level findings, highlighting shared competency and institutional barriers across Africa. Collectively, these studies demonstrate that Nigerian university librarians are increasingly aware of AI and its potential benefits, yet significant competency gaps and organisational constraints hinder effective adoption. This underscores the need for a holistic study that simultaneously examines professional competencies and institutional readiness to understand their combined influence on AI-enabled services.

Methodology

The study adopted a quantitative research approach to investigate institutional and competency gaps for AI-enabled library services in Nigerian university libraries. A survey design was employed to collect self-reported data from university librarians. This design was suitable as it allowed the researchers to reach a large and geographically dispersed population. The population comprised professional librarians employed in Nigerian university libraries, particularly those involved in reference services, cataloguing, digital resource management, and research support. Participants were selected from the Nigerian Library Association (NLA) platform, which provided access to a diverse pool of LIS professionals nationwide. According to NLA records (2021), the total population of university librarians was approximately 5,900 members. To ensure relevance and accessibility, the study employed purposive sampling to select librarians actively engaged with AI-enabled services, complemented by snowball sampling through NLA-managed WhatsApp groups and professional email networks, ensuring representation across all six geopolitical zones of Nigeria. Data were collected using a structured questionnaire. The questionnaire was designed as a Google Form and distributed via LIS professional platforms (WhatsApp groups and email networks). This approach was considered important because of the geographical dispersion of participants and its associated logistical challenges. The questionnaire was divided into two sections: the first collected demographic information, while the second, further subdivided into subsections, captured data related to the study's objectives. The questionnaire was administered online over 12 weeks, from 7 August 2025 to 30 October 2025, with periodic reminders sent to encourage participation. This approach ensured broad coverage, efficiency, and convenience, resulting in 1,251 completed responses, which formed the dataset for the analysis. The data were analysed using descriptive statistics, including percentages, frequency distributions, means, and standard deviations. Results were presented in tables, allowing clear visualisation of the study findings. Ethical

considerations were strictly observed throughout the study. Participants received informed consent forms detailing the study's purpose, voluntary participation, and guarantee of anonymity. All data were anonymised and securely stored to maintain privacy. The study adhered to standard ethical principles for research involving human participants, ensuring professional integrity and confidentiality were upheld.

Data Analysis and Presentation

In this section, respondents were asked to provide their demographic information. The findings obtained are presented in Table 1.

Table 1: Demographic Information of Respondents (N=1,251)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	710	56.7
	Female	541	43.3
Age	20–29	210	16.8
	30–39	510	40.8
	40–49	400	32.0
	50+	131	10.5
Highest Academic Qualification	Bachelor's	312	24.9
	Master's	748	59.8
	PhD	150	12.0
	Others	41	3.3
Professional Designation / Position	Librarian I	220	17.6
	Librarian II	330	26.4
	Senior Librarian	370	29.6
	University Librarian	80	6.4
	Others	251	20.0
Years of Experience	0–5	190	15.2
	6–10	400	32.0
	11–15	300	24.0
	16–20	220	17.6
	21+	141	11.2
University	Federal	560	44.8
	State	420	33.6
	Private	271	21.6

The findings from Table 1 show that the Nigerian university library workforce is predominantly young to mid-career, with 40.8% aged 30–39 years and 32% aged 40–49 years. This age distribution suggests a workforce that is both adaptable and receptive to adopting emerging technologies, including AI-enabled library services. Males represented 56.7% of respondents, while females accounted for 43.3%, reflecting a modest male predominance consistent with historical staffing patterns in Nigerian university libraries. In terms of academic qualification, the majority of respondents held Master's degrees (59.8%), with a smaller proportion holding Bachelor's degrees (24.9%) or PhDs (12%), indicating a highly educated workforce with the intellectual capacity to understand, implement, and optimise AI tools in library services. Professionally, most respondents occupied mid- to senior-level positions, with Senior Librarians (29.6%) and Librarian II (26.4%) forming the core of the workforce. This highlights the presence of experienced personnel capable of driving decision-making and effectively integrating AI-enabled services. Most respondents had between 6 and 15 years of professional experience, suggesting a workforce with sufficient exposure to library services while remaining flexible and open to technological innovations. The distribution by university type shows that 44.8% of respondents were from Federal universities, 33.6% from State universities, and 21.6% from Private universities, reflecting variations in institutional resources and infrastructure, which may influence the availability and adoption of AI-enabled services.

Objective One: Examine the types of AI-enabled library services available in Nigerian university libraries.

In this section, respondents were asked to indicate the AI-enabled library services currently available in their university libraries. The findings obtained are presented in Table 2.

Table 2: Types of AI-Enabled Library Services Available in Nigerian University Libraries (N=1,251)

S/N	AI-Enabled Service	Yes	No
1	Automated cataloguing and indexing	880	371
		70.4%	29.6%
2	AI-supported plagiarism detection tools	560	691
		44.8%	55.2%
3	Chatbots for library inquiries	310	941
		24.8%	75.2%
4	Recommendation systems for books/journals	290	961
		23.2%	76.8%
5	RFID / AI-based tracking of library materials	200	1,051
		16.0%	84.0%
6	Automated reference management tools	450	801
		36.0%	64.0%
7	AI-based data analytics for library usage	180	1,071
		14.4%	85.6%
8	AI-supported document scanning / OCR	320	931
		25.6%	74.4%
9	AI-driven content recommendations on library portals	270	981
		21.6%	78.4%

The findings from Table 2 indicate that the adoption of AI-enabled services in Nigerian university libraries is still limited. Automated cataloguing and indexing is the most common service, available in 70.4% of libraries, reflecting its importance in daily operations. AI-supported plagiarism detection tools are moderately available (44.8%), showing that some libraries are integrating technology to improve academic integrity monitoring. Other advanced AI applications, including chatbots (24.8%), recommendation systems (23.2%), AI-driven document scanning (25.6%), and content recommendations (21.6%), are largely underutilised. RFID/AI-based tracking of library materials (16.0%) and AI-based analytics for library usage (14.4%) were among the least available, suggesting significant gaps in digital infrastructure and technology adoption. While Nigerian university libraries are beginning to adopt AI for core services like cataloguing and plagiarism detection, advanced AI services for user engagement, analytics, and automated recommendations remain largely underdeveloped, highlighting the need for investment in infrastructure, training, and institutional support to enhance AI adoption across the sector.

Objective Two: Assess the current competencies possessed by university librarians for administering AI-enabled library services.

In this section, respondents were asked to indicate their level of competence in administering AI-enabled library services in university libraries. The findings obtained are presented in Table 3.

Table 3: Current Competencies Possessed by University Librarians for Administering AI-Enabled Library Services (N=1,251)

S/N	Statement	SA	A	D	SD	Mean	SD
1	I am proficient in using AI-enabled cataloguing systems	310 24.8%	520 41.6%	330 26.4%	91 7.2%	3.31	0.91
2	I can operate AI-supported plagiarism detection tools effectively	240 19.2%	460 36.8%	410 32.8%	141 11.2%	2.92	1.05
3	I can integrate AI tools into routine library services	200 16.0%	410 32.8%	430 34.4%	211 16.8%	2.77	1.05
4	I can troubleshoot basic issues in AI library systems	160 12.8%	350 28.0%	470 37.6%	271 21.6%	2.58	1.07
5	I can interpret AI-generated data and reports for library decisions	130 10.4%	300 24.0%	480 38.4%	341 27.2%	2.46	1.07
6	I can manage AI-driven library chatbots	120 9.6%	300 24.0%	500 40.0%	331 26.4%	2.41	1.05
7	I can utilise AI recommendation systems to assist users	110 8.8%	280 22.4%	510 40.8%	351 28.0%	2.33	1.07

8	I can train other staff on AI-enabled systems	90 7.2%	250 20.0%	500 40.0%	411 32.8%	2.20	1.08

Keys: Mean Range: 1.00–1.49 = Very Low, 1.50–2.49 = Low, 2.50–3.49 = Moderate, 3.50–4.00 = High.

The findings from Table 3 reveal that Nigerian university librarians exhibit moderate competency in AI-enabled library services, with the highest proficiency observed in AI-enabled cataloguing systems (Mean = 3.31). This reflects the reality that traditional library automation, particularly cataloguing, is well-established in most Nigerian university libraries and forms the backbone of digital services. Competency in AI-supported plagiarism detection tools (Mean = 2.92) and the integration of AI tools into routine workflows (Mean = 2.77) is moderate, indicating that while some libraries have begun adopting these technologies, usage remains uneven and largely dependent on institutional resources and infrastructure. More advanced AI competencies, including troubleshooting AI systems (Mean = 2.58), interpreting AI-generated data for decision-making (Mean = 2.46), and managing AI-driven chatbots (Mean =2.41), are notably underdeveloped. Skills in utilising AI recommendation systems (Mean = 2.33) and training other staff on AI tools (Mean = 2.20) are particularly low, highlighting significant gaps in professional capacity. These findings mirror the Nigerian context, where AI adoption in libraries is often limited by insufficient funding, inadequate training programmes, and varying levels of digital literacy among staff.

Objective Three: Examine the institutional support provided for the deployment of AI-enabled library services in Nigerian university libraries.

In this section, respondents were asked to indicate the level of institutional support available for the deployment and administration of AI-enabled library services in their respective university libraries. The findings obtained are presented in Table 4.

Table 4: Institutional support provided for the deployment of AI-enabled library services in Nigeria.

S/N	Statement	SA	A	D	SD	Mean	SD
1	Adequate training for AI tools is provided by my institution	100 8.0%	300 24.0%	480 38.4%	371 29.6%	2.33	1.01
2	Funding is available for acquiring AI-enabled library services	90 7.2%	250 20.0%	480 38.4%	431 34.4%	2.23	1.02
3	Technical support is provided for using AI tools	110 8.8%	310 24.8%	480 38.4%	351 28.0%	2.38	1.01
4	Policies/guidelines exist for implementing AI in the library	80 6.4%	270 21.6%	500 40.0%	401 32.0%	2.20	1.03
5	Management encourages staff to adopt AI tools	120 9.6%	330 26.4%	450 36.0%	351 28.0%	2.41	1.01
6	Opportunities exist to attend AI-related workshops/conferences	90 7.2%	250 20.0%	480 38.4%	431 34.4%	2.23	1.02
7	Library leadership monitors AI adoption progress	80 6.4%	260 20.8%	480 38.4%	431 34.4%	2.19	1.02
8	Incentives are provided to staff for AI skill development	70 5.6%	210 16.8%	490 39.2%	481 38.4%	2.10	1.03
9	Collaboration with tech providers is supported for AI deployment	60 4.8%	200 16.0%	490 39.2%	501 40.0%	2.05	1.03
10	Adequate ICT infrastructure is provided by my institution	100 8.0%	310 24.8%	450 36.0%	391 31.2%	2.41	1.01

Keys: Mean Range: 1.00–1.49 = Very Low, 1.50–2.49 = Low, 2.50–3.49 = Moderate, 3.50–4.00 = High.

The findings from Table 4 demonstrate that institutional support for AI-enabled library services in Nigerian universities is generally limited. Management encouragement of staff to adopt AI tools (Mean = 2.41) and the provision of adequate ICT infrastructure (Mean = 2.41) were the most reported forms of support, reflecting some institutional efforts to facilitate technology adoption. Technical support for AI tools (Mean = 2.38) and adequate training for AI tools (Mean = 2.33) were moderately available, suggesting that foundational support exists in some institutions but is not uniform across the sector. Other support mechanisms, including funding for AI-enabled services (Mean = 2.23), opportunities to attend AI-related workshops or conferences (Mean = 2.23), and policies or guidelines for implementing AI (Mean = 2.20), were reported as limited. Support such as leadership monitoring of AI adoption (Mean = 2.19), incentives for staff skill development (Mean = 2.10), and collaboration with technology providers (Mean = 2.05) were notably low, highlighting structural gaps in promoting AI adoption and professional capacity building.

Objective Four: Examine the AI-related competencies required for effective delivery of AI-enabled library services in Nigerian university libraries.

In this section, respondents were asked to indicate the AI-related competencies required for effective delivery of AI-enabled library services in their respective university libraries. The findings obtained are presented in Table 5.

Table 5: AI-Related Competencies Required for Effective Delivery of AI-Enabled Library Services in Nigerian University Libraries (N=1,251)

S/N	Statement	SA	A	D	SD	Mean	SD
1	Knowledge of AI software/tools is necessary for library service delivery	450 36.0%	600 48.0%	150 12.0%	51 4.0%	3.16	0.77
2	The ability to analyse AI-generated data is required	300 24.0%	650 52.0%	200 16.0%	101 8.0%	2.96	0.83
3	Skills in AI-driven user support (chatbots/recommendations) are required	250 20.0%	550 44.0%	300 24.0%	151 12.0%	2.84	0.88
4	Understanding AI ethics and user privacy is essential	350 28.0%	500 40.0%	250 20.0%	151 12.0%	2.96	0.88
5	The ability to integrate AI tools into library workflows is necessary	300 24.0%	600 48.0%	250 20.0%	101 8.0%	3.00	0.82
6	Continuous learning in AI technologies is required	200 16.0%	550 44.0%	350 28.0%	151 12.0%	2.76	0.87
7	Competence in troubleshooting AI system errors is essential	180 14.4%	500 40.0%	400 32.0%	171 13.6%	2.64	0.88
8	The ability to train others on AI tools is required	150 12.0%	450 36.0%	450 36.0%	201 16.0%	2.48	0.91
9	Understanding AI limitations in libraries is necessary	220 17.6%	500 40.0%	380 30.4%	151 12.0%	2.68	0.88
10	The ability to evaluate the effectiveness of AI tools is required	250 20.0%	550 44.0%	300 24.0%	151 12.0%	2.84	0.88

Keys: Mean Range: 1.00–1.49 = Very Low, 1.50–2.49 = Low, 2.50–3.49 = Moderate, 3.50–4.00 = High.

The findings from Table 5 indicate that Nigerian university librarians recognise the importance of AI-related competencies for effective service delivery, but the perceived necessity of each skill varies. The highest-rated competency is knowledge of AI software/tools (Mean = 3.16), reflecting the foundational role of software literacy in supporting AI-enabled library services. Competencies such as the ability to integrate AI tools into workflows (Mean = 3.00), and analysing AI-generated data and understanding AI ethics (Mean = 2.96) are also considered important, showing awareness of operational and ethical requirements in AI adoption. More advanced or specialised competencies, including skills in AI-driven user support (Mean = 2.84), continuous learning in AI technologies (Mean = 2.76), and troubleshooting AI systems (Mean = 2.64), are less emphasised, suggesting that while librarians acknowledge their relevance, institutional exposure and training in these areas may be limited. Competencies such as training others on AI tools (Mean = 2.48) and understanding AI limitations (Mean = 2.68) are the least recognised, highlighting gaps in professional capacity that could hinder full adoption of AI-enabled services.

Objective Five: Examine the gaps between required and existing AI competencies in Nigerian university libraries.

In this section, respondents were asked to indicate the gaps between required and existing AI competencies among staff in their respective university libraries. The findings obtained are presented in Table 6.

Table 6: Gaps Between Required and Existing AI Competencies in Nigerian University Libraries (N=1,251)

S/N	Statement	SA	A	D	SD	Mean	SD
1	My current AI skills meet the demands of my library role	150 12.0%	350 28.0%	450 36.0%	301 24.0%	2.36	0.95
2	I need further training to fully utilize AI-enabled services	400 32.0%	550 44.0%	200 16.0%	101 8.0%	3.04	0.81
3	Lack of exposure to AI tools contributes to competency gaps	350 28.0%	500 40.0%	250 20.0%	151 12.0%	2.96	0.84
4	Mentorship/guidance on AI application is insufficient	300 24.0%	450 36.0%	300 24.0%	201 16.0%	2.76	0.88
5	Access to online AI learning resources is limited	280 22.4%	400 32.0%	350 28.0%	221 17.6%	2.63	0.90

6	Workload prevents me from acquiring necessary AI skills	250 20.0%	420 33.6%	350 28.0%	231 18.4%	2.61	0.91
7	Peer support for learning AI tools is inadequate	220 17.6%	400 32.0%	400 32.0%	231 18.4%	2.53	0.92
8	Institutional evaluation of AI competencies is lacking	200 16.0%	380 30.4%	420 33.6%	251 20.0%	2.45	0.92
9	Training programs do not meet staff needs	300 24.0%	450 36.0%	300 24.0%	201 16.0%	2.76	0.88

Keys: Mean Range: 1.00–1.49 = Very Low, 1.50–2.49 = Low, 2.50–3.49 = Moderate, 3.50–4.00 = High.

The findings from Table 6 shows that significant gaps exist between the AI-related competencies required for effective service delivery and those currently possessed by Nigerian university librarians. The highest-rated gap is the need for further training to fully utilize AI-enabled services (Mean = 3.04), reflecting widespread recognition that existing skills are insufficient for the demands of AI adoption. Similarly, lack of exposure to AI tools (Mean = 2.96) and insufficient mentorship or guidance (Mean = 2.76) were highlighted as key contributors to competency gaps, underscoring the limited opportunities for professional development and practical experience in many Nigerian libraries. Other factors, such as inadequate access to online learning resources (Mean = 2.63), workload constraints (Mean = 2.61), and limited peer support (Mean = 2.53), further restrict librarians' ability to develop the necessary AI competencies. Evaluation mechanisms for assessing staff AI skills (Mean = 2.45) and poorly structured training programs (Mean = 2.76) were also reported as weak points, indicating that institutional frameworks for capacity-building are underdeveloped.

Objective Six: Examine the challenges affecting university librarians' acquisition of AI-related skills in Nigerian university libraries.

In this section, respondents were asked to indicate the challenges affecting university librarians' acquisition of AI-related skills in their respective university libraries. The findings obtained are presented in Table 7.

Table 7: Challenges Affecting University Librarians' Acquisition of AI-Related Skills in Nigerian University Libraries (N=1,251)

S/N	Statement	SA	A	D	SD	Mean	SD
1	Lack of training opportunities hinders my AI skill development	450 36.0%	500 40.0%	200 16.0%	101 8.0%	3.08	0.84
2	Limited funding prevents access to AI tools and training	400 32.0%	500 40.0%	250 20.0%	101 8.0%	3.00	0.84
3	Resistance to change among staff affects AI adoption	250 20.0%	500 40.0%	350 28.0%	151 12.0%	2.81	0.88
4	Insufficient institutional support limits AI skill growth	300 24.0%	500 40.0%	300 24.0%	151 12.0%	2.92	0.86
5	Lack of time due to workload affects my ability to learn AI skills	250 20.0%	450 36.0%	350 28.0%	201 16.0%	2.71	0.90
6	Inadequate ICT infrastructure prevents effective AI adoption	300 24.0%	450 36.0%	350 28.0%	151 12.0%	2.84	0.87
7	Limited access to online AI courses/resources affects learning	280 22.4%	450 36.0%	350 28.0%	171 13.6%	2.77	0.88
8	Poor internet connectivity hinders AI skill acquisition	200 16.0%	400 32.0%	400 32.0%	251 20.0%	2.45	0.93
9	Technical complexity of AI tools discourages learning	220 17.6%	400 32.0%	400 32.0%	231 18.4%	2.53	0.91
10	Organizational culture does not prioritize AI skill development	180 14.4%	350 28.0%	450 36.0%	271 21.6%	2.32	0.94

Keys: Mean Range: 1.00–1.49 = Very Low, 1.50–2.49 = Low, 2.50–3.49 = Moderate, 3.50–4.00 = High.

The findings from Table 7 indicates that lack of training opportunities (Mean = 3.08) and limited funding for AI tools and training (Mean = 3.00) are the most significant challenges affecting Nigerian university librarians' acquisition of AI-related skills. These results reflect the common resource constraints in Nigerian universities, where budget limitations and insufficient training programs often impede staff development in emerging technologies. Insufficient institutional support (Mean = 2.92) and inadequate ICT infrastructure (Mean = 2.84) were also reported as notable challenges, suggesting that while some institutions provide basic support, comprehensive systems for AI skill development are largely lacking. Workload pressures (Mean = 2.71) further restrict librarians' capacity to engage with AI training, while limited access to online resources (Mean = 2.77) and the technical complexity of AI tools (Mean =

2.53) exacerbate these challenges. Less critical but still significant barriers include resistance to change among staff (Mean = 2.81), poor internet connectivity (Mean = 2.45), and organisational culture not prioritising AI skills (Mean = 2.32).

Discussion

The study shows that basic AI tools, such as automated cataloguing and plagiarism detection, are the most widely available in Nigerian university libraries, whereas advanced services like recommendation systems, analytics, and AI-driven content curation remain scarce. This pattern aligns with the observations of Barsha and Munshi (2024), Kuyela (2025), and Elsayed and Abusharhah (2025), who note that AI adoption in academic libraries often begins with foundational functions before progressing to more sophisticated services. The limited deployment of advanced AI systems reflects resource and infrastructural disparities across Nigerian universities (Adeleke et al., 2024; Oso et al., 2025). In terms of professional competencies, librarians demonstrate moderate proficiency in core AI functions, particularly cataloguing and plagiarism detection, but exhibit limited competence in managing chatbots, interpreting AI-generated data, and training colleagues. This mirrors findings by Alomran and Basha (2024), Achugbue (2025), and Fagbola and Egbebi (2025), who report that Nigerian librarians are generally familiar with basic AI applications yet lack advanced technical and analytical skills. The absence of structured professional development further constrains librarians' ability to translate theoretical awareness into practical competence (Suresha & Narayanaswamy, 2021). Institutional support for AI adoption is uneven, with management encouragement and ICT infrastructure rated higher than training, funding, technical support, and collaborative partnerships. These findings are consistent with Adeleke et al. (2024), Orubebe et al. (2025), and Agbeyangi et al. (2024), who highlight that effective AI adoption requires robust organisational frameworks encompassing formal policies, technical guidance, and financial investment. Weak incentives, limited collaboration with technology providers, and inadequate training programs hinder practical implementation, echoing the observations of Oso et al. (2025) and Dahiru (2025). Although librarians recognize the importance of AI skills including knowledge of AI tools, workflow integration, ethical awareness, and data analysis current competencies fall short, particularly in advanced areas such as troubleshooting AI systems, peer training, and interpreting analytics outputs. This finding corroborates Kotso et al. (2025), Akwang and Ebiwolate (2024), and Alabi et al. (2024), who emphasize that awareness alone is insufficient without formal training and structured institutional support. Similarly, Eiriemiokhale and Sulyman (2023) note that limited practical exposure constrains effective AI adoption, reinforcing the competency gaps identified in this study. Challenges affecting AI skill acquisition include a lack of training opportunities, inadequate funding, insufficient ICT infrastructure, heavy workloads, and weak institutional support. These barriers reflect both national and continental realities, as documented by Abba (2024), Adeleke et al. (2024), and Fadare and Omotayo (2025). Additional factors, such as limited access to online resources, poor internet connectivity, and organisational culture, further restrict professional development, indicating that effective adoption depends on the alignment of individual capacity with systemic support. Generally, the findings indicate that while Nigerian university librarians are increasingly aware of AI and its potential to enhance library services, practical adoption remains largely limited to foundational functions due to competency gaps and institutional constraints. This pattern is consistent with both national and international literature (Clarivate, 2025; Dhage & Verma, 2025), which shows that AI adoption tends to be concentrated in core operational areas, with advanced functionalities underutilised.

Conclusion

The study concludes that the effective adoption and utilisation of AI-enabled library services in Nigerian universities are constrained by significant institutional and competency gaps. University librarians demonstrate moderate proficiency in core AI functions, such as automated cataloguing and plagiarism detection. However, advanced competencies, including managing AI-driven chatbots, interpreting AI-generated analytics, and training colleagues, remain underdeveloped. Correspondingly, institutional support is inconsistent. While some libraries provide basic ICT infrastructure and managerial encouragement, critical elements such as structured training programs, adequate funding, technical support, and strategic partnerships with technology providers are largely insufficient. The findings reflect broader realities in the Nigerian higher education sector, where resource limitations, infrastructural disparities, and gaps in professional development hinder the practical integration of AI technologies. Addressing these competencies and institutional gaps is essential to ensuring that AI can be effectively embedded into library services, thereby improving service delivery, operational efficiency, and user experience. This underscores the need for comprehensive strategies, including capacity-building initiatives, investment in ICT infrastructure, the establishment of formal AI policies, and sustained institutional support, to bridge the gap between awareness and practical deployment of AI in Nigerian university libraries.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Universities should implement targeted training and professional development initiatives to enhance librarians' competencies in advanced AI applications, including chatbots, analytics, recommendation systems, and workflow integration.

2. University management should establish clear AI adoption policies, provide dedicated funding, and promote collaboration with technology providers. Adequate institutional support is essential to translate librarians' competencies into practical service improvements.
3. University libraries must invest in reliable internet connectivity, modern computing resources, and AI-ready platforms. Robust infrastructure is critical for the effective implementation and sustainable use of AI-enabled library services.
4. Experienced librarians should mentor colleagues to facilitate knowledge and skill transfer and practical learning. Communities of practice can promote collaboration, problem-solving, and continuous professional growth in AI adoption.
5. Institutions should regularly assess AI adoption progress, librarian competencies, and service outcomes while integrating ethical training on data privacy, bias, and responsible AI use.

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Investigating awareness, frequency of use, perceived benefits challenges and demographic factors associated with artificial intelligence tools for academic writing by academic librarians in university libraries in Nigeria

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Abstract

This study investigated the awareness, usage, perceived benefits, challenges, and demographic factors associated with artificial intelligence (AI) tools for academic writing among academic librarians in Nigerian universities, using the Technology Acceptance Model (TAM) as its theoretical framework. A cross-sectional survey design was employed and data were collected from 93 academic librarians through a structured online questionnaire. Descriptive statistics was used to answer the research questions, while chi-square analysis was used to examine the relationship between selected demographic variables and awareness of AI tools. The findings revealed a moderate level of awareness of commonly known AI tools such as ChatGPT and Grammarly, whereas awareness of several other AI platforms was comparatively lower. Despite this moderate awareness, actual usage of AI tools for academic writing was generally low and largely restricted to basic functions such as proofreading, editing, and idea generation. Respondents reported low perceived benefits, suggesting weak perceptions of the usefulness of AI tools in supporting academic writing tasks. In contrast, perceived challenges were high, with major concerns including output inaccuracies, data privacy risks, high costs, inadequate technical skills, poor institutional support, and unstable Internet access. The study further found no significant relationship between awareness of AI tools and demographic variables such as gender, academic qualification, and work experience. The study concluded that while academic librarians in Nigerian universities have moderate awareness of AI tools for academic writing, usage remains constrained by low perceived usefulness, limited ease of use, and trust-related concerns. To promote ethical and effective integration, the study recommended the development of clear institutional policies, targeted professional training, and improved infrastructural support.

Keywords: Academic librarians; Artificial intelligence; AI tools; Academic writing; Survey, Nigeria.

Introduction

Artificial intelligence (AI) has emerged as one of the most transformative technologies shaping education, research, and scholarly communication in the twenty-first century. AI refers to computer systems or technologies designed to perform tasks that typically require human intelligence, including learning, reasoning, problem-solving, language understanding, content generation, and decision-making (Russell & Norvig, 2021). Recent advances in machine learning, natural language processing, and generative AI have expanded the capabilities of AI systems, enabling them to generate human-like text, summarise information, analyse large volumes of data, and support various knowledge-intensive activities. These developments have led to the increasing adoption of AI-powered tools such as ChatGPT, Gemini, DeepSeek, Microsoft Copilot, Grammarly, and QuillBot across educational and professional environments.

One area significantly influenced by AI technologies is academic writing. Academic writing refers to a formal and structured mode of scholarly communication used to present ideas, arguments, research findings, and evidence-based discussions within academic and professional contexts. It is characterised by clarity, objectivity, critical analysis, proper referencing, and adherence to disciplinary conventions. Academic writing is central to teaching, learning, research dissemination, and scholarly productivity in higher education institutions. Traditionally, academic writing requires substantial cognitive effort involving literature searching, critical evaluation of sources, organisation of ideas, drafting, editing, paraphrasing, citation management, and proofreading. However, the emergence of AI-powered writing tools has increasingly transformed how these tasks are performed.

AI tools are now widely utilised to support different stages of academic writing, including idea generation, literature summarisation, grammar checking, paraphrasing, translation, citation formatting, plagiarism detection, and content refinement. Generative AI systems, particularly large language models, can assist users in producing outlines, drafting essays, improving language clarity, summarising research articles, and generating references within seconds (AlSagri et al., 2024; Breznau & Nguyen, 2025). These capabilities offer opportunities to improve efficiency, reduce repetitive tasks, enhance writing quality, and support research productivity. Consequently, AI tools are becoming increasingly relevant in universities and research environments worldwide.

Despite these benefits, the integration of AI into academic writing has generated significant ethical, professional, and practical concerns. Scholars have raised issues relating to the accuracy and reliability of AI-generated information, plagiarism, copyright infringement, data privacy, algorithmic bias, overdependence on AI systems, and threats to critical thinking and originality in scholarly writing (Xames & Shefa, 2023). Furthermore, concerns regarding transparency, authorship, academic integrity, and responsible use have prompted universities and academic institutions to develop guidelines for AI use in teaching, learning, and research. As AI technologies continue to evolve, users are expected not only to possess awareness of AI tools but also the competencies required to evaluate and apply them responsibly.

Within the university environment, academic librarians occupy strategic positions in supporting research and academic writing. Academic librarians are responsible for providing information services, research support, literature search assistance, referencing guidance, information literacy instruction, and scholarly communication services to students and researchers. With the increasing integration of AI technologies into research and writing practices, academic librarians are expected to play expanded roles as facilitators, educators, and guides in the ethical and effective use of AI tools for academic purposes. Librarians may employ AI tools to support literature synthesis, research consultations, citation management, academic editing, and user support services. They are also expected to educate users on the opportunities, limitations, and ethical implications associated with AI-assisted academic writing.

Although AI tools are becoming increasingly visible in academic environments, evidence suggests that awareness and adoption among librarians vary considerably across institutions and regions. Some studies indicate that librarians possess basic awareness of AI technologies but differ in their levels of usage, confidence, technical competence, and perceptions regarding AI integration into library and academic services (Ali, Naeem, & Bhatti, 2020; Bayramli, 2024). In many developing countries, including Nigeria, challenges such as inadequate infrastructure, limited digital competencies, insufficient institutional support, unstable internet connectivity, and lack of formal AI training may influence the adoption and effective use of AI tools among academic librarians.

Furthermore, while existing studies have examined AI adoption in libraries generally, limited empirical attention has been given to AI tools specifically for academic writing among academic librarians in Nigerian university libraries. Existing literature has focused more broadly on AI applications in library services, with less emphasis on librarians' awareness, frequency of use, perceived benefits, perceived challenges, and demographic factors associated with the use of AI tools for academic writing. Understanding these dimensions is important because librarians increasingly serve as intermediaries between emerging technologies and academic users within higher education institutions.

Demographic variables such as age, gender, educational qualification, years of professional experience, and institutional type may also shape librarians' awareness, perceptions, and utilisation of AI tools. Similarly, perceived benefits such as improved productivity, enhanced writing quality, time efficiency, and research support may encourage adoption, whereas concerns relating to ethical issues, reliability, lack of training, technological limitations, and fear of misuse may hinder sustained use. Investigating these factors is therefore necessary to understand the extent to which academic librarians in Nigerian universities are prepared to engage with AI-driven academic writing technologies. Against this background, this study investigates the awareness, frequency of use, perceived benefits, challenges, and demographic factors associated with the use of artificial intelligence tools for academic writing among academic librarians in university libraries in Nigeria. The study contributes to the growing discourse on AI adoption in higher education and library practice by providing empirical evidence on how academic librarians engage with AI technologies in scholarly writing contexts. The findings are expected to provide insights for library administrators, policymakers, professional associations, and higher education institutions in developing strategies, policies, and training programmes that support the responsible and effective integration of AI tools into academic writing and library services.

Problem Statement

Artificial intelligence (AI) tools such as ChatGPT, Gemini, DeepSeek, and Microsoft Copilot are increasingly being integrated into academic writing processes across higher education institutions worldwide. These tools support activities such as idea generation, literature summarisation, paraphrasing, grammar checking, citation management, and content refinement, thereby improving efficiency and scholarly productivity (AlSagri et al., 2024; Breznau & Nguyen, 2025; Xames & Shefa, 2023). As academic writing continues to evolve through technological innovations, academic librarians are expected to play important roles not only as information professionals but also as facilitators and guides in the ethical and effective use of AI tools for scholarly communication. Despite the growing relevance of AI technologies in academic writing, the extent to which academic librarians in Nigerian university libraries are aware of and utilise these tools remains unclear. Although studies conducted in other contexts have examined AI adoption among librarians, there is limited empirical evidence on the awareness, frequency of use, perceived benefits, and challenges associated with the use of AI tools for academic writing among academic librarians in Nigeria.

Existing studies have focused more broadly on AI applications in library services, with inadequate attention given specifically to AI-supported academic writing practices (Ali et al., 2020; Bayramli, 2024; Kisilowska-Szurmińska, 2025). Furthermore, although some academic librarians may be aware of AI tools, awareness alone may not necessarily translate into effective or sustained use. Factors such as inadequate technical skills, insufficient training opportunities, poor infrastructural facilities, lack of institutional support, ethical concerns, and absence of clear policies may influence the extent to which librarians adopt AI tools for academic writing purposes. In addition, demographic characteristics such as age, gender, educational qualification, and years of professional experience may also shape librarians' awareness and usage patterns. The lack of sufficient empirical evidence on these issues creates a knowledge gap regarding how academic librarians in Nigerian university libraries engage with AI tools for academic writing. Consequently, it becomes necessary to investigate the awareness, frequency of use, perceived benefits, challenges, and demographic factors associated with the use of AI tools for academic writing among academic librarians in university libraries in Nigeria. The findings of this study will provide insights that can guide university management, library administrators,

policymakers, and professional bodies in developing appropriate policies, training programmes, and support systems for the effective and responsible integration of AI tools into academic writing and library services.

Objectives

1. To find out academic librarians' level of awareness of AI tools for academic writing in universities in Nigeria
2. To determine the frequency of AI tool usage for academic writing among academic librarians
3. To determine the perceived benefits of using AI tools for academic writing among academic librarians
4. To determine the challenges associated with the use of AI tools for academic writing among academic librarians

Hypothesis

H_{01} There is no significant relationship between gender, qualification, work experience, and awareness of AI tools among academic librarians

Literature Review

Scholarly interest in artificial intelligence within academic libraries has grown rapidly since the public release of generative AI tools such as ChatGPT in late 2022, with research focusing on awareness, adoption, perceived value, and associated challenges. Globally, studies show that librarians generally recognise the potential of artificial intelligence to support research, academic writing, and service delivery (Ajani et al., 2025; Ali et al., 2020; Khalifa & Albadawy, 2024; Onwubiko, 2025; Sharma et al., 2022; Rathinasabapathy et al., 2023). These studies collectively suggested that artificial intelligence is increasingly viewed as a supportive technology for enhancing scholarly productivity and information services, even though its integration varies widely across institutional and national contexts.

Several international studies have emphasised awareness and early engagement with artificial intelligence tools among librarians. For example, Ali et al. (2020) reported that university librarians in Pakistan are familiar with selected applications such as voice assistants, translation tools, and text mining platforms, but have limited exposure to advanced systems such as chatbots and robotics. Similarly, Bayramli (2024) observed that artificial intelligence research tools improved digital literacy and scholarly communication skills when integrated into academic library services. Cox (2023) and Cox and Tzoc (2023) further argued that artificial intelligence is reshaping professional competencies in academic libraries, requiring librarians to combine traditional information management skills with emerging technological capabilities. Extending this discussion, Hassan and Becker (2025) noted that artificial intelligence is redefining work processes and professional identity in academic libraries, increasing the demand for expertise in ethics, data literacy, and technology mediation.

Beyond awareness, a growing body of research has examined the practical use of artificial intelligence tools for academic writing, research support, and library operations. The studies indicated that artificial intelligence can assist with drafting, summarisation, editing, literature discovery, and reference management, thereby improving research efficiency and productivity (Sharma et al., 2022; Rathinasabapathy et al., 2023; Khalifa & Albadawy, 2024). Hosseini et al. (2024) identified benefits such as language refinement and structural support in scholarly writing, while Panda et al. (2024) discussed the expanding role of conversational tools such as ChatGPT in reference services and writing assistance. Marinclin et al. (2024) reported that AI implementation in Croatian academic libraries is still in its early stages. The study indicated potential for AI use in the surveyed higher education libraries, as they recognised its possible benefits in work processes and user experiences.

Despite these reported advantages, challenges continue to shape librarians' engagement with artificial intelligence technologies. Ethical concerns related to accuracy, transparency, authorship attribution, and academic integrity are frequently cited in the literature (Filson & Atuase, 2024; Warraich et al., 2024; Zeb et al., 2025). However, Michalak (2023) argued that librarians should play a central role in artificial intelligence policy development within universities to ensure responsible and accountable use. Kisilowska-Szurmińska (2025) in a Delphi study of Polish librarians, described artificial intelligence simultaneously as a tool, a collaborator, and a potential adversary, citing concerns over autonomy, job security, and governance. Technical and organisational barriers such as limited training opportunities, inadequate infrastructure, and weak institutional readiness further constrain adoption (Gasparini & Kautonen, 2022; Huang, 2024; de Leon et al., 2024; Marinclin et al. 2024). Studies conducted in Asia, Europe, and North America consistently demonstrated that awareness alone does not translate into sustained or meaningful use when these barriers persist (Yoon et al., 2022; Hussain & Ahmad, 2024). In addition, literature also places strong emphasis on artificial intelligence literacy as a mediating factor in adoption. Miltenoff (2024) identified expanding roles for academic librarians in artificial intelligence training, tool curation, and leadership in digital education, arguing that literacy gaps significantly limit librarians' ability to recognised and realise potential benefits. Meanwhile, Onwubiko (2025) noted that some academic researchers perceived the use of AI as a monster that may consume the worth of academic research.

Evidence from Nigerian-focused studies indicated that institutional and infrastructural constraints intensify the challenges associated with the use of artificial intelligence for research and academic work. Ajani et al. (2022) demonstrated that although Nigerian academic librarians were aware of global developments in artificial intelligence, local readiness for integration remained weak. The findings showed persistent uncertainty regarding institutional capacity to support adoption, driven by inadequate funding, limited technical expertise, unstable power supply, and insufficient training opportunities. Subsequent studies have reinforced these structural concerns while extending the

discussion to professional implications. Oladokun et al. (2025b) reported that librarians perceived artificial intelligence as a significant threat to job security, particularly among lower skilled staff. The author revealed patterns of job polarisation in which technologically skilled librarians were more likely to benefit from artificial intelligence adoption, while others experienced restricted career opportunities. The study further demonstrated that institutional preparedness for artificial intelligence adoption was inadequate, with limited retraining programmes and weak financial investment, thereby constraining positive engagement with these technologies. Ajani et al. (2025) provided complementary evidence, showing relatively high competence in general purpose artificial intelligence tools such as ChatGPT, Grammarly, and QuillBot, alongside low utilisation of advanced research focused systems. The study identified inadequate digital infrastructure, high access costs, weak institutional policies, and limited digital literacy as major barriers to effective and ethical use.

The reviewed studies show that while global research has extensively discussed AI awareness, adoption, benefits, and challenges in academic libraries, most investigations are situated in developed contexts with advanced infrastructure and stronger institutional investment. There is little empirical evidence on how these dynamics play out in Nigerian academic libraries, particularly in Nigeria. No study has specifically addressed awareness, usage frequency, perceived benefits, and challenges of AI tools for academic writing among academic librarians in this region, leaving a critical gap that the present study aims to address.

Theoretical Framework

This study is anchored on the Technology Acceptance Model developed by Davis in 1989. The model explains how users come to accept and use a new technology by focusing on the cognitive and psychological factors that shape technology-related behaviour (Davis, 1989). At the core of the model is the assumption that actual system use is determined by behavioural intention, which reflects a user's willingness to employ a technology in practice. Behavioural intention is influenced by users' attitudes toward using the technology and their beliefs about its usefulness. According to the Technology Acceptance Model, perceived usefulness refers to the degree to which an individual believes that using a particular technology will improve task performance, while perceived ease of use reflects the extent to which a person believes that using the technology will be free of effort. These two perceptions shape users' attitudes toward the technology, which in turn influence their intention to use it and ultimately determine actual usage behaviour. External variables, such as training, institutional support, infrastructure, and prior experience, are assumed to influence both perceived usefulness and perceived ease of use, thereby indirectly shaping adoption outcomes (Davis et al., 1989).

The Technology Acceptance Model remains one of the most widely applied and empirically validated frameworks for explaining technology adoption across disciplines. Granić and Marangunić (2019) affirm that the model has demonstrated strong explanatory power in predicting usage behaviour across different technological settings. Recent studies have continued to apply the model to understand acceptance of emerging digital tools in educational and professional environments (Lee & Lee, 2019; Shen et al., 2022; Tiwari et al., 2024; Al Adwan, 2020; Al Adwan et al., 2023; Al Emran et al., 2018).

Within library and information science, the Technology Acceptance Model has been successfully used to examine users' and librarians' responses to advanced digital systems and platforms. Prior research has applied the model to investigate acceptance of online databases, immersive technologies, and intelligent systems in library environments (Rafique et al., 2020; Weeransinghe & Hindagolla, 2017; Haider et al., 2025). More recent studies have extended its application to emerging technologies such as virtual reality, augmented reality, and metaverse-related services, reinforcing its relevance for analysing technology-driven engagement in libraries (Oladokun et al., 2025b; Oladokun et al., 2025c; Shah et al., 2025). The adoption of the Technology Acceptance Model in this study is therefore justified by its strong theoretical grounding and extensive empirical support across library, educational, and emerging technology research. It provides a coherent framework for interpreting the cognitive and perceptual factors that influence academic librarians' acceptance of artificial intelligence tools for academic writing.

Methodology

This study adopted a cross-sectional research design, which involves collecting data at a single point in time to assess the perceptions, experiences, and practices of participants. The design was chosen because it allows for an efficient examination of the current levels of awareness, frequency of use, perceived benefits, and challenges of AI tools for academic writing among academic librarians without the need for long-term follow-up. The study targeted academic librarians working in universities in Nigeria. However, to protect the identity of participating institutions, their names were anonymised in the study. A convenience sampling technique was employed to select participants. The convenience sampling was considered appropriate given the exploratory and descriptive nature of the study, and the dispersed distribution of academic librarians across Nigerian universities. In the Nigerian context, academic librarians are geographically scattered across federal, state, and private universities, and access to them is often mediated through professional networks and online platforms. Therefore, this approach was deemed necessary and suitable for this study because it enabled researchers to reach readily available, willing respondents, especially given the dispersed nature of academic librarians across the state and the study's limited time frame. In addition, this technique facilitated the inclusion of a reasonable number of participants despite potential constraints such as work schedules and varying levels of Internet connectivity for online participation. While convenience sampling enabled timely access to participants, it introduces

potential limitations related to sampling bias and representativeness. Because respondents were recruited through professional networks and voluntary online participation, the sample may over represent librarians who are more digitally engaged or professionally active within association platforms.

The primary instrument for data collection was a structured questionnaire systematically developed following an extensive review of literature on AI tools in academic writing. Several items were adapted from previously published and empirically tested instruments. Specifically, selected items measuring awareness, usage, perceived benefits, and challenges were adapted from previous studies (Ajani et al., 2025; Oladokun et al., 2025d). These studies were considered suitable sources because they were conducted within the Nigerian higher education context and addressed constructs closely aligned with the objectives of the present study. The questionnaire was divided into five sections (*Appendix I*). To ensure content validity, the draft questionnaire was reviewed by two experts in Library and Information Science, who evaluated it for clarity, relevance, and alignment with the study's objectives. Feedback from these experts led to refinements in wording, adjustment of ambiguous items, and improvement in scale consistency, thereby enhancing both the readability and conceptual accuracy of the instrument.

A pre-test (pilot study) was conducted with 10 academic librarians from a university in Rivers State, which was not part of the main study's population. The purpose of the pilot was to test the instrument's clarity, reliability, and ease of administration in a real-world setting. Based on feedback from the pilot participants, further refinements were made, such as simplifying technical terminology related to AI tools and removing redundant questions. Internal consistency was confirmed using Cronbach's Alpha, which yielded an overall reliability coefficient of 0.87, indicating high reliability of the instrument (Adamson & Prion, 2013).

The questionnaire was administered between February 12th and July 12th, 2025. In total, 93 academic librarians completed and returned the questionnaire. To maximise participation, the researchers used an online distribution via Google Forms shared through a professional WhatsApp group named the Nigerian Library Association.

Data collected were analysed using descriptive statistics, including frequency counts, percentages, mean, and standard deviation. This analytical approach was chosen because it effectively summarises and interprets responses, enabling a clear understanding of awareness levels, usage patterns, perceived benefits, and challenges of AI tools for academic writing. For interpretation, mean values above 2.5 were accepted, while values below 2.5 were rejected as not significant. In addition, chi-square was used to test the hypothesis at the 0.05 significance level. In addition to descriptive and inferential analysis, the study adopts an interpretive approach guided by the Technology Acceptance Model to explain patterns of alignment or misalignment between awareness, perception, and usage. Informed consent was obtained from all participants before data collection. In so doing, the first section of the Google Form contained a consent statement outlining the purpose of the study, the voluntary nature of participation, confidentiality measures, and the right to withdraw at any time without penalty. Participants indicated consent by checking an "I agree to participate" box before proceeding to the questionnaire.

Results

This section covers the study's analyses of demographic data, research questions, and hypotheses. Table 1 consists of the analysis of demographic information of respondents, while Tables 2, 3, 4, and 5 comprise the analyses of the study's research questions. Further, Table 6 reports the analysis of the hypothesis.

Table 1: Demographic Data of Respondents (N = 93)

Category	Frequency	Percentage (%)
Gender		
Male	38	40.9
Female	55	59.1
Qualification		
B.Sc.	25	26.9
M.Sc.	50	53.8
PhD	18	19.4
Work Experience		
Less than 1 year	5	5.4
5 years	20	21.5
6–10 years	25	26.9
11–15 years	15	16.1
16–20 years	8	8.6
Above 20 years	20	21.5

Source: Field Data, 2026

Table 1 presents the demographic characteristics of the 93 academic librarians who participated in the study. The results show a slightly higher representation of female respondents (59.1%) compared to males (40.9%), indicating a modest gender imbalance in favour of women. In terms of educational qualifications, majority of the respondents (53.8%) were Master's degree holders, (26.9%) and (19.4%) having completed their bachelors and master's degree respectively. This suggests that most respondents possess advanced academic training, which could influence their ability to engage with emerging technologies such as AI. Regarding years of professional experience, 26.9% of librarians reported 6–10 years of service, while 21.5% each had either 5 years or above 20 years of experience. The least represented group were those with less than one year of service (5.4%), suggesting that the sample comprised predominantly experienced professionals who are likely familiar with the demands of academic writing and research support.

Table 2: Level of Awareness of AI Tools for Academic Writing (N = 93)

S/n	Statement	SD	D	A	SA	Mean	Std. Dev
1.	I am aware of DeepSeek	20	25	28	20	2.57	1.05
2.	I am aware of ChatGPT	18	24	29	22	2.65	1.04
3.	I am aware of Gemini	19	27	27	20	2.54	1.03
4.	I am aware of Quillbot	17	28	28	20	2.56	1.02
5.	I am aware of Meta AI	21	26	27	19	2.50	1.04
6.	I am aware of Copilot	22	25	28	18	2.47	1.03
7.	I am aware of DALL·E	18	28	27	20	2.54	1.02
8.	I am aware of Writesonic	20	26	27	20	2.53	1.03
9.	I am aware of Jasper AI	19	27	28	19	2.52	1.02
10.	I am aware of Wordtune	18	29	27	19	2.51	1.02
11.	I am aware of Grammarly	16	26	29	22	2.65	1.04

Keys: SD = Strongly Disagree; D = Disagree; A= Agree; SA = Strongly Agree

Source: Author's work (2025)

Table 2 examines the level of awareness of AI tools for academic writing. The mean scores for the items ranged between 2.47 and 2.65, indicating a moderate level of awareness among respondents. The highest awareness was recorded for Grammarly (mean = 2.65) and ChatGPT (mean = 2.65), both of which are widely publicised and relatively easy to access. Awareness of DeepSeek (mean = 2.57), Gemini (mean = 2.54), Quillbot (mean = 2.56), and DALL·E (mean = 2.54) was also moderate but slightly lower, suggesting that these tools are known but perhaps not as actively explored. The lowest awareness levels were reported for Copilot (mean = 2.47) and Meta AI (mean = 2.50).

Table 3: Frequency of AI Tool Usage for Academic Writing (N = 93)

S/n	Frequency of AI tools usage	SD	D	A	SA	Mean	Std. Dev
1.	I use AI tools for brainstorming ideas for my academic writing.	25	35	20	13	2.09	0.94
2.	I use AI tools for generating outlines for my academic papers.	26	33	22	12	2.07	0.94
3.	I use AI tools for writing drafts of my academic papers.	27	34	20	12	2.05	0.93
4.	I use AI tools for proofreading and editing my academic papers.	26	32	22	13	2.10	0.94
5.	I use AI tools for formatting references and citations in my papers.	28	33	20	12	2.04	0.93
6.	I use AI tools for checking plagiarism in my academic papers.	25	34	21	13	2.09	0.94
7.	I use AI tools for summarizing articles and papers for my research.	27	35	19	12	2.03	0.92
8.	I use AI tools for translating academic content when needed.	29	34	18	12	2.01	0.92

Keys: SD = Strongly Disagree; D = Disagree; A= Agree; SA = Strongly Agree

Source: Field Data, 2026

Table 3 examines the frequency of AI tool usage for academic writing. The mean values range from 2.01 to 2.10, reflecting a low level of usage across all listed activities. The highest mean scores were for using AI tools for proofreading and editing (mean = 2.10) and brainstorming ideas (mean = 2.09), showing that where AI is used, it is

often applied to relatively straightforward and low-risk tasks. Other applications, such as generating outlines (mean = 2.07), checking plagiarism (mean = 2.09), and formatting citations (mean = 2.04), also received low ratings. The lowest usage was reported for translating academic content (mean = 2.01) and summarising articles (mean = 2.03).

Table 4: Perceived Benefits of AI Tools for Academic Writing (N = 93)

S/n	Statement	SD	D	A	SA	Mean	Std. Dev
1.	AI tools save time in the academic writing process.	28	35	20	10	1.97	0.91
2.	AI tools improve the quality of academic writing.	30	33	20	10	1.95	0.90
3.	AI tools help in generating creative ideas for writing.	29	34	20	10	1.96	0.90
4.	AI tools reduce the workload associated with academic writing.	30	33	20	10	1.95	0.90
5.	AI tools assist in maintaining academic integrity.	28	35	20	10	1.97	0.91
6.	AI tools enhance the accuracy of citations and references.	29	34	20	10	1.96	0.90
7.	AI tools facilitate understanding and summarisation of complex materials.	28	35	20	10	1.97	0.91
8.	AI tools support multilingual academic writing and translation.	29	34	20	10	1.96	0.90

Keys: SD = Strongly Disagree; D = Disagree; A= Agree; SA = Strongly Agree

Source: Author's work (2026)

Table 4 presents respondents' perceptions of the benefits of AI tools for academic writing. The mean scores for all items are between 1.95 and 1.97, indicating very low perceived benefits. Respondents expressed low agreement with statements suggesting that AI saves time, improves quality, generates creative ideas, reduces workload, or maintains academic integrity. Similarly, AI's potential for enhancing citation accuracy, simplifying complex materials, and supporting multilingual writing was also rated poorly.

Table 5: Challenges Associated with AI Tools for Academic Writing (N = 93)

S/n	Statement	SD	D	A	SA	Mean	Std. Dev
1.	AI tools are expensive to access or use.	8	13	31	41	3.13	0.95
2.	AI tools are difficult to learn and use.	8	14	29	42	3.13	0.96
3.	There is a lack of technical support for AI tools.	7	13	33	40	3.14	0.92
4.	AI tools often produce inaccurate or unreliable results.	7	12	25	49	3.25	0.95
5.	There are concerns about data privacy when using AI tools.	7	12	26	48	3.24	0.94
6.	AI tools require a strong internet connection to function effectively.	6	13	28	46	3.23	0.93
7.	There is low knowledge on how AI tools can be used for academic writing.	8	13	30	42	3.13	0.95
8.	AI tools may not align with academic writing guidelines.	7	14	29	43	3.15	0.94

Keys: SD = Strongly Disagree; D = Disagree; A= Agree; SA = Strongly Agree

Source: Field Data, 2026

Table 5 examines the challenges associated with using AI tools for academic writing. The mean values for all items exceed 3.1. The most prominent concerns include the production of inaccurate or unreliable results (mean = 3.25) and issues surrounding data privacy (mean = 3.24). Technical barriers, such as the need for a strong internet connection (mean = 3.23) and a lack of technical support (mean = 3.14), were also significant. Respondents also cited difficulty in learning and using AI tools (mean = 3.13), high costs (mean = 3.13), low knowledge of AI's application to academic writing (mean = 3.13), and potential misalignment with academic writing guidelines (mean = 3.15) as serious impediments.

Table 6: Chi-square Results for the Relationship between Gender, Qualification, Work Experience, and Awareness of AI Tools among Academic Librarians (N = 93)

Variable	χ^2 Value	df	p-value	Decision ($\alpha = 0.05$)
Gender	0.539	2	0.764	Retain H_0
Qualification	3.203	4	0.524	Retain H_0
Work Experience	13.541	8	0.095	Retain H_0

Source: Field Data, 2026

The chi-square analysis in Table 6 examined whether gender, qualification, and work experience were significantly associated with the awareness of AI tools among academic librarians in universities in Nigeria. For gender, the chi-square value ($\chi^2 = 0.539$, df = 2, p = 0.764) was not statistically significant at the 0.05 level. This indicates that awareness of AI tools does not differ meaningfully between male and female librarians. In other words, both genders demonstrate comparable levels of knowledge and familiarity with AI tools for academic writing. This finding suggests that interventions to improve awareness can be designed without tailoring specifically to one gender, as the gap is not gender-driven.

Regarding qualification, the chi-square result ($\chi^2 = 3.203$, df = 4, p = 0.524) also showed no statistically significant association with awareness of AI tools. This means that holding higher academic qualifications (e.g., bachelor's, master's, or doctoral degrees) does not necessarily translate into greater awareness of AI technologies. The implication here is that formal academic credentials alone do not guarantee exposure to or training in AI tools. For work experience, the chi-square value ($\chi^2 = 13.541$, df = 8, p = 0.095) similarly indicated no significant relationship at the 0.05 threshold, though the p-value approaches marginal significance. This suggests that while librarians with 6–10 years of experience exhibited slightly higher awareness levels, the overall relationship is not strong enough to be considered statistically significant. The practical implication is that AI awareness is not inherently linked to the number of years spent in the profession, but rather to opportunities for training, institutional support, and exposure to technological innovations.

Discussion

This study aimed to study academic librarians' awareness, frequency of use, perceived benefits, and challenges of artificial intelligence adoption for academic writing in universities in Nigeria. First, respondents demonstrated a moderate level of awareness of a range of AI writing tools. This pattern aligns with prior observations that awareness is uneven and tool-specific (Ali et al. 2020). The moderate awareness recorded in this study also resonates with studies that report growing recognition of AI's presence in library contexts but caution that familiarity often remains superficial (Bayramli, 2024; Hussain & Ahmad, 2024). In essence, librarians know that these technologies exist and can name familiar brands, but awareness does not yet equate to deep and working knowledge of capabilities and limitations. Within TAM, awareness alone does not directly predict usage. Instead, it functions as an external variable that influences perceived usefulness and perceived ease of use. The moderate awareness observed suggests that librarians recognised the existence of AI tools but may not yet understand how these tools can be applied effectively to academic writing tasks. As a result, awareness does not translate into positive perceptions of usefulness or ease of use, which limits movement toward actual adoption

Despite the moderate awareness, actual use of AI tools for academic writing was low across the array of writing tasks examined. Librarians reported some engagement with low-risk applications such as proofreading and idea brainstorming, but they infrequently used AI for higher-order tasks such as drafting, summarising complex literature, or translating content. This gap between recognition and practice validates the findings from Huang (2024) and de Leon et al. (2024), who documented trial-level experimentation with AI in libraries but limited sustained integration due to practical constraints. The present results, therefore, support a growing body of literature that situates many libraries at an early or tentative stage of adoption (Gasparini & Kautonen, 2022; Rathinasabapathy et al., 2023). This finding aligns closely with TAM's proposition that actual system use is driven by behavioural intention, not awareness. The low usage suggests weak behavioural intention among librarians, which can be attributed to unfavourable perceptions of usefulness and ease of use. Librarians appear more willing to apply AI tools to limited tasks such as proofreading and idea generation because these tasks require minimal trust in the system and lower cognitive effort. More complex tasks such as drafting and summarisation demand higher confidence in system output, which is lacking, thereby weakening intention to use and confirming TAM's causal pathway from perception to behaviour.

Perceptions of benefits were strikingly low in this study. Findings revealed that the respondents do not strongly endorse the claims that AI saves time, enhances writing quality, or meaningfully reduces workload. This finding contrasts with extent literature that frames AI as a productivity enhancer for writing and research (Khalifa & Albadawy, 2024; Sharma et al., 2022), but it accords with more cautious studies, which emphasised that perceived benefit depends heavily on hands-on exposure, demonstrated reliability, and contextual fit (Hosseini et al. 2024; Panda et al. 2024). This low perceived benefits can also be linked to concerns about the reliability and credibility of artificial intelligence outputs. Respondents expressed strong reservations about inaccuracies, data privacy, and alignment with academic writing standards. Such concerns may overshadow any potential advantages, leading librarians to view artificial intelligence tools as risky rather than beneficial. In academic writing contexts where precision, originality, and ethical compliance are critical, even minor doubts about output accuracy can substantially reduce users' willingness to acknowledge value. This finding aligns with studies that caution that perceived benefits depend not only on functional capability but also on trust in the technology's outputs and processes (Hosseini et al., 2024; Filson & Atuase, 2024; Onwubiko, 2025). In addition to this, the consistently low ratings for perceived benefits directly reflect weak perceived usefulness, a core construct of TAM. The survey librarians did not believe that AI tools significantly save time, improve writing quality, or reduce workload. The uniformly low mean scores may reflect limited practical engagement with AI tools, suggesting that many respondents evaluated benefits without extensive direct use. When users question the reliability, transparency,

or ethical alignment of AI-generated outputs, they are less likely to recognise performance advantages, even where such advantages exist. More fundamentally, the findings point to underlying trust concerns. According to TAM, when users do not perceive a technology as enhancing job performance, they are unlikely to develop positive attitudes toward its use. This explains why awareness has not progressed into sustained use. The findings indicated that librarians have not experienced clear performance gains from AI tools, or they do not trust the outputs sufficiently to recognize such gains. Consequently, perceived usefulness remains low, restricting acceptance and adoption.

By contrast, perceived challenges were high. Respondents expressed strong concerns about inaccuracy, data privacy, cost, poor technical support, weak internet connectivity, and a general lack of knowledge about how to integrate AI into academic writing. These anxieties agreed with previous studies (Ali et al., 2020; de Leon et al., 2024; Huang, 2024). Moreover, ethical and reliability concerns have been emphasised by multiple authors and appear central to the librarians' reluctance to embrace AI as a dependable writing partner (Filson & Atuase, 2024; Hosseini et al., 2024; Michalak, 2023). The prominence of these challenges in the present study supports the argument that, without robust infrastructure, policy, and training, awareness alone will not translate into beneficial use. Theoretically, TAM posits that when a system is seen as difficult to use or risky, users are less likely to develop favourable attitudes toward it. In this study, challenges related to learning difficulty and weak institutional support increase the perceived effort required to use AI tools. Ethical and accuracy concerns further intensify cognitive resistance, reinforcing negative perceptions. These conditions suppress both perceived ease of use and perceived usefulness, creating a dual barrier to adoption as predicted by TAM.

Finally, the study discovered that gender, educational qualification, and years of experience were not significantly associated with awareness of AI tools. This lack of a clear socio-demographic gradient suggests that awareness (and by extension the barriers and attitudes observed) is shaped more by institutional context, training opportunities, and access to technological resources than by individual background. This result aligns with studies that emphasise institutional readiness and resource distribution as stronger determinants of AI engagement than personal characteristics (Cox, 2023; Yoon, Andrews & Ward, 2022). As a result, this study further suggests that capacity-building interventions should be broadly inclusive rather than targeted solely at particular demographic groups. Supporting this, the absence of significant relationships between awareness and demographic factors such as gender, qualification, and work experience supports TAM's emphasis on external variables rather than personal characteristics. This finding suggests that institutional conditions such as training availability, policy clarity, infrastructure quality, and organisational support exert greater influence on technology acceptance than individual background factors. In TAM terms, these external variables shape librarians' perceptions of usefulness and ease of use more strongly than demographic attributes, explaining the uniformity of awareness levels across groups.

Conclusions

This study examined the awareness, usage, perceived benefits, challenges, and demographic factors associated with artificial intelligence (AI) tools for academic writing among academic librarians in Nigerian universities. The findings reveal that although academic librarians demonstrate moderate awareness of widely known AI tools, this awareness has not translated into substantial or sustained usage. Actual application of AI tools for academic writing remains generally low and is largely confined to basic tasks such as proofreading, editing, and idea generation. Perceived benefits were weak, indicating that many librarians do not yet view AI tools as sufficiently useful, reliable, or transformative for academic writing. In contrast, perceived challenges were high, with concerns centred on output inaccuracies, data privacy risks, limited technical competence, high access costs, inadequate institutional support, and infrastructural barriers such as unstable internet connectivity.

The study further established that demographic variables such as gender, academic qualification, and work experience were not significantly associated with awareness of AI tools, suggesting that awareness is relatively widespread across demographic groups but does not independently drive meaningful adoption. This indicates that demographic characteristics are less influential than broader perceptual, institutional, and structural conditions in shaping librarians' engagement with AI technologies.

Drawing on the Technology Acceptance Model, the study concludes that the major challenge facing AI integration among academic librarians in Nigerian universities is not merely awareness but constrained acceptance. While librarians recognised the existence of AI tools, low perceived usefulness, limited ease of use, and trust-related concerns significantly inhibit their movement from awareness to practical adoption. Sustainable integration of AI tools into academic writing among academic librarians will therefore depend on strengthening institutional policies, expanding targeted professional training, improving infrastructural support, and fostering trust in the ethical and effective use of AI technologies.

Recommendations

Based on the study's findings, the researchers recommend the following:

1. Universities should move beyond ad hoc exposure to AI tools by establishing institution-wide AI governance frameworks specifically addressing academic writing. These frameworks should define approved AI tools, acceptable use cases, documentation requirements, and accountability mechanisms for AI-assisted writing. Management should allocate dedicated funding for licensed AI platforms to reduce reliance on free versions that

raise concerns about data privacy and output reliability. Investment in stable internet infrastructure and technical support units should be prioritised to lower barriers related to access and system usability.

2. Library administrators s should integrate AI competence into routine professional practice by embedding AI tool training into continuous staff development programmes. Training should be practical and task-focused, covering activities such as literature summarisation, drafting support, citation management, and output evaluation. Libraries should also develop internal guidelines that translate institutional AI policies into library-specific workflows for academic writing support. Designating AI focal persons or small advisory teams within libraries would ensure sustained guidance, peer learning, and consistent practice.
3. Professional bodies such as the Nigerian Library Association should take a coordinating role by developing national guidelines on AI use in academic writing tailored to the Nigerian context. These associations should organise regular hands-on workshops and certification programmes that focus on ethical evaluation, verification of AI-generated content, and responsible advisory practices. Establishing shared repositories of vetted AI tools, training materials, and case examples would support consistent standards across institutions.
4. Education regulatory bodies such National Universities Commission (NUC) and the Librarians' Registration Council of Nigeria (LRCN) should formally incorporate AI literacy and ethical AI use into national standards for academic librarianship. This can be achieved by embedding AI competence into accreditation requirements, promotion criteria, and continuing professional development mandates. Policy makers should also encourage cross institutional collaboration by supporting funded pilot projects that test structured AI integration models in academic libraries and generate evidence based best practices.
5. Library and information science programmes should revise curricula to include applied modules on AI supported academic writing. These modules should combine conceptual understanding with practical assessment, requiring students to evaluate AI outputs, manage ethical risks, and integrate tools into scholarly workflows. Strengthening this pipeline will ensure that future librarians enter the profession with baseline AI competence rather than relying solely on post employment retraining.

Limitations and Suggestions for Further Research

This study has some limitations, and they should be considered when interpreting the findings. First, the use of a convenience sampling method limits the generalisability of the findings to all academic librarians in Nigeria, as the sample may not fully represent variations across regions and institutional types. Second, the study relied on self-reported data collected through a questionnaire. As with most survey-based research, responses may be affected by social desirability bias, where participants present themselves in a more favourable light, or by inaccurate recall of past experiences with artificial intelligence tools. Consequently, reported levels of awareness, usage, and perceived benefits may not fully reflect actual practice. In addition, the measurement scale used in the questionnaire development may have constrained the findings of this study. The four-point Likert scale did not include a neutral midpoint, which may have constrained respondents who were uncertain or had limited experience with AI tools. This design choice may have contributed to downward score compression, particularly in the perceived benefits section. Another limitation relates to the application of the Technology Acceptance Model (TAM). Although TAM was used to provide theoretical grounding and interpretive support for the findings, the questionnaire was not originally designed to operationalise its core constructs (perceived usefulness, perceived ease of use, behavioural intention) in a structured manner. As such, the study offers explanatory alignment with TAM rather than a direct construct-based empirical test of the model.

Third, although the study involved academic librarians from universities across Nigeria, it did not explicitly account for regional variation in digital infrastructure. Internet reliability, bandwidth, and cost differ substantially across states and geopolitical zones in Nigeria. These variations may influence both access to artificial intelligence tools and the quality of user experience, thereby shaping perceptions of usefulness and adoption in ways not fully captured by the present analysis. Fourth, the study was conducted within a specific time frame, and awareness and perceptions of artificial intelligence are evolving rapidly. New tools, updates to existing platforms, and shifts in institutional discourse may alter librarians' attitudes and usage patterns within short periods. As a result, the findings represent a snapshot of perceptions at the time of data collection and may not fully reflect subsequent developments in artificial intelligence awareness or adoption. Finally, the study focused specifically on artificial intelligence tools for academic writing, excluding other components of the broader artificial intelligence ecosystem in academic libraries. Areas such as reference services, acquisitions, metadata management, learning analytics, and user engagement were not examined. While this narrow focus allowed for depth of analysis, it limits the extent to which the findings can be generalised to librarians' overall engagement with artificial intelligence technologies.

Future research could address these limitations by combining survey data with observational or usage-based measures to reduce reliance on self-reported responses. Future studies may consider using expanded scales or mixed-method approaches to capture more nuanced attitudes toward AI adoption. Also, future studies should consider designing instruments explicitly structured around TAM constructs to enable more rigorous modelling of relationships among perceived usefulness, perceived ease of use, behavioural intention, and actual usage. Such an approach would allow for deeper analytical testing, including structural equation modelling or regression-based validation of AI adoption dynamics within academic libraries. Future studies should adopt a larger, more representative sample covering multiple states or geopolitical zones in Nigeria to enhance generalisability. Studies that incorporate regional comparisons could

provide deeper insight into how infrastructural disparities shape artificial intelligence adoption across Nigeria. Longitudinal designs would be useful for tracking changes in awareness and usage over time, while broader investigations could examine artificial intelligence adoption across multiple library functions to provide a more comprehensive understanding of its role in academic libraries.

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Investigating the Interrelationships Between Digital Literacy, Research Skills and Scholarly Productivity of Librarians in Kwara State, Nigeria

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Abstract

Scholarly productivity is becoming prominent in the academic landscape due to its importance to career growth and as a criterion for measuring intellectual contributions and visibility. Interestingly, studies have established different factors as its drivers. This study investigated the interrelationships between digital literacy skills, research skills and scholarly productivity of librarians in Kwara State, Nigeria. A quantitative methodology was adopted using a descriptive correlational survey. The total enumeration technique was employed to sample all 142 librarians and LIS educators across six institutions, from which 97 valid responses (68.3%) were obtained. Data were collected using an adopted questionnaire whose reliability coefficients were: scholarly productivity (.727), research skills (.855), and digital literacy skills (.829). Inferential statistics comprising Pearson Product-Moment Correlation (PPMC) and multiple regression were used to test the three hypotheses at a 0.05 significance level. Findings revealed that digital literacy skills had a weak negative and non-significant relationship with scholarly productivity ($r = -0.167$, $p = .101$). However, research skills showed a weak but significant positive relationship with scholarly productivity ($r = .279$, $p = .006$). Jointly, digital literacy and research skills significantly predicted scholarly productivity with a multiple correlation of $R = .358$ and $R^2 = .128$. The regression model was significant ($F(2,94) = 6.913$, $p = .002$). Coefficients further showed that research skills positively predicted scholarly productivity ($B = .271$, $p = .001$), while digital literacy skills had a significant negative effect ($B = -.196$, $p = .022$). The study concludes that although both digital literacy and research skills jointly influence productivity, research skills exert a stronger positive effect than digital literacy skills in the studied context.

Keywords: Digital literacy, Librarians, Research skills, Scholarly productivity

Introduction

The contemporary landscape of Library and Information Science (LIS) has undergone a profound transformation, driven largely by the increasing centrality of information and communication technologies in professional and academic practices. Librarians, traditionally responsible for the collection, organisation, preservation, retrieval and dissemination of information resources, now operate within environments heavily shaped by digital innovations and evolving scholarly expectations (Sulyman et al., 2022). As LIS schools continue to prepare future practitioners, the responsibilities of LIS educators and professional librarians have expanded to include not only instructional functions but also substantial scholarly engagement. In the academic context, scholarly products have become a core indicator of professional relevance, intellectual contribution, and career advancement (Cox, 2023; Omwanghe et al., 2024).

Globally, scholarly productivity has become a critical metric for institutional ranking, academic prestige, and disciplinary growth (Miotto et al., 2020; Patel & Rao, 2023). Consequently, librarians and LIS educators are increasingly required to demonstrate robust research engagement, reflected in publications such as journal articles, books, conference papers, datasets, and technical reports (Awoyemi & Agbetuyi, 2024). Despite this rising demand, evidence suggests persistent disparities in research output across disciplines, regions and institutional types. For instance, while the Life and Health Sciences record comparatively higher publication rates, the social sciences, where LIS is situated, lag

significantly behind (Babalola & Allahmagi, 2023). These disparities often reflect differences in research training, digital readiness, institutional support and individual competencies.

A substantial body of literature identifies several impediments to scholarly productivity among LIS professionals, including limited access to up-to-date information resources, insufficient mentoring, inadequate research facilities, lack of continuous training, poor collaboration networks, and time constraints (Adegbaye & Adegbaye, 2024; Idoko et al., 2024; Xia et al., 2023). Heaton-Shrestha (2023) broadly categorised these barriers into resource-related constraints, low prioritisation of research activities, and skills-related challenges. Among these, skills-related barriers, particularly deficiencies in research skills and digital literacy skills, emerge as critical yet understudied dimensions.

Research skills, covering the entire spectrum from topic conception to dissemination, enable librarians to design studies, identify research gaps, apply appropriate methodologies and critically engage with scholarly evidence (Zhao & Huang, 2024; Ardi et al., 2024). In parallel, the proliferation of digital technologies has redefined research practices, making digital literacy an indispensable competence for effective searching, referencing, collaboration, data collection, analysis, plagiarism checking and manuscript submission (Umar & Babalola, 2023; Ango, 2024). This convergence of digital and research competencies has given rise to the concept of digital research skills, reflecting the increasingly integrated nature of modern scholarly workflows (Blankendaal-Tran et al., 2023).

Empirical studies across various regions highlight the growing influence of digital and research skills on scholarly productivity. Researchers in Pakistan, the United States, the United Kingdom, and China demonstrate strong utilisation of digital tools, such as bibliographic managers, databases, and collaborative platforms, which significantly enhance publication output (Asif et al., 2025; Ipanaqué-Zapata et al., 2023; Scoulas & De Groote, 2024). However, the African context, and Nigeria in particular, presents a contrasting picture, although South Africa leads in LIS research output, many Nigerian institutions report low productivity rates among librarians, attributed partly to low digital literacy and poor deployment of digital tools (Amponsah et al., 2021; Babalola & Bakum, 2022; Oberhiri-Orumah & Friday, 2024).

Within Nigeria, findings remain inconsistent. While some studies report encouraging levels of digital skills and scholarly output among academic librarians in certain regions (Okeji et al., 2024; Idoko et al., 2024), others reveal pervasive challenges such as poor research motivation, inadequate training, limited digital tool utilisation, and institutional barriers (Omwanghe et al., 2024; Umar & Babalola, 2023). These inconsistencies suggest the need for context-specific investigations, particularly in states like Kwara, where empirical evidence on the interrelationships among digital literacy, research skills, and scholarly productivity remains scarce.

This gap is both theoretical and practical, in that theoretically, it is unclear how digital literacy and research skills interact to influence scholarly productivity, whether independently, jointly, or synergistically, within the LIS profession in Nigeria, while practically, understanding these relationships is essential for designing targeted interventions, capacity-building programmes and policy reforms that can enhance the research performance of librarians. It is against this backdrop that this study investigates the interrelationships between digital literacy, research skills, and scholarly productivity of librarians in Kwara State, Nigeria.

Statement of the Problem

Scholarly productivity has become a critical benchmark for measuring academic relevance, professional growth, and institutional reputation within the LIS profession. However, despite global advances in digital scholarship and the increasing integration of digital tools into research processes, the productivity levels of librarians in many developing contexts, including Nigeria, remain persistently low. Existing studies across different Nigerian regions have consistently reported challenges such as inadequate research competencies, insufficient digital literacy, poor utilisation of digital tools, limited mentoring, minimal collaboration networks, and institutional barriers that hinder research output (Adegbaye & Adegbaye, 2024; Omwanghe et al., 2024; Umar & Babalola, 2023). These limitations suggest a systemic problem affecting librarians' ability to participate effectively in scholarly communication.

Although research and digital skills are widely recognised as core requirements for quality scholarly output in the digital era, their exact influence and the nature of their interrelationship, remains poorly understood, particularly within the Nigerian LIS landscape. While some studies report promising levels of digital literacy and publication output among librarians in selected private and public universities (Okeji et al., 2024; Idoko et al., 2024), others describe widespread skill deficiencies, limited engagement with digital platforms, and poor research productivity (Babalola & Bakum, 2022; Oberhiri-Orumah & Friday, 2024). These inconsistent findings signal that the relationship between digital literacy, research skills and scholarly productivity may not be uniform across regions, nor adequately conceptualised.

Additionally, research practices globally have shifted towards digital research ecosystems where digital literacy is deeply intertwined with research skills, spanning literature search, reference management, collaborative writing, data analysis and scholarly dissemination (Jalal, 2020; Blankendaal-Tran et al., 2023). Yet, there is limited empirical evidence demonstrating how these intertwined competencies jointly or independently influence scholarly productivity among Nigerian librarians. This gap is particularly apparent in Kwara State, where no known study has examined how digital literacy and research skills predict or shape librarians' scholarly productivity.

The lack of empirical clarity presents both a theoretical and practical problem. Theoretically, it is unclear whether digital literacy directly enhances scholarly productivity, whether research skills mediate this relationship, or whether both

competencies operate synergistically. Practically, without an evidence-based understanding of these relationships, institutional interventions such as research training, digital skills development, provision of digital tools, or policy reforms may remain unfocused, ineffective or misaligned with librarians' actual needs. Therefore, the central problem this study addresses is the limited understanding of how digital literacy and research skills interact to influence the scholarly productivity of librarians, particularly within the under-studied context of Kwara State, Nigeria.

Objectives of the Study

This study mainly investigates the interrelationships between digital literacy, research skills, and scholarly productivity of librarians in Kwara State, Nigeria. The specific objectives are to:

1. establish the relationship between digital literacy skills and scholarly productivity of librarians in Kwara State, Nigeria;
2. establish the relationship between research skills and scholarly productivity of librarians in Kwara State, Nigeria; and,
3. establish the joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria.

Research Hypotheses

The following null hypotheses guided the conduct of this study and were tested at 0.05 level of significance:

1. There is no significant relationship between digital literacy skills and scholarly productivity of librarians in Kwara State, Nigeria.
2. There is no significant relationship between research skills and scholarly productivity of librarians in Kwara State, Nigeria.
3. There are no significant joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria.

Review of Related Literature

Theoretical Framework: Theory of Capabilities for Productive Transformation

Irmgard Nöbler, an economist, developed the Theory of Capabilities for Productive Transformation. According to Nöbler (2018), the idea focusses on how nations "catch-up" economically. It contends that catching up entails both process improvement (speed and sustainability of change) and structural change (diversification into new products and technologies). In contrast to "productive capacities" (physical capital, infrastructure), the idea highlights the importance of "productive capabilities," which are intangible assets found in the knowledge and skill base of businesses and communities. A knowledge-based notion of capacities is put out by Irmgard Nöbler, who makes a distinction between procedural—knowing-how knowledge—and conceptual—abstract knowledge. Knowledge structures, routines, and institutions, according to Irmgard Nöbler, are important bearers of capacities that impact alternatives for transformation as well as competences for managing that transformation (Nöbler, 2018).

A learning approach that develops capabilities at all levels and in all sectors is recommended by the Theory of Capabilities for Productive Transformation. This comprises strategies to affect belief systems and cultural values that support innovation and technological progress, industrial policies that encourage learning-intensive activities (particularly manufacturing), and suitable educational attainment structures. The idea underlines the relevance of learning processes within production systems, as well as learning between enterprises and through contacts with foreign firms. Furthermore, the theory argue that the creation and implementation of industry standards assist the acquisition of tacit knowledge, important for generating and sustaining rapid economic growth (Nübler, 2018).

Because of its components, which include structural change, process improvement, and productive capabilities, which are intangible assets found in the knowledge and skill base of businesses and societies, the Theory of Capabilities for Productive Transformation is deemed appropriate for this study. In the context of this study, digital literacy and research skills are the intangible assets that are linked to knowledge and abilities. It is thought that having these skill sets would put librarians on the path to diversifying their research into new products. Consequently, the skillsets will result in process improvement from librarians, transitioning from just knowing what digital technologies are (abstract knowledge), to knowing how to use digital technologies to enhance their research tasks. These productive capabilities of librarians will result in their seamless diversification into new research products, exceeding their research outputs prior to their acquisition of digital literacy and research skills.

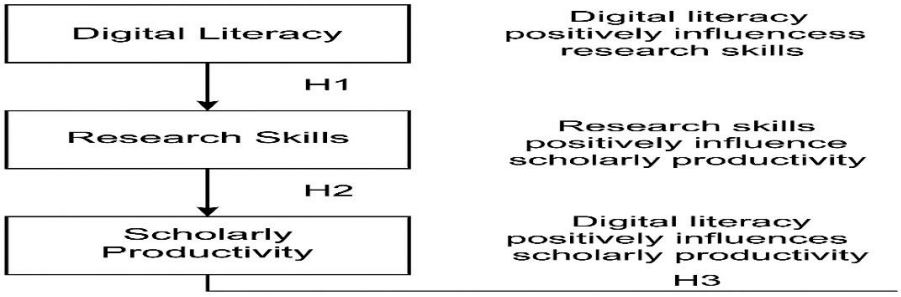
Conceptual Model

According to Elangovan and Rajendra (2015), a conceptual model is a framework used in research to outline potential causes of action or to present an idea or thought. It provides a modelling for depiction, analysis, and interrogation of data through visual display. When developed logically, a conceptual model will provide rigour to the research process. Conceptual models are abstract and psychological representations of the ideas contained in a research work. They are a succinct and precise consolidation of all relevant structural and behavioural features of the research in a predetermined format.

A conceptual model helps the researcher relate the study's components, acquire relevant data from a representative sample without bias, and enable an effective analysis of the collected data. Many researchers value the use of models in research because it enables them to explain how they are used as a tool for analysis, theorising, and decision-making by presenting an extended empirically-based example and discussing their relevance to important research concepts (Elangovan & Rajendra, 2015).

In order to present the variables—digital literacy skills, research skills, and scholarly output of librarians—this study uses an accessible conceptual model. Research skills include the ability to formulate clear research topics, problem statements, objectives, questions, and hypotheses; journal articles, textbooks, edited books, book chapters, and grants are examples of LIS educators' scholarly productivity; and digital literacy skills include the ability to recognise when digital information is needed, assess, use, and produce digital information.

Fig 1: Conceptual Model



Source: Scholarly Output Improvement Paradigm (2026)

Digital Literacy, Research Skills, and Scholarly Productivity: A Critical Synthesis

The contemporary research environment increasingly demands an integration of digital literacy and research skills as foundational competencies for scholarly productivity. Digital literacy, as conceptualised in recent scholarship, extends beyond basic technological competence to encompass the critical ability to locate, evaluate, create, and disseminate digital information in a manner that supports academic inquiry (Okeji et al., 2024; Ango, 2024). Central to this expanded definition is the emphasis on *judgement*, which is the informed appraisal of online information and digital resources necessary for effective knowledge production. Thus, digital literacy comprises a multi-layered set of abilities including information seeking, content creation or modification, and the communicative or collaborative sharing of digital artefacts (Ango, 2024).

A parallel discourse highlights research skills as a combination of cognitive, methodological, and communicative abilities required to execute the research process effectively. These include critical thinking, literature search and evaluation, methodological expertise, data analysis, academic writing, communication skills, and time management (Awodoyin et al., 2020; Oyedokun et al., 2020). These skills constitute the operational core of scholarly inquiry, enabling researchers to organise ideas, interrogate evidence, develop coherent arguments, and produce credible research outputs.

In the global academic landscape, especially within the 21st Century knowledge economy, digital and research skills are rarely separable. Digital technologies shape not only how research is conducted, but also how it is framed, disseminated, and utilised (Dezuanni et al., 2024). Consequently, the ability to navigate digital environments has become indispensable for lecturers, librarians, postgraduate students, and other scholars who engage in teaching, research, and knowledge dissemination (Adenekan et al., 2023). As institutions worldwide embrace digital ecosystems, effective research increasingly depends on familiarity with databases, data analysis software, collaborative platforms, and digital visibility tools (Umar & Babalola, 2023; Anorue et al., 2022).

Empirical evidence underscores the complexity of the interrelationships between digital literacy, research skills and scholarly productivity. Nwaogu and Ngwuchukwu (2025), in a study of postgraduate LIS students in South-East Nigeria, found that although students demonstrated basic digital literacy such as competence in internet use, email, and productivity tools, their ability to use advanced digital research tools was significantly limited. Poor proficiency in reference management software, web authoring tools, collaborative technologies, and data analysis programs revealed a critical gap in research readiness. This deficiency was further exacerbated by structural challenges such as inadequate ICT infrastructure, unreliable Internet connectivity, poor funding, and insufficient training opportunities. The findings demonstrate that access to digital tools does not automatically translate into research capability; rather, the absence of advanced digital skills constrains students' potential to engage meaningfully in scholarly work.

Contrasting evidence emerges from studies of academic librarians and LIS educators. Adenekan et al. (2025) reported high levels of digital skills among academic librarians in South-west Nigeria, with digital proficiency significantly influencing research engagement. Similarly, Malik et al. (2023) and Droog et al. (2024) observed that LIS educators with robust digital and research competencies reported greater confidence and efficiency in using digital tools across the research process. These findings suggest that professional role expectations, access to training, and sustained engagement with technology may mediate how digital literacy translates into research productivity.

Literature have also identified important mechanisms linking digital literacy to scholarly productivity. First, digital literacy fosters efficient information retrieval, enabling scholars to identify, refine, and synthesise relevant literature through advanced search techniques, Boolean operators, and database navigation (Adetomiwa, 2020; Anorue et al., 2022). Second, digital tools streamline research workflows through functions such as automated referencing, collaborative writing, data coding, and version control, thereby increasing accuracy, reducing errors, and improving overall output quality (Umar & Babalola, 2023; Veisi & Asnafi, 2022). Third, digital literacy enhances research visibility and dissemination. Tools such as institutional repositories, academic social networks, and social media platforms enable researchers to share outputs widely, increasing discoverability, collaboration opportunities, and citation potential (Eze et al., 2024; Gwynn, 2021).

Scholarly productivity, defined through publication output, visibility, co-authorship, and intellectual contribution, depends heavily on these digital and research competencies. For LIS educators, productivity is especially consequential, given promotion requirements and the visibility afforded by institutional repositories (Iroaganachi & Izuagbe, 2020). When scholars leverage digital tools to extend the reach of their research, they contribute not only to individual career advancement but also to institutional and national research visibility (Okonedo, 2015; Omigie & Aba, 2022).

However, notable tensions persist in the available literature. The first concerns the distinction between access and advanced proficiency. While digital devices are widely available, the depth of digital literacy required for rigorous research remains uneven, particularly among postgraduate students (Nwaogu & Ngwuchukwu, 2025). A second tension involves disparities between digital engagement and scholarly productivity. Although digital engagement improves research processes, not all users translate engagement into tangible scholarly outputs, suggesting the influence of motivation, institutional culture, and research identity (Droog et al., 2024; Awoyemi & Agbetuyi, 2024). A third tension is the imbalance between operational and critical literacies. Much digital training emphasises technical skills, yet scholarly productivity increasingly demands critical evaluation, ethical reasoning, and reflective judgment (Okeji et al., 2024; Ardi et al., 2024).

Overall, the reviewed studies converge on the understanding that digital literacy and research skills are mutually reinforcing capabilities that jointly facilitate scholarly productivity. Digital literacy enhances researchers' ability to conduct literature searches, analyse data, manage references, and disseminate findings, while research skills ensure the intellectual rigor necessary for credible scholarly outputs. Where institutions provide adequate infrastructure, training, and support, the synergy between these skills significantly enhances research visibility, academic reputation, and contribution to knowledge creation in the LIS field.

Methodology

Because this study is quantitative in nature, it used a descriptive survey of correlational type, which is thought to be appropriate for this research because it made it possible to determine the connections between digital literacy, research abilities, and scholarly productivity of librarians in Kwara State, Nigeria. The 142 LIS educators and professional librarians working in the libraries of the six institutions with LIS schools under investigation made up the study's actual population. The 142 LIS educators and professional librarians were chosen using the total enumeration technique. Hence, this study employed an adopted questionnaire. The scholarly productivity, research skills, and digital literacy sections of the questionnaire were adopted from Panerio et al. (2024), Umar and Babalola (2023), and Sulyman et al. (2024), respectively. Only 97 surveys, or 68.3% of the anticipated replies, were completely completed and sufficient for analysis. Cronbach's Alpha was used to determine the internal consistency of the questionnaire for each of the following variables: Scholarly Productivity (.727 – good), Research Skills (.855 – acceptable), and Digital Literacy Skills (.829 – acceptable). The hypotheses were tested using inferential statistics that combined regression analysis and Pearson Product Moment Correlation (PPMC).

Data Analysis

Table 1: Respondents' Demographic Information

Options		F	%
Respondent's institution	University of Ilorin	26	26.8
	Kwara State University	19	19.6
	Federal Polytechnic, Offa	20	20.6
	Kwara State Polytechnic	17	17.5
	Lens Polytechnic, Offa	8	8.2
	Al-Hikmah University, Ilorin	7	7.3
	Total	**97**	**100**
Gender	Male	62	63.9
	Female	35	36.1
	Total	**97**	**100**

Age range	21 - 30 years	27	27.8
	31 - 40 years	36	37.1
	41 - 50 years	20	20.6
	51 - 60 years	10	10.3
	61 years and above	4	4.1
	Total	**97**	**100**
Status	Academic librarian	35	36.1
	LIS educator	62	63.9
	Total	**97**	**100**
Highest academic qualification	BLIS	20	20.6
	MLIS	55	56.7
	PhD	22	22.7
	Total	**97**	**100**
Work experience	1 - 5 years	22	22.7
	6 - 10 years	31	32.0
	11 - 15 years	21	21.6
	16 - 20 years	13	13.4
	21 years and above	10	10.3
	Total	**97**	**100**
Marital status	Single	21	21.6
	Married	73	75.3
	Divorced	0	0
	Widow	3	3.1
	Total	**97**	**100**

Source: Researcher's Field Survey, 2025

Table 1 shows that the majority of the respondents, 26 (26.8%), are from the University of Ilorin, followed by Federal Polytechnic Offa, 20 (20.6%), Kwara State University, 19 (19.6%), Kwara State Polytechnic, 17 (17.5%), Lens Polytechnic, 8 (8.2%) and Al-Hikmah University, 7 (7.2%). On gender, 62 (63.9%) are males, while 35 (36.1%) are females. In the age range, 31 – 40 years has the highest representation with 36 (37.1%), followed by 21 – 30 years (27 27.8%), 41–50 years (20 20.6%), 51 – 60 years (10 10.3%) and 61 years and above (4 4.1%). Moreso, on status, 62 (63.9%) are LIS educators, while 35 (36.1%) are academic librarians. Furthermore, 55 (56.7%) of the respondents are MLIS holders, followed by PhD (22 22.7%) and BLIS (20 20.6%). On work experience, 31 (32.0%) have 6 – 10 years' experience, followed by 1 – 5 years (22 22.7%), 11 – 15 years (21 21.6%), 16 – 20 years (13 13.4%) and 21 years and above (10 10.3%). Finally, 73 (75.3%) of respondents are married, followed by single (21, 21.6%) and widowed (3 3.1%).

The demographic distribution suggests that the sample is composed largely of professionally qualified, early- to mid-career LIS educators and librarians. While this strengthens the relevance of the data for examining research-related skills, research productivity and digital literacy skills, the predominance of male respondents and the uneven institutional representation should be considered when generalising the findings to all librarians and LIS educators in the study area.

Hypotheses Testing

~~**Ho_1:**~~ 1. There is no significant relationship between digital literacy skills and scholarly productivity of librarians in Kwara State, Nigeria.

Table 2: PPMC results showing the relationship between digital literacy skills and scholarly productivity of librarians in Kwara State, Nigeria

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Digital literacy skills	32.24	5.92	96	-.167	.101	Not Significant
2.	Scholarly productivity	19.65	5.07	95			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_1 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

The Correlation Coefficient (r) of ~~is the correlation between the two variables –~~ digital literacy skills and scholarly productivity – is -0.167. The negative sign indicates a weak, negative relationship. This means that as digital literacy skills increase, research productivity tends to slightly decrease, and vice versa. However, the value of -0.167 suggests that this relationship is very weak. Furthermore, the p-value (0.101) is greater than the conventional significance level of 0.05. Since the p-value of 0.101 is greater than 0.05, the correlation is considered not statistically significant. This means that the observed negative relationship between digital literacy skills and research productivity could be due to random chance.

~~Ho_2:~~ 2. There is no significant relationship between research skills and scholarly productivity of librarians in Kwara State, Nigeria.

Table 3: PPMC results showing the relationship between research skills and scholarly productivity of librarians in Kwara State, Nigeria

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Research skills	27.38	6.04	96	.279**	.006	Significant
2.	Scholarly productivity	19.65	5.07	95			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_2 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

The correlation coefficient (r) of .279 indicates a weak positive relationship between the two variables of research skills and scholarly productivity. A positive correlation means that as a person's research skills increase, their scholarly productivity also tends to increase. The weakness of the relationship is based on the magnitude of the coefficient, where values closer to zero indicate a weaker relationship. Also, the p-value (Sig. P) .006 is less than the standard significance level of .05, as noted by the double asterisks (**). A p-value this low means the result is statistically significant. This implies that the observed relationship is unlikely to have occurred by random chance, and a similar positive relationship likely exists in the larger population from which the sample was drawn.

In summary, the data show a statistically significant, but weak, positive correlation between research skills and scholarly productivity. While there is a real relationship between the two variables, the strength of that relationship is not very strong. The finding is significant enough to conclude that it is not a result of random chance.

Ho_3: 3. There are no significant joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria.

Table 4: Model Summary results showing the significant joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.358[a]	.128	.110	4.78429

a. Predictors: (Constant), Research skills, Digital literacy skills

The R value of .358 represents the multiple correlation coefficient. This indicates the strength of the linear relationship between the predictor variables (Research skills and Digital literacy skills) and the dependent variable. A value of .358 suggests a moderate positive correlation. Also, the R Square value of .128 signifies that 12.8% of the variability in the dependent variable is accounted for by the predictors in the model. This means that the combined effect of Research skills and Digital literacy skills explains about 12.8% of the changes observed in the outcome.

Furthermore, the Adjusted R Square value of .110 is a more accurate estimate of the model's explanatory power in the wider population. It accounts for the number of predictors in the model, providing a better measure of how well the model would generalise to a new sample. In this case, the model would likely explain about 11.0% of the variance in a new population sample. Moreso, the Standard Error of the Estimate, 4.78429, represents the average distance that the observed values fall from the regression line. It is a measure of the model's accuracy, with lower values indicating a more precise model. In simple terms, it is the typical size of the residual, or the average prediction error.

Table 5: ANOVA results showing the significant joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	316.477	2	158.239	6.913	.002[b]
	Residual	2151.605	94	22.889		
	Total	2468.082	96			

a. Dependent Variable: Scholarly productivity

b. Predictors: (Constant), Research skills, Digital literacy skills

The Sum of Squares for the regression is 316.477, with 2 degrees of freedom (Df), representing the variation in research productivity that is explained by the model's predictors. The Mean Square is 158.239, which is the average explained variation per degree of freedom. Also, the Sum of Squares for the residual is 2151.605, with 94 degrees of freedom. This represents the variation in research productivity that the model does not explain (i.e., the error). The Mean Square is 22.889, which is the average unexplained variation. Furthermore, the Total Sum of Squares is 2468.082, with 96 degrees of freedom. This is the total variation in the dependent variable, which is the sum of the explained (regression) and unexplained (residual) variations.

Moreso, the F-statistic is 6.913, and the Sig. (significance) value is .002. The F-statistic is calculated by dividing the Mean Square of the Regression by the Mean Square of the Residual (158.239 / 22.889 = 6.913). It tests the overall significance of the regression model. The p-value (Sig.) .002, which is less than the conventional alpha level of .05, makes us conclude that the model is statistically significant. This means that at least one of the predictor variables (Research skills or Digital literacy skills) significantly contributes to the prediction of Scholarly productivity.

Table 6: Coefficients[a] results showing the significant joint relationships among digital literacy, research skills and scholarly productivity of librarians in Kwara State, Nigeria

		Unstandardised Coefficients		**Standardised Coefficients**		
Model		**B**	**Std. Error**	**Beta**	**T**	**Sig.**
1	(Constant)	18.545	3.217		5.764	.000
	Digital literacy skills	-.196	.084	-.228	-2.329	.022
	Research skills	.271	.082	.322	3.287	.001

a. Dependent Variable: Scholarly productivity

The unstandardised coefficient (B) for the constant is 18.545. This value represents the predicted scholarly productivity when both Digital literacy skills and Research skills are zero. It serves as a baseline for the model. For Digital Literacy Skills, the Unstandardised Coefficient (B) -0.196 indicates a negative relationship. This means that for every one-unit increase in Digital literacy skills, Scholarly productivity is predicted to decrease by 0.196 units, holding Research skills constant. Interestingly, the Standardised Coefficient (Beta) = -0.228 shows that a one standard deviation increase in Digital literacy skills leads to a 0.228 standard deviation decrease in Scholarly productivity. Ultimately, with the Significance (Sig.) 0.022, which is less than the conventional significance level of 0.05, the relationship between Digital literacy skills and Scholarly productivity is statistically significant.

On Research Skills, the Unstandardised Coefficient (B) 0.271 indicates a positive relationship, meaning that for every one-unit increase in Research skills, Scholarly productivity is predicted to increase by 0.271 units, holding Digital literacy skills constant. Also, the Standardised Coefficient (Beta) 0.322 shows that a one standard deviation increase in Research skills leads to a 0.322 standard deviation increase in Scholarly productivity. Above all, with the Significance (Sig.) 0.001, which is less than 0.05, the relationship between Research skills and Research productivity is also statistically significant.

In summary, the model suggests that Research skills have a significant positive impact on Scholarly productivity, while Digital literacy skills have a significant negative impact. The Standardised Beta values indicate that Research skills have a slightly stronger influence on productivity compared to Digital literacy skills in this specific sample.

Discussion of Findings

Relationship Between Digital Literacy Skills and Scholarly Productivity of Librarians in Kwara State, Nigeria

The findings revealed a weak, negative relationship between digital literacy skills and scholarly productivity of librarians in Kwara State, Nigeria. While digital literacy is widely acknowledged as a critical enabler of scholarly productivity, findings of this study challenge this assumption by showing that increased digital literacy does not necessarily translate into higher research output in the local context. This contrasts with the findings of Scoulas and De Groote (2024), who reported a positive correlation between the frequency of use of online journals and databases and faculty research productivity. Similarly, Panerio et al. (2024) found a significant relationship between digital literacy and research skills among Filipino nursing students, suggesting that digital competence enhances research capacity.

However, the findings align with studies that highlight the complexity of this relationship in developing contexts. For instance, Mba and Ekechukwu (2021) lamented the minimal leverage of digital and research skills in Africa, attributing low scholarly productivity to infrastructural and systemic challenges. Likewise, Oberhiri-Orumah and Friday (2024)

found that despite access to open-access resources, librarians in Bayelsa State, Nigeria, exhibited low scholarly productivity, indicating that access alone is insufficient without effective application.

Several factors may explain the negative relationship observed in this study. First, digital literacy skills do not automatically equate to effective research engagement. As Izuagbe (2021) noted, LIS educators who lack confidence in using digital tools may perceive them as irrelevant or difficult, even when they possess basic digital skills. This suggests a gap between skill acquisition and practical application. Second, infrastructural limitations such as poor Internet connectivity, low bandwidth and outdated technology as highlighted by Olaniyi et al. (2024) and Sharma et al. (2023), may hinder the effective use of digital tools for research. These challenges are particularly prevalent in digitally-divided societies like Nigeria, where access to reliable digital infrastructure remains inconsistent.

Third, the persistence of traditional research practices may also play a role. Many LIS educators in Nigeria still rely on conventional methods of conducting and disseminating research, as observed by Olaniyi et al. (2024). This overreliance on traditional approaches may limit the integration of digital tools into the research process, thereby weakening the potential impact of digital literacy on research productivity. Furthermore, the quality and relevance of digital literacy training may be inadequate. If training programs do not align with the specific research needs of librarians, the skills acquired may not be effectively applied. This aligns with the findings of Blankendaal-Tran et al. (2023), who reported that students often lack the ability to use digital tools for critical research tasks such as data analysis and visualisation.

In contrast, studies from other regions present a more optimistic picture. For example, Okeji et al. (2024) found that librarians in private universities in Anambra State, Nigeria, possessed strong digital literacy skills and demonstrated encouraging research outputs. Similarly, Umar and Babalola (2023) emphasised that digital-savvy LIS researchers tend to be more productive, reinforcing the expected positive relationship between digital skills and research output.

The divergence in findings suggests that the relationship between digital literacy and scholarly productivity is highly context-dependent. In environments where digital infrastructure is robust, and where digital skills are effectively integrated into research practices, a positive relationship is more likely to emerge. Conversely, in contexts like Kwara State, Nigeria, where infrastructural, institutional and pedagogical challenges persist, digital literacy alone may not be sufficient to drive scholarly productivity.

Relationship Between Research Skills and Scholarly Productivity of Librarians in Kwara State, Nigeria

The findings revealed a weak positive relationship between research skills and scholarly productivity among librarians in Kwara State, Nigeria. These results, while indicating some level of influence, suggest that research skills alone may not be sufficient to significantly boost research productivity without other supporting factors. From the existing literature, research skills are broadly defined as the ability to formulate research questions, review literature, select appropriate methodologies, analyse data and disseminate findings (Zhao & Huang, 2024; Ardi et al., 2024). These skills are essential for producing quality research outputs such as journal articles, books, and conference papers. However, the weak correlation found among the respondents implies that while librarians may possess research skills to some extent, their application may be limited or hindered by contextual challenges.

Comparatively, studies from other regions show stronger relationships between research skills and productivity. For instance, Panerio et al. (2024) found a significant synergy between research skills and digital literacy among Filipino nursing students, which enhanced their research capacity. Similarly, Giginyu and Echedom (2024) reported a strong positive relationship between the ability to recognise information needs and scholarly productivity among lecturers in North-west, Nigeria. These findings suggest that when research skills are supported by digital literacy, institutional support and collaborative environments, their impact on productivity is more pronounced.

In contrast, the situation in Kwara State, Nigeria, mirrors findings from other parts of Nigeria where research productivity remains low despite the presence of research skills. Oberhiri-Orumah and Friday (2024) observed shallow research productivity among librarians in Bayelsa State, Nigeria, while Umar and Babalola (2023) reported very low productivity in the Nigerian North-eastern region. These studies attribute the low output to factors such as poor digital infrastructure, lack of mentorship, inadequate training and limited access to research tools.

The theoretical framework, Theory of Capabilities for Productive Transformation by Nübler (2018), adopted in the study provides a useful lens for interpreting these findings. The theory emphasises that productive capabilities (such as research skills) must be activated through structural changes and process improvements. In Kwara State, Nigeria, the weak relationship may reflect a lack of such enabling conditions. Without adequate training, institutional incentives and access to digital tools, the potential of research skills may remain underutilised. Furthermore, literature have highlighted that research productivity is not solely dependent on individual skills, but also on systemic factors. Adegbaye and Adegbaye (2024) and Idoko et al. (2024) point to issues such as poor funding, lack of mentorship and weak institutional support as barriers to productivity. These challenges are particularly acute in digitally-divided societies like Nigeria, where access to scholarly databases and publishing platforms is limited.

Significant Joint Relationship Among Digital Literacy, Research Skills and Scholarly Productivity of Librarians in Kwara State, Nigeria

The findings revealed a statistically significant joint relationship among digital literacy skills, research skills and scholarly productivity of librarians in Kwara State, Nigeria. The results align with the theoretical framework of Nübler's

Theory of Capabilities for Productive Transformation, which emphasises the importance of intangible assets such as skills and knowledge in driving innovation and transformation. In this context, digital literacy and research skills are not merely technical competencies but are foundational capabilities that enable librarians to diversify their research outputs and improve the processes through which knowledge is generated and disseminated.

From a comparative standpoint, the study echoes the findings of Umar and Babalola (2023), who observed that digital technologies have significantly reshaped research practices among LIS educators in Nigeria. Their work highlighted how digital tools facilitate tasks such as literature search, data analysis, referencing and manuscript submission, all of which contribute to enhanced scholarly productivity. Similarly, Idoko et al. (2024) found that LIS educators with strong research skills and access to digital tools were more likely to publish in multiple journals, reinforcing the notion that these skills are critical enablers of scholarly output.

Contrastingly, while global studies such as Scoulas and De Groote (2024) reported a positive correlation between the use of online databases and faculty scholarly productivity in developed contexts, African studies, including those by Mba and Ekechukwu (2021) and Oberhiri-Orumah and Friday (2024), lamented the low scholarly productivity in the region. These disparities underscore the contextual challenges faced by Nigerian librarians, such as limited access to digital infrastructure, inadequate training and institutional constraints.

Furthermore, the findings are consistent with the conceptual model developed by the researcher, which posits that digital literacy skills (e.g., the ability to assess, use, and produce digital information) and research skills (e.g., the ability to formulate research questions, select methodologies and analyse data) are critical predictors of scholarly productivity. This model is supported by empirical evidence from studies such as Panerio et al. (2024), who found a significant relationship between digital literacy and research skills among Filipino nursing students, and Blankendaal-Tran et al. (2023), who emphasised the importance of digital research skills in tertiary science education.

Conclusion

This study examined the interrelationships among digital literacy, research skills, and scholarly productivity of librarians in Kwara State, Nigeria, drawing insights from empirical data grounded in Nübler's Theory of Capabilities for Productive Transformation. The findings reveal a complex and context-specific pattern, highlighting that while digital literacy and research skills collectively exert a significant influence on scholarly productivity, their individual effects differ significantly. Digital literacy demonstrated a weak and negative relationship with scholarly productivity, suggesting that possession of digital skills does not automatically translate into increased scholarly output. Conversely, research skills exhibited a significant though weak positive relationship, indicating that the ability to conceptualise, design, and execute research contributes meaningfully, even if modestly, to librarians' scholarly productivity.

The results further underscore the reality that productivity in scholarly communication is not driven by skills alone but is shaped by broader structural and institutional conditions. Challenges such as inadequate digital infrastructure, insufficient training, inconsistent access to research tools, limited mentoring, and entrenched traditional research practices continue to constrain the effective utilisation of digital and research skills among librarians in the region. While global and some local studies report positive associations between digital competence and scholarly productivity, the context of Kwara State demonstrates that without enabling environments including robust infrastructure, institutional incentives, and sustained capacity building, the potential contributions of digital literacy and research skills remain underleveraged. This reinforces the theoretical position that productive capabilities must be supported by appropriate structures and processes to yield transformative outcomes.

Overall, the findings highlight the need for a holistic and context-responsive approach to enhancing scholarly productivity among librarians in Kwara State, Nigeria. Strengthening research skills through continuous professional development, improving digital research infrastructure, and aligning skill-building initiatives with real research needs are critical steps toward fostering a more productive research culture. The significant joint effect of digital literacy and research skills suggests that capacity-building programmes should integrate both competencies rather than treat them as isolated constructs. By addressing systemic barriers and strategically cultivating these productive capabilities, institutions can create an environment where librarians are better equipped to generate impactful scholarly outputs, contribute to institutional visibility, and advance knowledge within the LIS profession.

Recommendations

Based on the findings, this study recommends that:

1. Management of institutions offering LIS should strengthen their continuous research skills training by implementing sustained capacity-building programmes focusing on research methodology, literature review techniques, data analysis, academic writing, and scholarly communication to enhance librarians' research competence.
2. Management of institutions offering LIS should institutionalise mentorship and collaborative research models. This can be achieved by employing senior researchers and experienced LIS educators to mentor early-career librarians to promote research confidence, skill acquisition, and consistent scholarly engagement.
3. Management of institutions offering LIS should collaborate with agencies and bodies to redesign digital literacy training to emphasise research-oriented tools. This could be achieved by organizing training that extends beyond

basic ICT skills to include advanced reference managers, statistical software, digital collaboration platforms, plagiarism detection tools, and open-access publishing systems relevant to research workflows.

4. Management of institutions running LIS should improve their ICT infrastructure and digital research resources such as stable Internet connectivity, modern computers, licensed software, and access to scholarly databases to enable librarians to effectively apply digital and research skills.
5. Management of LIS schools and academic libraries should embed digital and research skills into librarians' everyday workflows. This could be achieved by aligning librarians' job roles and performance expectations with digital research activities, ensuring that digital literacy and research skills are practically integrated into routine academic tasks.
6. Management of institutions should develop clear institutional policies supporting research and digital skill use. This could be done by establishing strong policy frameworks that support digital scholarship, encourage collaboration, and provide structured guidance for research engagement.

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INFLUENCE OF THE USE OF ARTIFICIAL INTELLIGENCE BY RESEARCHERS ON KNOWLEDGE SHARING IN UNIVERSITIES IN KATSINA STATE, NIGERIA

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ABSTRACT

The study examined the influence of the use of AI by researchers on knowledge sharing in universities in Katsina State and addresses two research questions that include: What are the knowledge-sharing strategies used by researchers in universities in Katsina State? What is the level of use of AI tools among researchers in universities in Katsina State? And one influential hypothesis, $H0_1$: Use does significantly influence knowledge sharing by researchers in the universities in Katsina. The study used a descriptive survey design across three public universities in Katsina State to examine current practices and perceptions without manipulating variables. From a population of 2,899 academic staff, a proportionate stratified random sample of 500 respondents was selected. Data were collected using a validated and reliable researcher-designed questionnaire (CVI > 0.70; Cronbach's Alpha = 0.871). Analysis was conducted with SPSS (v23) using descriptive statistics and frequency distributions to address research questions, and linear regression analysis to test one hypothesis. The result showed that the researchers in Katsina State universities exchange knowledge through a combination of both traditional and digital means, such as the use of scholarly publications and conferences, as well as AI tools, social media, and collaborative systems. Quick exchange of ideas is also facilitated via informal channels like email and messaging applications, and AI tools are moderately used by the researchers in Katsina State universities, and more frequently, they use easy-to-use platforms, such as ChatGPT, Grammarly, Turnitin, and Mendeley, and less frequently, they use advanced AI tools in ML, predictive analytics, and expert decision systems. As such, the study recommended that universities in Katsina State should implement targeted training programs and workshops to familiarize researchers with advanced AI tools, including machine learning, predictive analytics, and expert systems, to enhance their integration into research workflows and improve knowledge-sharing efficiency, among others.

Keywords: Influence, Use, AI, Researcher, Knowledge Sharing

Introduction

The rapid development of artificial intelligence (AI) has altered the academic research and information exchange on an international scale to a great extent. AI technologies are gradually becoming a part of research processes in higher education institutions to provide increased efficiency, accuracy, and accessibility to information. This change is also being reflected in university libraries as they are the primary centers of knowledge generation and distribution. Literature searches, data analysis, and collaborative research are now done with the help of AI tools, such as machine learning algorithms and natural language processing systems, and this is a larger part of the trend by which digital technologies are beginning to transform how researchers interact, share knowledge, and generate novel ideas (Prystupa, 2026).

The use of AI in research and knowledge sharing in Nigerian universities is slowly picking up. University libraries are very important in the provision of access to academic resources and in assisting researchers in their academic activities. Nonetheless, the level of AI adoption is uneven among institutions, especially in states such as Katsina, where the technological integration and development of the infrastructure are still developing. The impact of AI on the research practice within this context is important to understand to encourage more effective knowledge sharing between scholars. Sharing of knowledge is an essential element of academic research, which enhances the collaborative process, innovation, and knowledge development. To share information, researchers in universities use various methods such as conferences, academic publications, digital repositories, collaborative platforms, and informal channels of communication such as emails and messaging applications (Thalaya & Puritat, 2022). The augmentation of AI in these plans also increases efficiency by automating, making intelligent recommendations, and collaboration, which increases access to pertinent research materials and allows scholars to communicate with each other.

The nature of AI tools and their application have high influence on the research in the university library. The automation of literature search, data analysis and academic writing are tools that facilitate literature searches, data analysis and writing intelligent assistants, which are predictive analytics systems, automated referencing software, plagiarism detection software, and intelligent writing assistants. They make research more productive, decrease research errors and facilitate cooperation (Gasparini & Kautonen, 2022). The mapping of the particular AI tools that are already in operation

in the Katsina State universities will give an understanding of the technological progress and research activities in the institutions. Regardless of those benefits, the adoption of AI is associated with challenges that affect its efficiency in knowledge sharing. The overuse of AI tools, moral and bias, lack of contextual awareness, inefficient infrastructure, and data privacy are the obstacles that should still be mentioned. These issues are important to discuss to get the most out of AI in assisting research cooperation and knowledge sharing in university libraries.

Statement of the Problem

The use of artificial intelligence (AI) in academic research has a major impact on the sharing of knowledge among scholars in university libraries. The AI tools that can be utilized to simplify the processes of the research work, collaborate, and make the information more accurate and accessible are predictive analytics, automated referencing, plagiarism detectors, and intelligent writing assistants. The use of appropriate tools will allow researchers to better utilize literature and process data with greater accuracy and easier access to knowledge between disciplines, thus making it easier to be innovative and productive in the academic world (Prystupa, 2026). Regardless of its potential, the impact of AI in universities in Katsina State is not high because of the low level of using high-technology tools, the lack of proper infrastructure, and institutional support. Such issues as data privacy concerns and a lack of clear policies are also the obstacles to the successful implementation of AI that limit its influence on research processes and collaborative practices. It is important to determine the influence of using AI in sharing knowledge thus to determine viable interventions to ensure that the advantages of AI are maximized in research practices in university libraries within Katsina State.

Research Questions

1. What are the knowledge-sharing strategies used by researchers in universities in Katsina State?
2. What is the level of use of AI tools among researchers in universities in Katsina State?

Research Hypothesis

$H0_1$: Use does significantly influence knowledge sharing by researchers in the universities in Katsina State

Literature Review

The concept of Artificial Intelligence (AI) is described as a large language processing model which enables automation of complex academic tasks to emulate human cognitive ability, such as data analysis, literature review, writing and decision making (Fitiria, 2021; Prystupa, 2026). Within an academic research setting, AI utilizes such methods as machine learning and natural language processing to produce insights, facilitate academic research, and decrease manual labor. Research can be aided by AI tools, which can streamline literature review, data analysis, and editing while assisting with plagiarism detection and improving accessibility to information, but they also introduce several ethical and privacy concerns, including accuracy, authorship, transparency, bias, and handling sensitive information (Xu, 2023; Othman, 2026).

The use of AI tools, such as ChatGPT, Turnitin, Grammarly, and AI-driven reference managers, is becoming more prevalent in Nigerian universities, consistent with the trend in other parts of the world, where such user-friendly tools are employed to streamline the literature search, writing, and plagiarism checking processes (Farag, Mahfouz & Alhajri 2021; Huang, 2022). The use of higher advanced AI systems, such as machine learning, predictive analysis, and expert decision-making tools, is not as common as it is in other areas of the world, especially due to the complexity of the techniques and the lack of infrastructure. Although AI helps to make work more efficient, productive, and more collaborative, the potential of this technology is limited by issues of training, infrastructure, and ethical concerns, which is why institutions should provide support and capacity building (Farag et. al., 2021). AI can be leveraged in the dissemination of knowledge through formal methods, such as academic publications, conferences, and open access archives, and informal sharing of information, data, research results, and methodologies through peer-to-peer dialogue and online platforms (Pence 2022; Prystupa, 2026). While journal articles, seminars, and workshops continue to be effective tools for disseminating the exchange of ideas, collaborative research platforms, social media, and data repositories have the potential to reach and engage with researchers from diverse fields (Tella, 2020; Fitria, 2021; Othman, 2026). However, problems such as digital literacy and data security remain, as do the following strategies supported by AI that can search and summarize research content automatically and facilitate collaboration in virtual space (Thalaya & Puritat, 2022; Huang, 2022).

Methodology

The research employed a descriptive survey research design that involved gathering this information through three state-owned universities in Katsina State namely, Federal University Dutsin-Ma, Umaru Musa Yar'adua University, Katsina, and Federal University of Transportation, Daura, so that it was possible to describe the current state of affairs, perceptions, and practices systematically without the possibility of employing any manipulations of the variables. The study was comprised of 2,899 academic staff and a proportionate stratified random sampling method was used to obtain a representative sample of 500 respondents. A researcher-created questionnaire consisting of Likert-scale questions and

sections on challenges were used to collect data, the validity of which was established by the expert review and Content Validity Index of more than 0.70, and reliability testing involving a pilot study resulted in a Cronbachs Alpha of 0.871, which is highly consistent. The questionnaires were personally given under the guidance of the university library personnel and the data analyzed using SPSS version 23 by utilizing descriptive statistics like the mean and standard deviation of the primary research questions and frequency tables with percentages of the questions regarding the challenges.

Result & Discussion

Table 1: Response Rate of Academic Staff in Universities in Katsina State, Nigeria

Academic in Universities in Katsina state, Nigeria			
Name of Universities	**No. of Questionnaire distributed**	**No. of Questionnaire Returned**	**%**
Umaru Musa Yar'adua University Katsina	205	182	36.4
Federal University Dutsin-Ma	196	175	35.0
Federal university of Transport Daura	99	85	17.0
	500	**442**	**88.**
Total Number of Questionnaire Returned and Percentage 442 (88.4%)			

Table 1 demonstrates that the response rate of academic personnel in the three universities is high. Katsina with Umaru Musa Yaradua University registered 182 returned questionnaires (36.4%), and Federal University, Dutsin-Ma with 175 returns (35.0%). Daura Federal University of Transportation had 85 returned questionnaires (17.0%). In general, the response rate of 88.4% shows that there was a high rate of participation among the respondents. This good response rate implies that the information gathered is valid and representative of the academic staff in the sampled universities in Katsina State. It also indicates efficiency of data collection strategy that was adopted by the researcher such as personal administration and follow-ups.

Table 2: What is the knowledge-sharing strategies used by researchers in universities in Katsina State?

Items	**SD**		**D**		**UD**		**A**		**SA**		**Mean**	**STD**
I shared knowledge through **academic publications** using tools like Turnitin and Claude.	72	18.1	64	16.1	32	8.0	168	42.2	62	15.6	3.21	1.37
I shared knowledge through **conferences, seminars, and workshops** supported by AI tools for presentation and communication.	40	10.1	56	14.1	48	12.1	192	48.2	62	15.6	3.45	1.20
I shared knowledge through **collaborative platforms** such as IBM Watson and Claude for co-authoring and data sharing.	72	18.1	96	24.1	16	4.0	160	40.2	54	13.6	3.07	1.38
I shared knowledge through **social media and academic networks** like ResearchGate and LinkedIn.	56	14.1	72	18.1	-	-	224	56.3	46	11.6	3.33	1.29
I shared knowledge through **data repositories and open access platforms** for storing and sharing research outputs.	72	18.1	144	36.2	24	6.0	136	34.2	22	5.5	2.73	1.26
I shared knowledge through **AI-powered tools** like ChatGPT for summarizing and synthesizing information.	72	18.1	104	26.1	16	4.0	199	50.0	7	1.8	2.91	1.25
I shared knowledge through **informal communication tools** such as email and messaging apps for quick idea exchange	80	20.1	88	22.1	16	4.0	120	30.2	94	23.6	3.15	1.50

Field Survey 2026, Key: SD= Strongly Disagree; D= Disagree; UD= Undecided; A= Agree; SA= Strongly Agree)

According to the survey data, the researchers in the universities in Katsina State use numerous knowledge-sharing strategies that blend the traditional academic practices with the modern AI and digital tools. The strategy of academic publications is still central, and such tools as Turnitin and Claude are employed to help with the preparation and publication of academic writing, scoring 3.21 on average. Knowledge sharing can also take place through conferences, seminars, and workshops, which are also significant in terms of their importance to share the knowledge, especially when supplemented with AI tools to deliver the presentation and communicate, which is the highest mean of listed strategies at 3.45. Academic networks such as ResearchGate and LinkedIn have a mean of 3.33 and are actively utilized by the researchers to share research and exchange information with colleagues. Co-authoring and sharing data is also done using collaborative platforms like IBM Watson, Claude, but this strategy has a mean of 3.07, which indicates moderate adoption.

Moreover, researchers can also use digital repositories, open-access solutions, and AI-based applications such as ChatGPT to store, synthesize, and summarize information; however, the average scores of 2.73 and 2.91, respectively indicate lower usage frequencies. The informal channels of communication, including email and messaging applications, are the popular approach to the exchange of ideas quickly, with the mean of 3.15, noting its significance in the daily academic communication. On the whole, these findings suggest that the scholars in Katsina State use a combination of formal, semi-formal, and informal knowledge-sharing interventions, combining the conventional academic methods with the newly developed AI tools to improve collaboration, communication, and sharing of the research results. The difference between the mean scores indicates the difference in the adoption and the familiarity with advanced AI tools, indicating the opportunity and gaps in knowledge-sharing practices.

Table 3: What is the level of use of AI tools among researchers in universities in Katsina State?

Items	SD		D		UD		A		SA		Mean	STD
1. Machine Learning (ML) Tools												
I am using IBM Watson to analyze research data and predict trends.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using RapidMiner to support predictive modeling for academic research.	128	32.2	136	34.2	16	4.0	111	27.9	7	1.8	2.33	1.24
I am using Orange for data visualization and pattern recognition in research projects.	120	30.2	136	34.2	56	14.1	72	18.1	14	3.5	2.31	1.18
I am using Weka to automate complex statistical analyses in my studies.	80	20.1	128	32.2	24	6.0	128	32.2	38	9.5	2.79	1.34
2. Natural Language Processing (NLP) Tools												
I am using ChatGPT to summarize academic texts and assist in drafting research sections.	40	10.1	56	14.1	48	12.1	192	48.2	62	15.6	3.45	1.20
I am using Claude AI for contextual interpretation of literature.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using DeepSeek for advanced text retrieval and synthesis across sources.	64	16.1	104	26.1	64	16.1	96	24.1	70	17.6	3.01	1.36
I am using SpaCy to process and analyze large volumes of research text.	120	30.2	136	34.2	56	14.1	72	18.1	14	3.5	2.31	1.18
3. AI-Powered Literature Review Tools												
I am using Claude AI to automate literature review and contextual analysis.	40	10.1	56	14.1	48	12.1	192	48.2	62	15.6	3.45	1.20
I am using ChatGPT to generate structured summaries of academic research.	96	24.1	136	34.2	8	2.0	112	28.1	46	11.6	2.69	1.40
I am using DeepSeek for efficient information retrieval across databases.	88	22.1	144	36.2	40	10.1	126	31.7	-	-	2.51	1.15
I am using Scholarcy to condense long research articles for easier review.	120	30.2	136	34.2	56	14.1	72	18.1	14	3.5	2.31	1.18
4. Predictive Analytics Systems												
I am using IBM Watson to predict research outcomes using historical data.	128	32.2	136	34.2	16	4.0	111	27.9	7	1.8	2.33	1.24

I am using RapidMiner for trend forecasting in academic studies.	120	30.2	136	34.2	56	14.1	72	18.1	14	3.5	2.31	1.18
I am using KNIME to build predictive models and perform data mining.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using Microsoft Azure ML to support evidence-based research decision-making.	40	10.1	248	62.3	16	4.0	80	20.1	14	3.5	2.45	1.03
5. AI-Based Data Analysis Tools												
I am using IBM Watson to identify hidden patterns in complex datasets.	128	32.2	136	34.2	16	4.0	111	27.9	7	1.8	2.33	1.24
I am using Tableau AI to enhance data visualization for research findings.	72	18.1	144	36.2	24	6.0	136	34.2	22	5.5	2.73	1.26
I am using SAS Viya as an AI-driven analytics platform for my research.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using RapidMiner for regression, clustering, and hypothesis testing.	120	30.2	136	34.2	56	14.1	72	18.1	14	3.5	2.31	1.18
6. Intelligent Writing Assistants												
I am using ChatGPT to draft and refine academic manuscripts.	96	24.1	136	34.2	8	2.0	112	28.1	46	11.6	2.69	1.40
I am using DeepSeek to generate technical content for research writing.	80	20.1	184	46.2	88	22.1	24	6.0	22	5.5	2.31	1.03
I am using Grammarly to improve grammar and clarity in my papers.	56	14.1	72	18.1			224	56.3	46	11.6	3.33	1.29
I am using Writesonic to enhance coherence and style in writing.	80	20.1	184	46.2	88	22.1	24	6.0	22	5.5	2.31	1.03
7. Plagiarism Detection Systems												
I am using Turnitin to detect similarities and ensure originality in research work.	40	10.1	56	14.1	48	12.1	192	48.2	62	15.6	3.45	1.20
I am using Grammarly to highlight potential plagiarism in manuscripts.	72	18.1	64	16.1	32	8.0	168	42.2	62	15.6	3.21	1.37
I am using Unicheck to check document originality.	40	10.1	248	62.3	16	4.0	80	20.1	14	3.5	2.45	1.03
I am using PlagScan to support plagiarism detection in academic submissions.	72	18.1	144	36.2	24	6.0	136	34.2	22	5.5	2.73	1.26
8. AI-Powered Reference Management Tools												
I am using EndNote to automate citation and bibliography management.	72	18.1	96	24.1	16	4.0	160	40.2	54	13.6	3.07	1.38
I am using Zotero to organize and store references for research projects.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using Mendeley as a collaborative reference management tool.	56	14.1	72	18.1			224	56.3	46	11.6	3.33	1.29
I am using RefWorks to format citations accurately.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
9. Expert Systems (Decision Support Systems												
I am using IBM Watson to provide decision support for research design and analysis.	80	20.1	184	46.2	88	22.1	24	6.0	22	5.5	2.31	1.03
I am using ExpertChoice for multi-criteria decision-making in research.	128	32.2	112	28.1	-	-	96	24.1	62	15.6	2.63	1.52
I am using DEXi to build expert decision models.	80	20.1	184	46.2	88	22.1	24	6.0	22	5.5	2.31	1.03
I am using CLIPS to simulate human expertise in academic decisions.	104	26.1	80	20.1	8	2.0	144	36.2	62	15.6	2.95	1.49
10. AI for Research Collaboration and Knowledge Management												

I am using Claude AI to support collaborative research writing and idea generation.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using ChatGPT to facilitate knowledge sharing among research teams.	56	14.1	72	18.1			224	56.3	46	11.6	3.33	1.29
I am using Notion AI to manage shared research notes and projects.	112	28.1	136	34.2	40	10.1	64	16.1	46	11.6	2.49	1.35
I am using Slack AI to summarize team discussions and track tasks.	56	14.1	72	18.1			224	56.3	46	11.6	3.33	1.29

Field Survey 2026, Key: SD= Strongly Disagree; D= Disagree; UD= Undecided; A= Agree; SA= Strongly Agree)

The statistics show that scientists in the Katsina State demonstrate moderate levels of AI tools utilization with many of them favoring easy-to-use and productivity-enhancing apps. ChatGPT is the most commonly used Natural Language Processor in text summarization and drafting (mean = 3.45, STD = 1.20), followed by DeepSeek (mean = 3.01, STD = 1.36) and SpaCy (mean = 3.5, STD = 2.31), and Claude AI (mean = 2.49, STD The AI-powered literature review tools, Claude AI (mean = 3.45, STD = 1.20) and Scholarcy (mean = 3.5, STD = 2.31) are moderately used, and ChatGPT (mean = 2.69, STD = 1.40) and DeepSeek (mean = 2.51, STD = 1.1 Machine Learning systems, such as IBM Watson (mean = 2.49, STD = 1.35), RapidMiner (mean = 2.33, STD = 1.24), predictive analytics systems, such as KNIME (mean = 2.49, STD = 1.35) are underutilized. There are moderate applications of AI-based data analysis tools, such as Tableau AI (mean = 2.73, STD = 1.26) and SAS Viya (mean = 2.49, STD = 1.35). The intelligent writing assistants such as ChatGPT (mean = 2.69, STD = 1.40) and Grammarly (mean = 3.33, STD = 1.29) are used moderately, whereas the plagiarism detecting tools (Turnitin mean = 3.45, STD = 1.20) are utilized significantly. Mendeley (mean = 3.33, STD = 1.29) and EndNote (mean = 3.07, STD = 1.38) are most commonly used and Zotero and RefWorks are least commonly used (mean = 2.49, STD = 1.35) and expert systems such as IBM Watson are lowly adopted (mean = 2.31 In the case of the AI-based research collaboration, there is moderate use of ChatGPT and Slack AI (mean = 3.33, STD = 1.29), but less so of Claude AI and Notion AI (mean = 2.49, STD = 1.35), which indicates the selective adoption of collaborative AI tools..

$H0_1$: Use does significantly influence knowledge sharing by researchers in the universities in Katsina state, Nigeria

Table 4: Use does significantly influence knowledge sharing by researchers in the universities in Katsina

	N	Mean	S.D.	R	R^2	Durbin	P-value	Remark	Decision
Use	500	2.0251	.67661	.099[a]	.010	.252	.049[b]	Significant influence	**$H0_3$: Rejected**
Knowledge sharing by researchers in the universities in Katsina		2.7286	1.25641						

The analysis shows that the use of AI (mean = 2.0251, SD = 0.67661) has a statistically significant influence on knowledge sharing (mean = 2.7286, SD = 1.25641), with R = 0.099, R^2 = 0.010, and p = 0.049. It implies that although there is a quantifiable impact of AI use on knowledge sharing to this researcher, it only accounts for about 1% of the variance, which means that the practical impact is extremely small.

Discussion of Findings

1. **What is the knowledge sharing strategies used by researchers in universities in Katsina State?**

The result showed that the researchers in Katsina State universities exchange knowledge through a combination of both traditional and digital means, such as the use of scholarly publications and conferences, as well as AI tools, social media, and collaborative systems. Quick exchange of ideas is also facilitated via informal channels like email and messaging applications. The adoption of AI-based tools is mediocre, which implies the possibility to improve knowledge-sharing habits. The moderate utilization of AI-based platforms implies the prospects of improving digital knowledge sharing. By following Chinedu (2023) and Prystupa (2026), the efficiency of knowledge-sharing systems may be enhanced through the reinforcement of AI integration. Thus, universities need to provide training opportunities on AI-based collaborative platforms; they need to incorporate AI tools into institutional knowledge management systems and encourage workshops that demonstrate and emphasize digital knowledge-sharing practices.

2. **What is the level of use of AI tools among researchers in universities in Katsina State?**

The results suggest that AI tools are moderately used by the researchers in Katsina State universities, and more frequently, they use easy-to-use platforms, such as ChatGPT, Grammarly, Turnitin, and Mendeley, and less frequently, they use advanced AI tools in ML, predictive analytics, and expert decision systems. The means (2.31-3.5) and SD (1.03-2.31) represent the moderate usage with significant variance, which shows the uneven adoption of AI in the research processes. The impact of AI use on knowledge sharing is very small ($p = 0.049$) but indicates the significance (explains 1 per cent of the variation). This is consistent with Fitria (2021); Xu (2023) and Othman (2026) also found that in Africa such as Indonesia and Nigerian found, to prefer easy-to-use AI instead of sophisticated analytics software. The practical suggestions involve easy-to-use interfaces of higher-level AI, arranging workshops where real-world applications of research are demonstrated, and promoting pilot projects to become more familiar and used.

Conclusions

The study concludes that the use of AI by researchers in universities in Katsina State has a statistically significant but practically insignificant effect on knowledge sharing, accounting for about 1 per cent of the variance ($R\ 2 = 0.010$, $p = 0.049$). Scholars use a blend of conventional means, including scholarly journals and conferences, and digital ones, including AI-based applications, social media, and collaborative networks, as well as informal communication through email and messaging applications, to share knowledge quickly. The use of AI among scholars is moderate, with the preference given to easy-to-use applications such as ChatGPT, Grammarly, Turnitin, and Mendeley, whereas more sophisticated systems of machine learning, predictive analytics, and expert decision-making are not widely used, which indicates the unequal integration of AI into the research process. These results indicate that universities have an opportunity to increase digital knowledge-sharing through offering specific training, incorporating AI in institutional knowledge management systems, supporting workshops on AI usage, and promoting pilot projects to gain familiarity and acceptance of sophisticated AI tools.

Recommendations

1. Universities in Katsina State should implement targeted training programs and workshops to familiarize researchers with advanced AI tools, including machine learning, predictive analytics, and expert systems, to enhance their integration into research workflows and improve knowledge-sharing efficiency.
2. Institutions should integrate AI-powered collaborative platforms and knowledge management systems into university research infrastructure, providing user-friendly interfaces and support to encourage consistent use of AI tools for both formal and informal knowledge-sharing activities.

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LAW LIBRARIES AND THE LEGAL INFORMATION ECOSYSTEM IN NIGERIA: A CRITICAL EXAMINATION OF ACQUISITION, DISSEMINATION, AND USE

By

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Abstract

Legal information is a centre hub through which legal education, research, advocacy, and the administration of justice revolve. This study examined law libraries and the legal information ecosystem in Nigeria, with specific focus on acquisition, dissemination, and use of legal information resources in Clifford University Law Library, Owerrinta, Abia State. The study adopted a descriptive survey design. The population comprised 270 respondents, made up of 250 law students, 15 law lecturers, and 5 law library personnel. Total enumeration was used because the population was manageable and all categories were direct users or providers of law library services. A structured four-point Likert scale questionnaire was used for data collection, while 249 valid responses were analyzed using frequency counts, percentages, weighted mean, and criterion mean interpretation. Findings showed that acquisition practices were generally effective, especially in the provision of current legal textbooks and electronic legal resources. Dissemination was also strong through orientation, user education, and staff assistance, although digital dissemination and easy access to electronic databases remained weaker. Utilization was very high, as respondents depended on the law library for assignments, research, teaching support, and academic performance. However, poor Internet connectivity, inadequate training, limited infrastructure, high database costs, and funding constraints affected optimal access and use. The study concludes that Clifford University Law Library is a vital component of the legal information ecosystem, but its impact will be stronger through improved funding, expanded database access, better ICT infrastructure, continuous information literacy training, and stronger collaboration between librarians and law lecturers.

Keywords: law libraries; legal information ecosystem; acquisition; dissemination; utilization; Clifford University; Nigeria

Introduction

The legal profession is deeply dependent on information. Legal reasoning, classroom teaching, scholarly writing, advocacy, adjudication, and policy interpretation all depend on access to authoritative sources of law and legal commentary. Statutes, judicial precedents, law reports, regulations, gazettes, textbooks, journals, indexes, digests, citators, and electronic databases form the documentary foundation upon which legal knowledge is built and applied. In a university, the law library provides the organized environment where these resources are selected, processed, preserved, interpreted, disseminated, and used by students, lecturers, librarians, researchers, and other members of the legal community.

Recently, law libraries have experienced unprecedented wave of change. They are no longer passive repositories of books. They have become active knowledge systems within a wider legal information ecosystem. This ecosystem includes legal information resources, users, technologies, institutional policies, professional library services, digital platforms, and the skills required to locate, evaluate, and use legal information. In this sense, the usefulness of a law library is not measured only by the number of books on the shelves. It is also measured by the currency of its collection, the reliability of its access systems, the quality of user guidance, the availability of electronic resources, and the extent to which users can apply legal information to academic and professional tasks.

Research has shown that students and legal personnel require current legal resources, including recent enactments, law reports, journals, electronic resources, and legal databases, while effective use of such resources depends on information literacy, database access, organization of resources, and user support (Igbinosa et al., 2025; Obuezie & Echedom, 2023a, 2023b; Yemi-Peters et al., 2024). These findings are important in Nigeria because many academic law libraries operate in a hybrid environment where printed materials remain highly relevant while electronic legal resources are increasingly expected by users.

Digital transformation has widened the possibilities of legal research. Online public access catalogues, institutional repositories, subscription-based legal databases, open access legal platforms, email alerts, and digital reference services now allow users to reach legal materials beyond the physical library. At the same time, digital transformation has created new inequalities. A law library may possess useful electronic resources, but users may still be excluded by weak internet connectivity, inadequate computers, limited subscriptions, low awareness, or poor search skills. Studies on Nigerian academic law libraries have continued to identify inadequate funding, poor internet access, limited training, high database costs, and gaps in resource organization as barriers to effective legal information service delivery (Alabi, 2025; Igbinosa et al., 2025; Liman, 2025).

Within the Nigerian university system, the law library is expected to support legal education by providing access to primary and secondary legal materials. Primary legal materials include statutes, law reports, judicial decisions, regulations, and official gazettes, while secondary materials include textbooks, journals, legal encyclopedias, commentaries, indexes, digests, and research guides. These resources assist law students in understanding legal doctrine, preparing assignments and seminar papers, participating in moot court exercises, and developing research competence. They also support academic staff in teaching, supervision, publication, and curriculum development.

Against this background, this study examines law libraries and the legal information ecosystem in Nigeria, using Clifford University Law Library, Owerrinta, Abia State, as the institutional focus. The study gives attention to acquisition, dissemination, utilization, and the factors influencing access and use because these dimensions jointly determine whether a law library can support legal education and research in a meaningful and sustainable manner.

Statement of the Problem

Law libraries are central to legal education because they acquire, organize, preserve, and disseminate legal information resources required for teaching, learning, research, and professional development. However, the presence of a law library does not always ensure adequate acquisition, accessibility, dissemination, and effective utilization of current legal information resources.

Studies reveal that many Nigerian university law libraries still face problems relating to inadequate legal materials, poor access to legal information, weak organization systems, limited dissemination services, and inadequate information literacy skills among users (Igbinosa et al., 2025; Obuezie & Echedom, 2023b; Yemi-Peters et al., 2024).

Although these challenges have been widely reported in Nigerian universities, there is limited empirical evidence on how they affect private university law libraries such as Clifford University Law Library. These deficiencies reduce the capacity of law libraries to effectively support legal education, scholarship, and research activities. If these problems persist, law students and lecturers may continue relying on outdated or unreliable legal information sources for academic and professional tasks. This study therefore examines the acquisition, dissemination, and use of legal information resources in Clifford University Law Library.

Objectives of the Study

The main objective of the study was to examine law libraries and the legal information ecosystem in Nigeria, with particular focus on acquisition, dissemination, and use in Clifford University Law Library. Specifically, the study sought to:

- examine the existing practices of acquiring legal information resources in Clifford University Law Library;
- assess the strategies used in disseminating legal information resources to users;
- analyze patterns of utilization of legal information resources among law students, academic staff, and law library personnel; and
- identify factors influencing access to and effective use of legal information resources.

Literature Review

Conceptual Clarification of Law Libraries and the Legal Information Ecosystem

Law libraries are specialized information centres established to support legal education, legal research, professional practice, and access to justice. They provide access to legal information resources such as statutes, law reports, gazettes, regulations, treaties, legal textbooks, journals, digests, indexes, and electronic legal databases. Unlike general academic libraries, law libraries are highly sensitive to authority, currency, accuracy, and jurisdictional relevance because legal research depends on reliable and up-to-date information. Thus, the strength of a law library is not measured only by the size of its collection, but by how well its resources are acquired, organized, disseminated, accessed, and used.

The legal information ecosystem describes the relationship among legal information resources, law librarians, users, technologies, policies, and services. Within this ecosystem, the law library serves as the link between legal information and legal information users. It selects relevant materials, organizes them for retrieval, creates awareness, supports legal research, and guides users in the ethical and accurate use of information. In Nigeria, this ecosystem is gradually becoming hybrid, as print resources continue to exist alongside electronic databases and open access legal platforms. Alabi (2025) observes that free legal databases can reduce access barriers created by expensive subscription-based platforms, while Yemi-Peters et al. (2024) show that information literacy competence is necessary for legal personnel to identify, retrieve, evaluate, and use legal information effectively. Therefore, acquisition, dissemination, utilization, and access must be understood as connected activities within one legal information system.

Acquisition Practices of Legal Information Resources

Acquisition is the starting point of effective law library service because it determines the quality, relevance, adequacy, and currency of available resources. Since law changes through new legislation, judicial decisions, amendments, revised textbooks, and emerging areas of legal scholarship, law libraries must acquire resources continuously. This means that weak acquisition practices can limit teaching, learning, research, and professional preparation.

Furthermore, acquisition in law libraries should cover both primary and secondary legal materials. Primary legal materials include constitutions, statutes, regulations, gazettes, treaties, law reports, and court decisions, while secondary sources include textbooks, journals, legal commentaries, encyclopedias, digests, indexes, bibliographies, and research manuals. In the present digital environment, acquisition also includes e-books, e-journals, legal databases, institutional repositories, online catalogues, and credible open access legal platforms.

Recent studies show that acquisition must be guided by user needs, curriculum requirements, professional relevance, and regular collection evaluation. Obuezie and Echedom (2023b) found that adequacy of legal information resources and services remains central to the effectiveness of selected Nigerian university law libraries. Similarly, Obuezie and Echedom (2023a) reported that postgraduate law students require both print and electronic legal information resources to meet their academic and research needs. In the same direction, Ani (2024) examined the extent to which law students' information needs were provided for in selected Nigerian university law libraries, while Igbinosa et al. (2025) emphasized that availability and proper organization of legal information resources are necessary for enhanced access. These studies suggest that acquisition should not be treated as mere purchase of books, but as a planned process shaped by users' needs and institutional goals.

However, acquisition is often affected by funding and the high cost of legal materials. Law reports, current textbooks, journals, and subscription-based databases require sustained financial commitment. Consequently, law libraries need clear acquisition policies, adequate budgetary support, collaboration with faculties of law, and periodic assessment of collection gaps. Although free legal databases can support access where paid platforms are limited, they should complement rather than replace authoritative legal resources (Alabi, 2025).

Dissemination Strategies for Legal Information Resources

Dissemination refers to the strategies through which law libraries make legal information resources known, accessible, and usable. It is not enough for a law library to acquire resources; users must be informed about available materials and guided on how to retrieve and use them. Therefore, dissemination includes orientation programmes, reference services, current awareness services, display of new arrivals, library notices, email alerts, selective dissemination of information, online catalogues, database training, research guides, and personal assistance from law librarians.

More importantly, dissemination begins with proper organization. Legal materials must be classified, catalogued, indexed, labelled, shelved, and described in ways that make retrieval easy. Igbinosa et al. (2025) identified classification, subject registers, bibliographies, indexing, abstracting, online cataloguing, shelf guides, book catalogues, authority files, and display of new arrivals as methods used in organizing legal information resources for enhanced access in academic law libraries. This implies that users may assume that resources are unavailable when they are actually present but poorly organized or poorly publicized.

In addition, user education remains a strong dissemination strategy because legal information sources can be complex. Users need to understand legal citations, law report abbreviations, statutory updates, jurisdictions, search strategies, database use, and the difference between authoritative and non-authoritative sources. Yemi-Peters et al. (2024) found that legal personnel require information literacy competencies for effective legal information use. Similarly, earlier work on electronic library support services for law students in South-East Nigerian university libraries showed the importance of awareness and access to electronic resources such as Law Pavilion, open access journals, and other legal research tools. Thus, effective dissemination requires both traditional methods and digital channels such as online catalogues, institutional portals, emails, WhatsApp groups, social media, and database demonstrations.

Utilization Patterns of Legal Information Resources

Utilization is the actual use of legal information resources by law students, academic staff, and law library personnel. Utilization includes the use of statutes, law reports, textbooks, journals, gazettes, digests, indexes, databases, and research guides for assignments, lectures, moot court activities, seminar papers, project writing, legal drafting, and academic research. In this sense, utilization is the stage at which acquired and disseminated resources begin to produce educational and professional value.

However, utilization is influenced by availability, awareness, accessibility, user competence, staff assistance, internet connectivity, opening hours, and the perceived usefulness of the library. Where users see the law library as a reliable source of current and authoritative legal information, they are more likely to use it. Conversely, where resources are outdated, poorly organized, or difficult to access, users may depend on general internet sources that may not be accurate, authoritative, or current.

Literature further shows that information literacy is closely tied to utilization. Yemi-Peters et al. (2024) revealed that legal personnel need competencies in identifying, retrieving, evaluating, and applying information. This is important because legal research requires users to trace cases, interpret citations, update statutes, distinguish binding from persuasive authorities, and evaluate electronic legal information. Also, Okeji (2020), though slightly outside the preferred recent range, remains relevant because the study examined undergraduate law students' utilization of law library resources in selected South-East Nigerian universities. More recently, Alabi (2025) argued that free legal databases can support law students where subscription-based access is limited, but users still require guidance to determine authority, currency, and relevance.

Factors Influencing Access to and Effective Use of Legal Information Resources

Access to and effective use of legal information resources are influenced by financial, institutional, technological, professional, and user-related factors. Funding is a major factor because it affects the acquisition of law reports, textbooks, journals, databases, computers, internet facilities, and qualified personnel. When funding is inadequate, collections become outdated, database subscriptions may lapse, and users may not receive the quality of service required for legal education and research.

In addition, ICT infrastructure plays a major role in access. Poor internet connectivity, inadequate computers, unstable power supply, weak library management systems, and limited technical support can reduce access to electronic legal resources. Igbinosa et al. (2025) identified funding, ICT tools, training, and internet connectivity as important issues affecting the organization and accessibility of legal information resources in academic law libraries. Similarly, Alabi (2025) observed that free legal databases may help reduce the access gap created by costly subscription-based platforms. This shows that access depends not only on the presence of resources but also on the systems that make retrieval possible.

Furthermore, user awareness and training strongly influence effective use. Users may fail to use available resources because they do not know that the resources exist or lack the skills to retrieve them. For this reason, orientation, information literacy instruction, database demonstrations, legal research clinics, and lecturer-librarian collaboration are necessary. Yemi-Peters et al. (2024) support this position by emphasizing information literacy competencies among legal personnel in Nigerian federal universities. Therefore, an effective law library must combine adequate resources, reliable access systems, trained personnel, and continuous user education.

From the reviewed literature, it is clear that studies have examined legal information resources, adequacy of law library services, information literacy, electronic legal resources, and organization of legal materials in Nigerian law libraries. However, many of these studies discuss acquisition, dissemination, utilization, and access separately rather than as connected parts of one legal information ecosystem.

In addition, limited attention has been given to emerging private university law libraries such as Clifford University Law Library. Since such libraries are still developing their collections, services, digital platforms, and user support systems, this study fills the gap by examining how legal information resources are acquired, disseminated, accessed, and used within Clifford University Law Library.

Empirical Review

Obuezie and Echedom (2023b) empirically examined legal information resources and services in selected Nigerian university law libraries and found that adequacy, currency, and availability of legal materials remain central to effective legal education and research. Similarly, Yemi-Peters et al. (2024) found that legal personnel require information literacy skills to identify, retrieve, evaluate, and use legal information effectively, showing that access alone does not guarantee proper utilization. In addition, Igbinosa et al. (2025) established that proper organization, funding, ICT facilities, internet connectivity, and staff training significantly influence access to and effective use of legal information resources in academic law libraries.

Methodology

The study adopted a descriptive survey research design to examine law libraries and the legal information ecosystem in Nigeria, with emphasis on acquisition, dissemination, utilization, and factors influencing access and use in Clifford University Law Library, Owerrinta, Abia State. The design was appropriate because the study sought to describe existing practices, user perceptions, service patterns, and constraints affecting legal information service delivery.

The study area was Clifford University Law Library. The library serves the Faculty of Law by providing access to legal textbooks, law reports, journals, reference materials, electronic resources, user education, and research support services. The population of the study was 270 respondents, comprising 250 law students, 15 law lecturers in the Faculty of Law, and 5 law library personnel. The law students were drawn from 100 to 500 level, with 50 students in each level.

Total enumeration was adopted for the study because the population was manageable and all categories of respondents were directly connected to the law library either as users or service providers. This means that all 250 law students, all 15 law lecturers, and all 5 law library personnel were included in the study. This approach was considered suitable because law lecturers are legitimate users of the law library for teaching, research, supervision, and curriculum support, while law librarians are directly involved in acquisition, dissemination, and user assistance.

The instrument for data collection was a structured questionnaire developed in line with the objectives of the study. The questionnaire contained sections on demographic information, acquisition of legal information resources, dissemination strategies, utilization patterns, factors influencing access and use, and strategies for improvement. The response format was a four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The scale was weighted as follows: Strongly Agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1. A criterion mean of 2.50 was adopted for decision-making; therefore, any item with a mean score of 2.50 and above was interpreted as accepted, while any item below 2.50 was interpreted as rejected.

The instrument was subjected to face and content validation by experts in Library and Information Science to ensure clarity, relevance, and alignment with the study objectives. Reliability was determined using Cronbach's alpha, and a coefficient of 0.70 and above was considered acceptable. Out of the 270 questionnaires administered, 249 valid responses were retrieved and used for analysis, representing a response rate of 92.2 percent. Data were analyzed using frequency counts, percentages, weighted mean, and four-point Likert scale interpretation. Ethical issues such as voluntary participation, anonymity, confidentiality, and use of data strictly for academic purposes were observed.

Results and Presentation of Findings

This section presents the results in line with the research questions. The analysis is based on 249 valid responses. Responses are presented using the full four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The weighted mean was calculated using the assigned values of 4, 3, 2, and 1 respectively. The criterion mean was 2.50; therefore, items with mean scores of 2.50 and above were accepted, while those below 2.50 were rejected.

Table 1: Four-point Likert scale analysis of acquisition of legal information resources (N = 249)

Item	SA	A	D	SD	Mean	Decision
The law library acquires current legal textbooks	160 (64.26%)	89 (35.74%)	0 (0.00%)	0 (0.00%)	3.64	Accepted
The library has adequate law reports and case law materials	110 (44.18%)	84 (33.73%)	35 (14.06%)	20 (8.03%)	3.14	Accepted
Legal journals and periodicals are regularly updated	112 (44.98%)	83 (33.33%)	34 (13.65%)	20 (8.03%)	3.15	Accepted
Electronic legal resources are available in the library	158 (63.45%)	91 (36.55%)	0 (0.00%)	0 (0.00%)	3.63	Accepted
Acquisition of resources is based on users' needs	108 (43.37%)	86 (34.54%)	35 (14.06%)	20 (8.03%)	3.13	Accepted
Funding is sufficient for acquiring legal materials	75 (30.12%)	91 (36.55%)	50 (20.08%)	33 (13.25%)	2.84	Accepted

2026 Field Survey

Table 1 shows that acquisition practices in Clifford University Law Library were generally positive under the four-point Likert scale. Current legal textbooks and electronic legal resources recorded high mean scores, showing strong acceptance by respondents. Adequacy of law reports, case law materials, journal updates, and user-based acquisition were accepted but remained moderate. Funding recorded the weakest mean score, indicating that financial constraint remains a major limitation in collection development.

Table 2: Four-point Likert scale analysis of dissemination of legal information resources (N = 249)

Item	SA	A	D	SD	Mean	Decision
The library informs users about available resources	130 (52.21%)	92 (36.95%)	20 (8.03%)	7 (2.81%)	3.39	Accepted
Library orientation programmes are conducted for users	132 (53.01%)	90 (36.14%)	19 (7.63%)	8 (3.21%)	3.39	Accepted
Electronic databases are easily accessible	75 (30.12%)	91 (36.55%)	50 (20.08%)	33 (13.25%)	2.84	Accepted
Library staff assist users in accessing legal information	110 (44.18%)	84 (33.73%)	35 (14.06%)	20 (8.03%)	3.14	Accepted
The library uses digital platforms to disseminate information	76 (30.52%)	91 (36.55%)	50 (20.08%)	32 (12.85%)	2.85	Accepted
The library provides user education on information resources	165 (66.27%)	84 (33.73%)	0 (0.00%)	0 (0.00%)	3.66	Accepted

2026 Field Survey

Table 2 reveals that dissemination is strong in user education, orientation, and communication of available resources. The highest mean scores were recorded for user education, orientation, and awareness of available resources, showing that the library actively introduces users to its resources and services. However, electronic database accessibility and

the use of digital platforms recorded weaker mean scores. This implies that traditional and staff-mediated dissemination practices are stronger than digital dissemination systems.

Table 3: Four-point Likert scale analysis of utilization of legal information resources (N = 249)

Item	SA	A	D	SD	Mean	Decision
I frequently use the law library resources	170 (68.27%)	79 (31.73%)	0 (0.00%)	0 (0.00%)	3.68	Accepted
I use the library for academic assignments and research	168 (67.47%)	81 (32.53%)	0 (0.00%)	0 (0.00%)	3.67	Accepted
I make use of electronic legal databases	112 (44.98%)	83 (33.33%)	34 (13.65%)	20 (8.03%)	3.15	Accepted
I prefer library resources to free online sources	130 (52.21%)	91 (36.55%)	20 (8.03%)	8 (3.21%)	3.38	Accepted
I am satisfied with the resources available in the library	132 (53.01%)	90 (36.14%)	19 (7.63%)	8 (3.21%)	3.39	Accepted
I have the skills to effectively use legal information resources	110 (44.18%)	84 (33.73%)	35 (14.06%)	20 (8.03%)	3.14	Accepted
Library resources improve my academic performance/research	172 (69.08%)	77 (30.92%)	0 (0.00%)	0 (0.00%)	3.69	Accepted

2026 Field Survey

Table 3 indicates very high utilization of the law library. The highest mean scores were recorded for frequent use, assignments and research, and academic performance or research improvement. This confirms the central role of the library in legal education at Clifford University. Nevertheless, electronic database use and users' skills in using legal information resources recorded moderate mean scores. These findings show that digital legal research competence remains an area requiring attention.

Table 4: Four-point Likert scale analysis of factors influencing access and use (N = 249)

Item	SA	A	D	SD	Mean	Decision
Lack of awareness affects use of library resources	130 (52.21%)	92 (36.95%)	20 (8.03%)	7 (2.81%)	3.39	Accepted
Poor internet connectivity limits access to electronic resources	170 (68.27%)	79 (31.73%)	0 (0.00%)	0 (0.00%)	3.68	Accepted
Inadequate training affects use of library resources	168 (67.47%)	81 (32.53%)	0 (0.00%)	0 (0.00%)	3.67	Accepted
Limited library resources affect research activities	166 (66.67%)	83 (33.33%)	0 (0.00%)	0 (0.00%)	3.67	Accepted
Inadequate infrastructure affects access to legal information	169 (67.87%)	80 (32.13%)	0 (0.00%)	0 (0.00%)	3.68	Accepted
High cost of databases limits access to electronic resources	128 (51.41%)	93 (37.35%)	20 (8.03%)	8 (3.21%)	3.37	Accepted
Library opening hours affect usage of resources	75 (30.12%)	91 (36.55%)	50 (20.08%)	33 (13.25%)	2.84	Accepted

2026 Field Survey

Table 4 shows that access and use are strongly affected by infrastructural, financial, and user-related factors. Poor internet connectivity, inadequate training, limited resources, and inadequate infrastructure recorded the highest mean scores and were therefore treated as critical factors. High database cost and lack of awareness also emerged as major factors. Library opening hours recorded the weakest mean score, suggesting that it is less critical compared with internet, infrastructure, training, and funding-related challenges.

Table 5: Four-point Likert scale analysis of strategies for improving access and utilization (N = 249)

Item	SA	A	D	SD	Mean	Decision
Increased funding will improve library services	174 (69.88%)	75 (30.12%)	0 (0.00%)	0 (0.00%)	3.70	Accepted
Training programmes will improve resource utilization	172 (69.08%)	77 (30.92%)	0 (0.00%)	0 (0.00%)	3.69	Accepted
Improved ICT infrastructure will enhance access	170 (68.27%)	79 (31.73%)	0 (0.00%)	0 (0.00%)	3.68	Accepted
Subscription to more databases will improve research	169 (67.87%)	80 (32.13%)	0 (0.00%)	0 (0.00%)	3.68	Accepted
Awareness programmes will increase usage of resources	168 (67.47%)	81 (32.53%)	0 (0.00%)	0 (0.00%)	3.67	Accepted

2026 Field Survey

Table 5 shows strong support for strategies aimed at improving access and utilization. All the items recorded mean scores well above the 2.50 criterion mean, indicating strong acceptance of increased funding, training programmes, improved ICT infrastructure, subscription to more databases, and awareness programmes. These strategies directly respond to the challenges identified in the study.

Discussion of Findings

The findings show that Clifford University Law Library is a functional and relevant part of the legal information ecosystem. The high agreement on current legal textbooks and electronic legal resources indicates that the library is making significant effort to support legal education. This finding agrees with Obuezie and Echedom (2023a, 2023b), who emphasized the importance of current legal information resources, users' legal information needs, and adequate law library services in Nigerian universities. However, the moderate rating of law reports, case law materials, and updated journals suggests that acquisition should be sustained and reviewed regularly.

Funding emerged as the weakest acquisition area. Although a majority of respondents agreed that funding was sufficient, the level of disagreement shows that finance remains a concern. This finding supports Igbinosa et al. (2025), who identified inadequate funding as one of the challenges affecting enhanced access to legal information resources in academic law libraries. In practical terms, a law library cannot remain current without steady institutional funding because legal texts, law reports, journals, and databases require continuous updating.

The findings on dissemination show that the law library performs strongly in user education, orientation, and communication of available resources. This is commendable because legal information sources are not always easy for users to navigate without guidance. The result agrees with Yemi-Peters et al. (2024), who found that information literacy competence is important for effective legal information use. However, the weaker ratings for electronic database access and digital dissemination show that the digital component of the library's service requires improvement. This also aligns with Liman (2025), who notes that electronic resources need adequate facilities, training, awareness, and support to be effectively adopted.

Utilization of legal information resources was very high. Respondents frequently used the law library for assignments, research, and academic performance. This finding shows that the law library is not marginal to the academic life of the Faculty of Law; rather, it is central to teaching, learning, and research. The high preference for library resources over free online sources also shows that users recognize the authority and credibility of library-provided resources. Nevertheless, the moderate rating of electronic database use and users' legal information skills reveals a gap between general library use and advanced digital legal research competence.

The findings on access factors reveal that poor internet connectivity, inadequate training, limited resources, inadequate infrastructure, lack of awareness, and high database costs affect effective use. These findings agree with Igbinosa et al. (2025), who identified internet connectivity, training, funding, and resource shortages as challenges in academic law libraries. They also support Alabi's (2025) position that free legal databases can help reduce access gaps where subscription costs are high. However, free databases should be curated and taught within the library system so that users understand their limits and proper use.

Overall, the study shows that Clifford University Law Library has a strong service foundation, but its legal information ecosystem is not yet fully optimized. Acquisition, dissemination, and utilization are active, but they are constrained by financial, infrastructural, digital, and training-related challenges. The implication is that improving one area alone will not be enough. Better funding must be accompanied by user training, improved ICT infrastructure, stronger digital dissemination, expanded database access, and collaboration between law librarians and academic staff.

Conclusion

This study examined law libraries and the legal information ecosystem in Nigeria, focusing on acquisition, dissemination, and use of legal information resources in Clifford University Law Library, Owerrinta, Abia State. The study concludes that the law library plays a critical role in supporting legal education, research, and academic development. The high level of agreement across acquisition, dissemination, and utilization indicators shows that the library is a valued and functional component of the university's legal education system.

The study also concludes that the effectiveness of the legal information ecosystem is moderated by financial, technological, and capacity-related constraints. Inadequate funding, poor internet connectivity, limited ICT infrastructure, high database costs, and training gaps reduce the extent to which users can fully benefit from available legal information resources. Therefore, while the law library is effective within existing conditions, it requires stronger institutional support to meet the demands of modern legal education and digital legal research.

Finally, acquisition, dissemination, and utilization should not be treated as isolated library functions. They are interdependent processes. Acquisition provides the resources, dissemination creates awareness and access, and utilization reflects the actual value of those resources to users. A strong legal information ecosystem requires these three processes to function together.

Recommendations

- University management should increase and sustain funding for Clifford University Law Library to support the acquisition of current legal textbooks, law reports, journals, statutes, reference materials, and electronic legal databases. A predictable annual law library budget should be encouraged.
- The Law Library should strengthen ICT infrastructure by improving internet connectivity, providing adequate computers, maintaining stable access to electronic resources, and adopting reliable digital library systems. This will improve both dissemination and electronic legal research.
- The library should expand subscriptions to relevant legal databases while also curating credible free and open access legal databases for students and lecturers. This mixed access strategy will reduce the effect of high database costs and widen research opportunities.
- Regular information literacy and legal research training should be organized for law students, academic staff, and library personnel. Such training should cover database searching, use of law reports, statutory research, legal citation, evaluation of online legal sources, and ethical use of information.
- The library should intensify awareness strategies through orientation programmes, current awareness services, email alerts, notice boards, faculty communication channels, new arrival displays, and digital platforms. Users should be consistently informed about available resources and services.
- Law librarians should collaborate more closely with academic staff to integrate legal research skills into coursework, moot court preparation, seminar work, and project supervision. This will make library use more practical and curriculum-driven.
- The Law Library should explore inter-library cooperation, resource sharing, and consortium-based subscriptions with other university law libraries. Such collaboration can reduce costs, expand access, and strengthen the legal information ecosystem.

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LECTURERS' AWARENESS AND READINESS FOR ADOPTION OF ARTIFICIAL INTELLIGENCE FOR TEACHING IN NIGERIAN TERTIARY INSTITUTIONS

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Abstract

AI is a global phenomenon whose presence has been felt in all dimensions of humanity. In education, it has brought new paradigms to the processes and approaches deployed by lecturers for pedagogical delivery. This study investigated lecturers' awareness and readiness for adopting AI for teaching in Nigerian tertiary institutions. A descriptive survey of correlational type was employed, using a self-developed questionnaire with a reliability coefficient of r = 0.921. Using convenience sampling, valid responses yielded 416 collected via an online Google Form disseminated across social media platforms. Data were analysed using descriptive statistics, Pearson Product-Moment Correlations, and regression analysis. Findings revealed high awareness of AI-supported teaching styles, such as personalised learning (M = 3.36, SD = 1.14), intelligent tutoring systems (M = 3.28, SD = 1.27), and predictive analytics (M = 3.28, SD = 1.41), while gamification (M = 2.40, SD = 1.08) and automated assessment (M = 2.28, SD = 1.47) ranked lowest. Awareness of widely used AI tools such as Chatbots (M = 3.33) exceeded that of newer tools like Brisk AI (M = 1.78). Readiness scores indicated higher preparedness for Chatbots (M = 3.27, SD = 1.00) and MagicSchool.ai (M = 3.25, SD = 1.21). Hypothesis testing showed a lower positive relationship between awareness of AI teaching styles and awareness of AI tools (r = .384, p = .000). A significant negative relationship emerged between awareness of AI teaching styles and readiness to adopt AI (r = –.295, p = .000). Regression results (R = .465; R^2 = .216; F(2,413) = 56.895, p = .000) indicated that awareness and readiness jointly predicted lecturers' understanding of AI-adoptable teaching styles. Major challenges included insufficient technological resources (M = 3.28) and erratic power supply (M = 3.26). Overall, the study concludes that although lecturers possess substantial awareness of AI, gaps in readiness and infrastructural limitations continue to hinder effective AI adoption for teaching.

Keywords: Artificial intelligence, Awareness, Nigeria, Readiness, Teaching, Tertiary institutions

Introduction

The advent of artificial intelligence (AI) has sparked a revolutionary age of innovation in severalfields, most notably education, which has been profoundly impacted (Kim & Lee, 2021). AI presents itself as a powerful tool with the ability to transform traditional educational approaches as educational institutions work to meet the diverse and evolving needs of students in an increasingly dynamic environment (Chen & Patel, 2021). Boucher (2020) described AI as systems that exhibit intelligent behaviours by analysing their surroundings and acting autonomously to accomplish a certain job. AI is a machine that can mimic intelligence by endowing computers with human-like abilities, including comprehension, reasoning and problem-solving (Buabbas et al., 2023). Furthermore, the American College of Education (2023) described AI as computer systems capable of performing tasks that typically require human intelligence.

It appears that AI has transformed traditional education and opened up new avenues for instruction and learning. Andreu Perez et al. (2017) stressed that AI is one of the technological advancements that has the power to impact and mould educational activities in every civilisation due to the convenience and simplicity it gives to teaching and learning activities. Similarly, Chen et al. (2024) observed that the quick development of AI has drastically changed higher

education, impacting classroom delivery, material generation and instructional design. But when applied carefully, AI was a tool that enhanced effective instruction rather than a shortcut around it (Fitzpatrick, 2025).

As AI systems develop, they will put humans' basic beliefs about the nature of intellectual labour, scholarly communication, and the calibre of research to the test. In order to adapt our scientific institutions to the constantly evolving scientific production process, science policymakers must take this into consideration (Kusumegi et al., 2025). In current classrooms, where students increasingly choose visual and interactive learning, AI may boost teacher performance, clarity of instruction, and student engagement. Citing ChatGPT as an example, Chen et al. (2024) and Mogavi et al. (2024) asserted that the AI tool can generate text and code, provide real-time feedback, personalised tutoring, and enhanced learning experiences in a wide range of subjects. As a result, lecturers will gain a great deal from incorporating AI into their instruction and evaluation of their students.

Lecturers are academic instructors primarily responsible for delivering lectures, facilitating learning, and supporting students' academic progress at a higher education institution. They engage in activities such as preparing and delivering lectures, assessing student performance, and often contributing to curriculum development (Hassan et al., 2024). AI progression has brought about changes that streamline these activities, as they have increasingly been recognised as a valuable tool for supporting instructional design, content development, and classroom delivery (Chen et al., 2020). Notably, studies have established that the adoption of AI-based tools for teaching and learning in educational institutions largely relies on the awareness, perception and readiness for adoption. Ukeh et al. (2020) noted that AI technology progress raises critical considerations regarding awareness, readiness, adoption, fairness, privacy, and the role of human teachers. Amadi-Iwai et al. (2024) stressed that awareness entails knowing about specific information and using one's experience to understand a condition among others. Hence, awareness deals with the extent to which lecturers have information and knowledge of AI. On the other hand, utilisation entails using AI tools to improve teaching strategies, expedite research procedures, and eventually raise educational standards generally (Anderson & Dron, 2011).

As we explore the influence of AI on the educational landscape, it is clear that although AI offers the potential for substantial progress and enhancements, it also requires a careful look at the awareness and readiness for adoption of AI for teaching by lecturers to fully optimise its advantages while addressing potential obstacles. It is on this note that this study investigates the awareness and readiness for adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria.

Statement of the Problem

The 21st Century has witnessed a massive surge in technological development which has resulted in the use of AI for teaching by lecturers. Initially, lecturers were traditionally viewed as individuals whose role is to foster a conducive learning environment and facilitate students' comprehension and knowledge acquisition. Due to this, lecturers are expected to keep up with technological trends to provide efficient and effective knowledge acquisition for their students. AI-powered tools can enable lecturers to generate teaching materials more efficiently, personalise instructional content, and support complex content delivery with reduced effort.

Subaveerapandiyan et al. (2023) lamented that although AI is becoming more and more prominent in the educational landscape, it is still in its early stages of adoption in the educational sector. In order to integrate AI into educational institutions, a number of challenges must be addressed, including raising awareness, privacy, security, readiness for adoption, and ethical considerations. Additionally, Asim et al. (2023) listed several important factors influencing lecturers' adoption of AI for teaching, including highly integrated technological infrastructure, funding and costs related to AI, collaboration between AI experts and professionals, the need for a highly networked and integrated environment, the high cost of AI technologies, and a lack of knowledge and expertise among lecturers. This justifies why this study is structured to investigate the awareness and readiness for adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria.

Objectives of the Study

The main objective of this study is to investigate the awareness and readiness for adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria. The specific objectives are to:

1. identify the level of awareness of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria;
2. determine the extent of readiness for adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria;
3. identify the types of learning styles that AI can be adopted for by lecturers in selected Universities in Kwara State, Nigeria;
4. ascertain the relationship between awareness and adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria;
5. determine the relationship between readiness and adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria;
6. identify the joint relationship between awareness, readiness and adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria; and,

7. ascertain the challenges hindering the adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria.

Research Questions

This study intends to answer the following questions:

1. What is the level of awareness of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria?
2. What is the extent of readiness for adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria?
3. What are the types of learning styles that AI can be adopted for by lecturers in selected Universities in Kwara State, Nigeria?
4. What are the challenges hindering the adoption of AI for teaching by lecturers in selected Universities in Kwara State, Nigeria?

Research Hypotheses

The following hypotheses guided the conduct of this study and were tested at the 0.05 level of significance:

Ho_1: There is no significant relationship between lecturers' awareness and adoption of AI for teaching in selected Universities in Kwara State, Nigeria.

Ho_2: There is no significant relationship between lecturers' readiness and adoption of AI for teaching in selected Universities in Kwara State, Nigeria.

Ho_3: There is no significant relationship among lecturers' awareness, readiness and adoption of AI for teaching in selected Universities in Kwara State, Nigeria.

Review of Related Literature

Awareness of AI for Teaching by Lecturers

The introduction of AI has significantly transformed education. It has enhanced learning and teaching settings in a variety of academic disciplines. The conventional method of teaching, which required the teacher to be physically present, has to change as a result of the increase in the usage of AI. Intelligent tutoring systems SciSpace, Schoarlcy, Jenni AI, ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin, Consensus, Microsoft CoPilot, Gemini, Chatbots, Perplexity, Search Smart, Mendeley, and Evidence Hunt are just a few of the AI tools that Barua (2023) identified as useful for teaching and assessment. According to Karsenti (2019), MOOC platforms, including Coursera, for example, use AI to notify instructors when a significant number of students give incorrect answers to a topic.

However, a careful awareness of the instruments is necessary to properly maximise their potential for teaching. According to Fry and Lenhart (2018), awareness is the ability to comprehend and utilise technical tools and platform band systems. It also entails understanding how these technologies might affect and be used in daily life. In the digital age, awareness has grown to include understanding digital tools, cybersecurity threats, and technical innovations like blockchain and artificial intelligence. It is becoming more and more anticipated of individual organisations to comprehend how technology impacts their social, professional, and personal lives (Fry & Lenhart, 2018).

Lecturers are aware of AI platforms for teaching, according to surveys conducted worldwide. For example, Chen et al. (2020) discovered that teachers are aware of and use AI to create structured lesson plans, examples, and assessments. This frees them up to concentrate more on pedagogy than on regular material preparation. Furthermore, Madu and Musa (2024) investigated the degree of AI awareness in connection to the digital competency of instructors at Federal University, Wukari (FUW), Taraba State, Nigeria. According to the survey, professors had a moderate level of understanding regarding the application of AI.

In a similar vein, Karim and Mahphoth (2025) discovered that most instructors are aware of AI and believe it to be very helpful, simple to use, and successful in raising student engagement and teaching effectiveness. The majority of respondents had favourable opinions about the ongoing use of AI in their instructional strategies. The study gives suggestions for improving lecturers' AI competency and classroom integration, even though it provides empirical insights into the usage of AI in marketing education. Lecturers are consequently aware of AI and how it affects instruction. However, lecturers' preparedness and acceptance of these tools are critical to the successful deployment of AI.

Readiness for Adoption of AI for Teaching by Lecturers

Learning, teaching, and institutional and organisational administration are all impacted by the application of AI in education, which includes automating processes that can be utilised to provide personalised learning experiences (Ghnemat et al., 2022; Santos & Serpa, 2023). Adoption involves, among other things, the practical and efficient use of information, materials, goods, and services. According to Anderson and Dron (2011), adoption means utilising AI tools to enhance instructional tactics, speed up research processes, and ultimately improve educational standards overall. Ochai (2007) asserts that adoption serves as a gauge for the success and efficacy of a certain program. The effective and successful integration of these technological developments in educational settings is the focus of the adoption of AI-based teaching aids.

AI is being used by numerous colleges across the world to conduct evaluations and provide courses. For example, according to Fahimirad and Kotamjani (2018), Deakin University in Australia used IBM's Watson supercomputer, an emerging form of AI, to help students solve their challenges. Both the quality of education and the quantity of time spent teaching students were significantly enhanced by this technology. According to Karsenti (2019), the majority of Nigerian colleges use artificial intelligence (AI) techniques to detect instances of plagiarism in student work. Turnitin, which can identify several copied works and display the plagiarised portion, the source, and the proportion, was used as an example by the author. This demonstrates how professors' use of AI in the classroom promises to provide standardised, high-quality instruction.

Studies, however, have shown that AI use in education has remained low, especially in Nigerian universities. For example, Ukeh and Anih (2024) observed that instructors at the Federal University in Otuoke, Nigeria, used AI relatively infrequently for both teaching and research. Similarly, a study on business educators' awareness, proficiency, and use of AI for job performance and improvement was carried out by Amadi-Iwai et al. (2024). According to the report, business instructors are not aware of how to use AI to enhance their work performance. The results of the study show that business studies instructors are not enough skilled at using AI in the classroom.

Furthermore, Yakubu (2025) discovered that departments and faculties at Ahmadu Bello University Zaria, Kaduna state, Nigeria, have very little use of AI technologies for teaching. This remark highlights the need for additional research and the creation of tactics targeted at enhancing the integration of AI tools in the teaching process and provides insight into the existing state of technology integration in educational practices at the institution. This result is consistent with Guan and Jiang's (2020) findings that the use of AI tools in educational settings is still relatively limited.

Additionally, Agi et al. (2024) discovered that although lecturers in Nigerian universities have a moderate awareness of AI applications in teaching and assessment, their use of AI tools is still low. This was discovered while assessing the degree of awareness, utilisation, and limitations of AI tools for teaching and assessment. Reluctance to adapt as well as a lack of understanding and training about the integration of AI in instruction and evaluation are major contributing factors to this restricted use. Adoption of AI in schools is far from uniform. Teachers in high-poverty settings, who frequently lacked access, training, or clear supervision, were much less likely to adopt AI than those in wealthier schools (Fitzpatrick, 2025). Thus, to ascertain the level of adoption of AI tools for teaching purposes among Nigerian' university lecturers, a comprehensive study and strategy that includes education, training, enhancement of infrastructure, and institutional backing may be necessary.

AI Adoption for Teaching by Lecturers

The potential of AI to improve both conventional and contemporary teaching methods has drawn a lot of attention to its incorporation in education. Personalised learning, intelligent tutoring systems, gamification, automated assessment and feedback, virtual classrooms, predictive analytics, language learning, and project-based learning are just a few of the many uses of AI that academics have investigated (Jiang et al., 2025; Mpolomoka, 2025; Nakade et al., 2024; Nja et al., 2024). By utilising real-time feedback, adaptive content delivery, and predictive analytics, AI-driven personalised learning has been demonstrated to enhance academic success, retention, and engagement (Nakade et al., 2024). Students' motivation has also been shown to be strongly correlated with intelligent tutoring systems. Intelligent tutoring systems and motivation in chemistry learning were found to be significantly correlated ($r = .662$, $p < .05$) by Nja et al. (2024), indicating that AI can promote learner autonomy and persistence.

Gamification, when powered by AI, has emerged as a promising strategy for enhancing engagement and motivation. Jiang et al. (2025) examined AI-driven gamified scaffolding for English language learners, comparing traditional storytelling with task-based and self-regulated learning approaches. Their findings indicate that AI-enhanced gamified learning outperforms traditional methods, reinforcing the role of gamification in promoting active and exploratory learning. Furthermore, it is important to stress that AI has enhanced project-based learning by providing personalized feedback and adaptive learning paths. Tamana (2025) observed increased motivation and engagement in AI-supported problem-based learning, while du Plessis (2025) emphasized the role of AI in fostering critical and creative thinking. Teachers are encouraged to integrate AI tools to help students apply theoretical knowledge to real-world scenarios.

AI-based assessment systems streamline grading processes, reduce turnaround times, and provide personalized feedback, thereby improving instructional efficiency (Aldreabi et al., 2025; Azoulay et al., 2025; Mpolomoka, 2025). These systems enable educators to focus on higher-order teaching tasks while ensuring timely feedback for learners. Notably, the rise of virtual learning environments, such as Moodle, Blackboard, and Canvas, has been accelerated by AI integration. These platforms offer continuous access to learning materials, interactive forums, and adaptive feedback, facilitating learning beyond physical classrooms (Navaladiyan & Parthiban, 2023). AI-driven virtual classrooms thus support flexibility and inclusivity in education.

AI has also been instrumental in predicting academic performance. Nnaji et al. (2025) found that AI-generated formative assessments predicted 63.2% of students' achievement in chemistry, with gender moderating this predictive power. This underscores the potential of AI in early intervention and personalized support strategies. AI tools such as ChatGPT and QuillBot have gained popularity among students for language learning and translation. Phung et al. (2025) reported positive perceptions of AI in English language learning, although students expressed concerns about the reliability of

AI-generated outputs. This highlights the need for critical evaluation and responsible use of AI tools in language education.

Challenges Hindering the Adoption of AI for Teaching by Lecturers

The use of AI in education raises a number of serious issues, including as the eradication of critical thinking and creativity (Rudolph et al., 2023). The problems with accuracy, bias, relevance, and these tools' capacity for reasoning are crucial, nevertheless. Inadequate digital literacy, a lack of institutional support, ethical concerns, resistance, a lack of innovative thinking, fear of losing one's job, a lack of resources, staff growth, a lack of knowledge, the digital gap, and views towards AI are some more issues. Above all, educators' unwillingness to employ AI-related materials or technologies for teaching is the main factor impeding the adoption of AI for teaching in Nigerian universities.

The aforementioned idea is in line with the claims made by Wang and Liu (2023) and Hosseini et al. (2023), who suggested that the use of AI in education raised concerns about how these tools might affect the legitimacy and authenticity of academic work, leading to moral and social conundrums. The authors pointed out that learning materials produced by AI might not have the human touch and originality that students will value. In a similar vein, Ogundimu (2024) observed that the perceived complexity and high costs of applying AI solutions are the main causes of lecturers' hesitation. There are also concerns about how AI could affect the workforce, which could result in professors' resistance and worries about losing their jobs.

According to AIContentfy (2023), another significant problem with AI in education is the absence of original thought. AI systems are excellent at producing content using algorithms and patterns, but they have trouble thinking creatively or unconventionally. It is possible for lecturers to inadvertently plagiarise. Furthermore, Eiriemiokhale et al. (2024) proposed that AI lacks the human capacity to identify the underlying meaning and emotions expressed by learners, lacks sensitivity to diversity, impedes the development of diverse voices and perspectives, minimises learners' imaginations because it is run on programs, struggles to understand complex emotions, makes it difficult to infuse learning materials with genuine human sentiment or connect with learners on an empathic level, and repeats content.

Bamidele (2019) provided a number of insightful explanations for why AI acceptance and implementation in schools are so low in many developing nations. These include high-tech and socioeconomic issues such inadequate funding, staff development, awareness, and attitudes towards AI. Additionally, Nchunge et al. (2013) noted that it is difficult to fully embrace the instructional potential of developing technologies because the majority of lecturers in higher education have been acclimated to almost outdated methods. Furthermore, there is disagreement over the reliability and efficacy of AI assessments, particularly when it comes to detecting nuanced elements of writing like coherence and originality (Aluthman, 2016).

Luckin (2017) shed light on the potential benefits of these technologies in terms of AI-enabled continuous and adaptive learning. AI is undoubtedly ingrained in the education sector, and concerns about its application have been voiced. These concerns include ethics, awareness, adoption readiness, a lack of innovative thinking, job displacement, a lack of resources, the digital divide, equity, and the basic framework of evaluation processes. This raises the dilemma of how to effectively balance automated techniques with the thorough insights offered by human evaluators. Discussing the understanding, preparedness for adoption, and obstacles preventing lecturers in Nigeria from using AI for teaching becomes crucial due to the divisions caused by the opinions of educators.

Methodology

This study adopted a descriptive survey design of a correlational type. The population of this study comprises lecturers in tertiary institutions in Nigeria. A convenience sampling technique was used to pick participants based on their willingness to participate in the study. A self-developed questionnaire with an internal consistency of .921, which was designed with Google Form, was used for data collection. The questionnaire was administered online by sharing the link on various social media platforms such as WhatsApp, LinkedIn and Facebook. After making the link active for two weeks, only 416 responses were received. Descriptive and inferential statistics were used to present and analyse the data in frequency, percentage, tables, stacked bar chart, mean and standard deviation, PPMC and regression.

Table 1: Respondents' Demographic Information

Options		F	%
Gender	Male	225	54.1
	Female	191	45.9
	Total	**416**	**100**
Age range	21-30 years	67	16.1
	31-40 years	111	26.7
	41-50 years	103	24.8
	51-60 years	77	18.5
	61 years and above	58	13.9
	Total	**416**	**100**

Respondent's institution	University	209	50.2
	Polytechnic/Monotechnic	145	34.9
	Colleges of Education	62	14.9
	Total	**416**	**100**
Highest academic qualification	BSc/BA/BLIS/B.Ed./LL.B/MBBS	198	47.6
	MSc/MA/MLIS/M.Ed.	136	32.7
	PhD	82	19.7
	Total	**416**	**100**
Discipline	Pure/Applied Sciences	44	10.6
	Arts and Humanities	51	12.3
	Education	62	14.9
	Social Sciences	83	20.0
	ICT	71	17.1
	Engineering	37	8.9
	Health Sciences	36	8.7
	Law	32	7.7
	Total	**416**	**100**

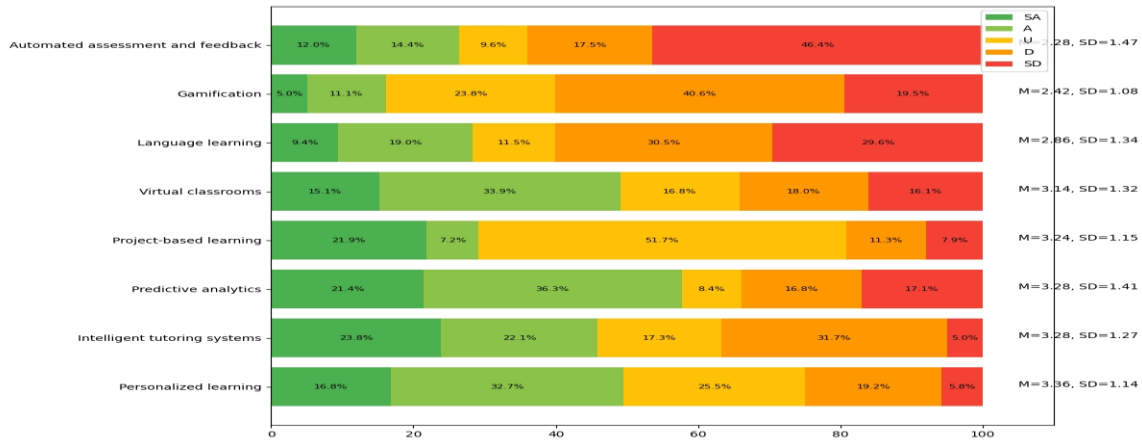
Source: Researchers' Field Survey, 2026

The demographic characteristics of the 416 respondents revealed a relatively balanced gender distribution, with males representing 54.1% and females 45.9%. Respondents spanned diverse age groups, with the highest proportions found among individuals aged 31 – 40 years (26.7%) and 41 – 50 years (24.8%), indicating that mid-career academics constituted the core of the sample. Participation across younger (21–30 years) and older (61+ years) groups further reflects a wide spectrum of professional experience.

In terms of institutional affiliation, respondents were drawn from universities (50.2%), polytechnics or monotechnics (34.9%), and colleges of education (14.9%). This distribution suggests broader representation from university-based staff, although contributors from other tertiary institution types were also well represented. Regarding academic qualifications, nearly half of the respondents held a bachelor's degree (47.6%), followed by those with master's degrees (32.7%), while 19.7% possessed a doctoral degree, demonstrating inclusion across various academic attainment levels.

Representation across academic disciplines was also diverse. The majority of respondents were affiliated with social sciences (20.0%), ICT (17.1%), and education (14.9%), while others came from arts and humanities, pure/applied sciences, engineering, health sciences, and law. Collectively, this demographic spread indicates that the sample captures a broad range of academic backgrounds, institutional contexts, and career stages, thereby supporting the robustness and generalizability of the study's findings.

Fig 1: Lecturers' Awareness of Teaching Styles AI can be Adopted for

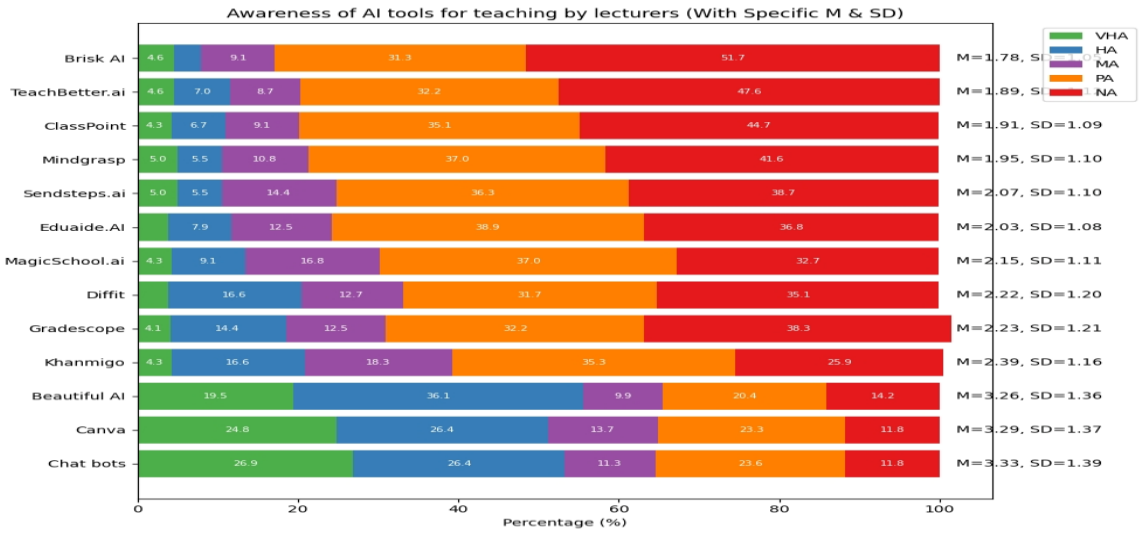


The findings in Fig 1 show that personalized learning (M = 3.36, SD = 1.14), intelligent tutoring systems (M = 3.28, SD = 1.27), and predictive analytics (M = 3.28, SD = 1.41) are the highest-ranked options, indicating that lecturers view AI most favorably when it enhances adaptivity, individualized instruction, and data-driven insight. Personalized learning, with the highest mean score and a relatively low SD, reflects strong consensus about AI's value in tailoring instruction to students' needs. Meanwhile, intelligent tutoring systems and predictive analytics share high mean scores but show greater variability, suggesting that although many lecturers acknowledge their instructional advantages, others remain cautious due to concerns over technological complexity, ethical issues, and institutional readiness.

In contrast, gamification (M = 2.40, SD = 1.08) and automated assessment and feedback (M = 2.28, SD = 1.47) received the lowest rankings, signaling widespread reservations among lecturers. Gamification's low mean and low SD indicate a consistent perception that AI-driven game-based approaches may not align with higher-education academic expectations or may lack perceived pedagogical rigor. Automated assessment and feedback, the lowest-ranked option, not only has the smallest mean, but also the largest SD, showing substantial disagreement among lecturers. This dispersion suggests unresolved concerns about the fairness, reliability, and transparency of AI-based scoring systems, especially for complex or subjective assessments.

Overall, the pattern of responses demonstrates that lecturers tend to prefer AI applications that support instructional decision-making (such as personalising learning or providing predictive insights) rather than those that may be seen as replacing core pedagogical responsibilities like grading or designing authentic engagement strategies. High-ranked options are those perceived as augmenting the lecturer's role, whereas the lowest-ranked options reveal discomfort with ceding evaluative or motivational functions to automated systems. These findings underscore the need for careful implementation, robust policy frameworks, and professional development to strengthen trust and ensure that AI tools meaningfully complement academic teaching practices.

Fig 2: Level of awareness of AI for teaching by lecturers



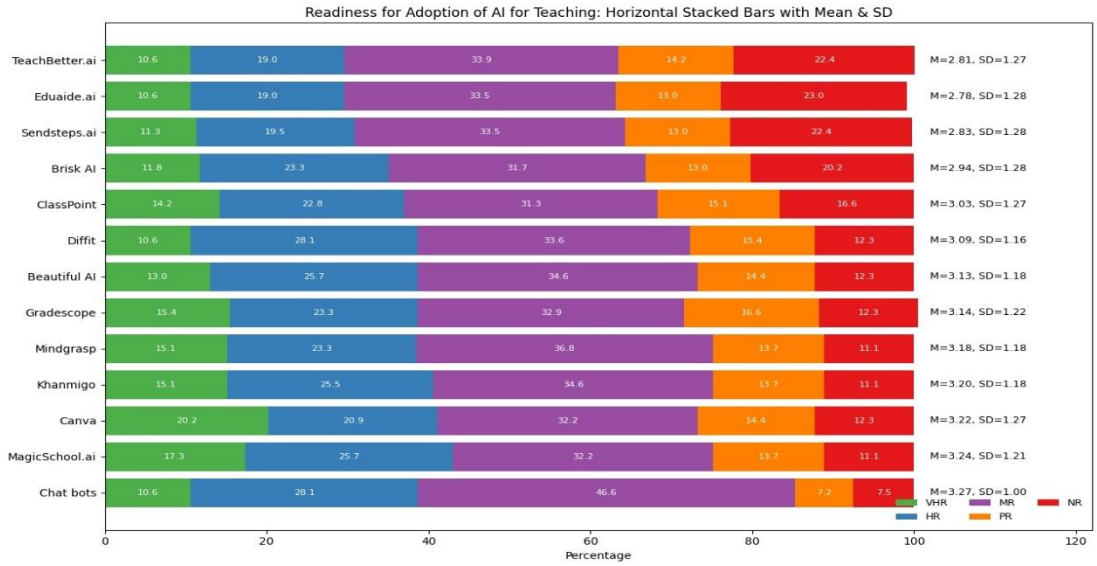
The findings in Fig 2 revealed that Chatbots, Canva, and Beautiful AI were ranked the highest, revealing a clear pattern of strong recognition and integration among lecturers. Chatbots hold the highest mean awareness score (M = 3.33), indicating widespread familiarity with AI-powered conversational systems such as ChatGPT, Gemini, and Copilot. This prominence is unsurprising, as such tools have become central in global discourse around AI in education, frequently highlighted in media, training workshops, and institutional discussions. Canva (M = 3.29) follows closely, reflecting its extensive utility in instructional design and content creation. Its intuitive interface and integration of AI-enhanced features likely contribute to its strong adoption. Beautiful AI (M = 3.26) also enjoys considerable awareness, particularly for its role in generating visually appealing and structured presentations, suggesting that lecturers increasingly value AI tools that streamline pedagogical preparation.

In contrast, Mindgrasp, ClassPoint, TeachBetter.ai, and Brisk AI demonstrate significantly lower awareness levels, with mean scores ranging from 1.95 down to 1.78. Mindgrasp, though designed to support comprehension and summarisation tasks, appears to have limited visibility within academic settings, potentially due to its specialised focus and less pervasive marketing. ClassPoint, which enhances interactivity in presentation software, shows similarly low awareness, implying that lecturers may still rely heavily on traditional slide presentations without supplementary AI-driven engagement features. This may also reflect a lack of institutional promotion or limited compatibility with existing teaching workflows.

TeachBetter.ai and Brisk AI occupy the lowest positions, with mean scores of 1.89 and 1.78 respectively. These tools, which offer functions such as automated lesson planning and real-time feedback, are relatively new and may not yet have reached a broad user base in higher education. Their low awareness suggests a need for targeted professional development initiatives to expose lecturers to emerging AI possibilities. The high proportion of respondents indicating "Not Aware" further points to gaps in dissemination, availability, or perceived relevance to lecturers' immediate instructional needs.

Overall, the contrast between the highest- and lowest-ranked tools underscores disparities in exposure, accessibility, and perceived usefulness. Highly ranked tools share characteristics of visibility, multifunctionality, and cross-disciplinary applicability, while lower-ranked tools tend to be niche, newer, or less integrated into mainstream educational ecosystems. This pattern highlights the importance of institutional support and awareness-raising efforts to ensure that lecturers are informed about the full breadth of AI tools that can enhance teaching and learning.

Fig 3: Readiness for adoption of AI for teaching by lecturers



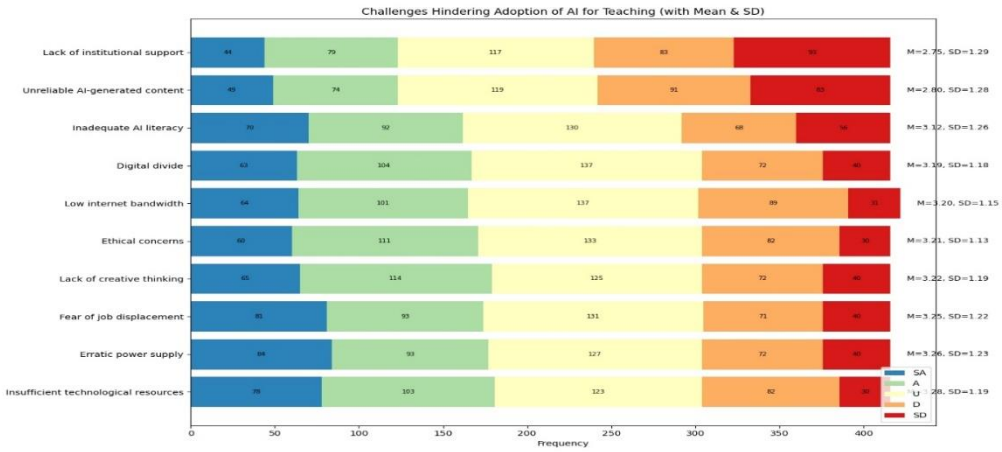
The findings in Fig 3 indicate that Chatbots (M = 3.27, SD = 1.00), MagicSchool.ai (M = 3.25, SD = 1.21), Canva (M = 3.22, SD = 1.27), and Khanmigo (M = 3.20, SD = 1.19) benefit from widespread familiarity and direct pedagogical relevance. Chatbots top the list and appear to be the most accessible and widely understood AI resources, likely due to their extensive public visibility and versatility across instructional tasks. MagicSchool.ai follows closely, reflecting its reputation as a teacher-focused tool with structured supports for lesson planning, assessment, and differentiation. Canva's strong ranking highlights the increasing importance of digital content creation in modern pedagogy, as lecturers rely on it for visually rich learning materials. Khanmigo's performance suggests that AI tutoring and guided instructional support align well with lecturers' perception of what constitutes meaningful classroom assistance.

In contrast, Brisk AI (M = 2.94, SD = 1.28), Sendsteps.ai (M = 2.84, SD = 1.29), and TeachBetter.ai (M = 2.81, SD = 1.27) demonstrate considerably lower readiness, largely attributable to limited awareness or narrower perceived utility. Brisk AI's lower ranking suggests that although it offers instructional automation features, lecturers may not yet identify clear or compelling use cases within their daily teaching practices. Sendsteps.ai, despite its potential for enhancing classroom interactivity, records among the highest levels of non-readiness, implying that lecturers either lack exposure to it or regard it as peripheral to core instructional tasks. TeachBetter.ai's similarly low mean score reinforces this pattern of unfamiliarity and uncertain pedagogical relevance.

The contrast between the highest- and lowest-ranked tools underscores a broader pattern: tools that are well-publicized, easy to use, and tightly aligned with lecturers' instructional needs tend to receive higher readiness ratings, while those perceived as specialized or less essential struggle to gain traction. The standard deviations across both groups indicate moderate variability in perception, with SD values generally around 1.20, suggesting that attitudes remain diverse and may reflect differences in discipline, digital literacy, and institutional support.

Overall, these findings emphasize the importance of visibility, perceived utility, and practical alignment in shaping lecturers' readiness to adopt AI for teaching. For the lower-ranked tools, improved dissemination, hands-on demonstrations, and contextualized training could enhance adoption levels. Meanwhile, the stronger performance of higher-ranked tools illustrates an encouraging trend: lecturers are most prepared to adopt AI solutions that offer clear added value, reduce workload, and integrate seamlessly into existing educational workflows.

Fig 4: Challenges hindering the adoption of AI for teaching by lecturers



The findings in Fig 4 demonstrate that the main challenges hindering the adoption of AI for teaching are: Insufficient technological resources (M = 3.28), erratic power supply (M = 3.26), fear of job displacement (M = 3.25), lack of creative thinking (M = 3.22), and ethical concerns (M = 3.21). Collectively, these reflect a constellation of structural, psychological, and pedagogical barriers that shape lecturers' readiness to integrate AI tools into instructional practices. Their relatively high means indicate that these issues are widely experienced or perceived, with consistent patterns of agreement among respondents.

Foremost among these is insufficient technological resources, which received the highest mean score. This underscores the centrality of infrastructure as a prerequisite for effective AI-enhanced teaching. Without robust hardware, software, and digital platforms, lecturers are limited in their ability to experiment with or implement AI-supported pedagogies. Closely linked is the challenge of erratic power supply, which directly undermines the reliability and accessibility of digital tools. High frequencies of agreement and moderate standard deviations for both indicators suggest that these infrastructural deficits are pervasive, cutting across institutions regardless of size or academic orientation.

The third-ranked challenge, fear of job displacement, speaks to deeper concerns about the future of academic labour. Despite the ongoing narrative that AI serves as an assistive rather than replacement technology, the responses indicate that many lecturers remain apprehensive about how automation may alter teaching roles, professional relevance, or job security. This uncertainty is reflected in the substantial proportion of undecided responses, implying that lecturers may lack sufficient information or exposure to understand AI's practical implications for pedagogy and workforce stability.

Finally, lack of creative thinking and ethical concerns round out the top five. The former suggests that lecturers may perceive AI as potentially limiting originality or encouraging over-reliance on automated processes, thereby suppressing critical and creative capacities essential in higher education. Meanwhile, ethical concerns, including issues of bias, data privacy, and fairness, reflect a growing awareness of the moral implications associated with AI systems. Although these challenges have slightly lower means than the first three, their relatively high ranking indicates that lecturers' reservations extend beyond infrastructure to encompass intellectual and social implications of using AI in teaching.

Hypotheses Testing

Ho_1: There is no significant relationship between lecturers' awareness of teaching styles AI can be adopted for and awareness of AI that can be adopted for teaching.

Table 2: PPMC results showing the relationship between lecturers' awareness of teaching styles AI can be adopted for and awareness of AI that can be adopted for teaching

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Awareness of teaching styles AI can be adopted for	23.5	4.9	416	.384**	.000	Significant
2.	Awareness of AI that can be adopted for teaching	30.7	10.6	416			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_1 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

The results in Table 2 show a positive and statistically significant relationship between lecturers' awareness of teaching styles that AI can be adopted for and their awareness of AI tools that can be used for teaching. The correlation coefficient (r = .384**) indicates a moderate positive relationship, meaning that as lecturers become more aware of AI-supported teaching styles, their awareness of AI tools for teaching also tends to increase. The significance value (p = .000), which is below the 0.05 threshold, confirms that this relationship is not due to chance and is statistically meaningful.

The mean scores (23.5 and 30.7) further suggest that lecturers generally show a considerable level of awareness in both areas, although awareness of AI tools appears slightly higher. The standard deviations (4.9 and 10.6) indicate that awareness of teaching styles is more consistent among lecturers, whereas awareness of AI tools varies more widely. Overall, the findings imply that enhancing lecturers' understanding of AI-supported teaching methods may also improve their awareness of AI tools, thereby supporting more effective integration of AI in teaching.

Ho_1: There is no significant relationship between lecturers' awareness of teaching styles AI can be adopted for and readiness to adopt AI for teaching.

Table 3: PPMC results showing the relationship between lecturers' awareness of teaching styles AI can be adopted for and readiness to adopt AI for teaching

S/N	Variables	Mean	SD	Df	Correlations ®	Sig. P	Remark
1.	Awareness of teaching styles AI can be adopted for	23.5	4.9	416	-.295**	.000	Significant
2.	Readiness to adopt AI for teaching	39.9	14.2	416			

**. Correlation is significant at the 0.05 level (2-tailed).

Decision Rule: Reject Ho_1 if the p-value is ($p<0.05$). If otherwise, do not reject (i.e., if the p-value is greater than (or equal to 0.05).

The data in Table 3 shows a statistically significant negative relationship between lecturers' awareness of AI-adoptable teaching styles and their readiness to adopt AI for teaching. The mean score for awareness (M = 23.5, SD = 4.9) suggests a moderate level of awareness among lecturers, while the readiness mean score (M = 39.9, SD = 14.2) indicates a relatively high but more widely varied level of readiness. The correlation coefficient ($r = –0.295$, $p = .000$) reveals a weak but meaningful inverse relationship, meaning that as awareness of AI-related teaching styles increases, readiness to adopt AI slightly decreases.

This significant negative correlation implies that greater awareness does not necessarily translate into higher readiness; in fact, it may highlight concerns or perceived challenges associated with AI adoption. Lecturers who are more informed about AI-based teaching strategies might also be more aware of the complexities, risks, or resource requirements, which could reduce their readiness to adopt such tools. Since the p-value is below 0.05, the result is statistically significant, leading to the rejection of the null hypothesis and confirming that awareness and readiness are indeed related, though in an inverse direction.

Ho_3: There are no significant relationships among lecturers' awareness of AI, readiness to adopt AI and teaching styles AI can be adopted for.

Table 4: Model Summary results showing the significant relationships among lecturers' awareness of AI, readiness to adopt AI and teaching styles AI can be adopted for

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.465[a]	.216	.212	4.34421

a. Predictors: (Constant), Readiness to adopt AI for teaching, Awareness of AI for teaching

The model summary indicates that lecturers' awareness of AI and their readiness to adopt AI for teaching have a moderate combined relationship with the teaching styles for which AI can be adopted. The correlation coefficient (R = .465) suggests a moderate positive relationship, meaning that as lecturers become more aware of AI and more ready to adopt it, the range or suitability of AI-supported teaching styles tends to increase. The R Square value of .216 indicates that approximately 21.6% of the variance in AI-adoptable teaching styles can be explained by lecturers' awareness and readiness—showing that while the predictors are meaningful, a significant portion of the variance is influenced by other factors not included in this model.

The adjusted R Square value (.212) confirms that the model remains stable even after accounting for the number of predictors, suggesting that the variables included have genuine explanatory power. The standard error of the estimate (4.34421) reflects the average deviation of observed values from the regression line, and while not excessively large, it indicates variability that the model does not fully capture. Overall, the results imply that awareness and readiness are important but not exclusive determinants of AI adoption across teaching styles, highlighting the need for additional factors—such as institutional support, technological infrastructure, or pedagogical orientation—to fully understand adoption patterns.

Table 5: ANOVA results showing the significant relationships among lecturers' awareness of AI, readiness to adopt AI and teaching styles AI can be adopted for

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2147.451	2	1073.725	56.895	.000[b]
	Residual	7794.203	413	18.872		
	Total	9941.654	415			

a. Dependent Variable: Lecturers' awareness of teaching styles AI can be adopted for

b. Predictors: (Constant), Readiness to adopt AI for teaching, Awareness of AI for teaching

The ANOVA results in Table 5 show that the overall regression model examining the relationship among lecturers' awareness of AI, readiness to adopt AI, and the teaching styles AI can be adopted for is statistically significant. The regression sum of squares (2147.451) compared with the residual sum of squares (7794.203) indicates that the model explains a meaningful portion of the variation in the dependent variable. The F-value of 56.895 is notably high, and the associated significance value (p = .000) shows that the model is statistically significant at the 0.05 level. This means that lecturers' awareness of AI and their readiness to adopt AI jointly make a significant contribution to predicting their awareness of teaching styles suitable for AI integration.

Furthermore, the mean square values reinforce the strength of the model, with the regression mean square (1073.725) being much larger than the residual mean square (18.872). This large ratio reflects the strong explanatory power of the predictors. Overall, the ANOVA results indicate that awareness and readiness are important determinants in shaping lecturers' understanding of where AI can be effectively applied in teaching, confirming that the relationship among these variables is not due to chance.

Table 6: Coefficients[a] results showing the significant relationships among lecturers' awareness of AI, readiness to adopt AI and teaching styles AI can be adopted for

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	22.020	.922		23.892	.000
	Awareness of AI that can be adopted for teaching	.166	.020	.360	8.237	.000
	Readiness to adopt AI for teaching	-.090	.015	-.263	-6.011	.000

a. Dependent Variable: Lecturers' awareness of teaching styles AI can be adopted for

The results in Table 6 indicate that lecturers' awareness of AI tools that can be adopted for teaching has a significant positive influence on their awareness of teaching styles for which AI can be adopted. The unstandardized coefficient (B = 0.166) shows that for every unit increase in lecturers' awareness of AI, there is a corresponding increase in their awareness of AI-supported teaching styles. The standardized beta value (β = .360) indicates a moderately strong effect, while the high t-value (t = 8.237) and the p-value (Sig. = .000) confirm this relationship is statistically significant at the 0.001 level. This suggests that the more lecturers understand AI applications, the more aware they are of the teaching styles that AI can enhance or support.

Conversely, lecturers' readiness to adopt AI has a significant negative relationship with their awareness of teaching styles AI can be adopted for. The negative unstandardized coefficient (B = –0.090) and standardized beta (β = –.263) imply that as readiness to adopt AI increases, awareness of AI-compatible teaching styles unexpectedly decreases. The relationship is statistically significant (t = –6.011, p = .000), suggesting an inverse pattern. This may indicate that lecturers who feel more ready to adopt AI may perceive fewer constraints on their teaching styles or may prioritize adoption over understanding specific pedagogical applications. Overall, the model emphasizes that awareness of AI tools enhances knowledge of AI-compatible teaching styles, while readiness to adopt AI shows an inverse influence that may warrant further investigation.

Discussion of Findings

Lecturers' awareness of teaching styles AI can be adopted for

The findings showing that lecturers expressed greater awareness of AI applications for personalized learning, intelligent tutoring systems, and predictive analytics align with global trends indicating that educators tend to recognize AI most readily when it enhances instructional efficiency and supports data-driven pedagogy. Literature corroborates this pattern: Nakade et al. (2024) emphasise that AI-driven personalized learning significantly improves academic performance through adaptive content delivery, while Nja et al. (2024) demonstrate a strong positive association between intelligent tutoring systems and student motivation. Similarly, Nnaji et al. (2025) highlight the value of predictive analytics in forecasting academic outcomes, underscoring lecturers' intuition that such tools offer tangible pedagogical benefits. These high-ranked applications reflect what Chen et al. (2020) describe as AI's capacity to support structured instructional planning, and align with broader scholarly observations that lecturers are increasingly aware of AI tools that directly augment teaching effectiveness (Karim & Mahphoth, 2025; Chen et al., 2024).

Conversely, the low rankings assigned to gamification and automated assessment and feedback suggest a persistent reservation among lecturers toward AI functions perceived as either peripheral to higher-order teaching or potentially unreliable. Although studies such as Jiang et al. (2025) provide evidence that AI-supported gamified learning can enhance engagement, lecturers in this context appear less convinced of its pedagogical suitability—perhaps due to

concerns about academic rigor or contextual relevance within higher education. Even more striking is the low awareness and acceptance of automated assessment systems, despite literature acknowledging their potential to streamline grading and provide timely feedback (Aldreabi et al., 2025; Mpolomoka, 2025). This hesitation is consistent with documented concerns about AI's limitations in fairness, objectivity, and ethical reliability, particularly in grading complex student work (Rudolph et al., 2023; Aluthman, 2016). Collectively, these contrasts indicate that while lecturers readily embrace AI applications that enhance instructional decision-making, they remain cautious about tools that appear to replace core human-centered aspects of evaluation and learner engagement, reinforcing the need for strengthened trust, training, and institutional support.

Level of awareness of AI for teaching by lecturers

The findings indicating high lecturer awareness of Chatbots, Canva, and Beautiful AI, compared with the markedly lower awareness of Mindgrasp, ClassPoint, TeachBetter.ai, and Brisk AI, align with broader patterns in the literature that emphasise the uneven diffusion of AI tools within higher education. Highly recognised tools, particularly Chatbots such as ChatGPT have received sustained global visibility, media attention, and institutional engagement, factors that Chen et al. (2024) and Mogavi et al. (2024) argue have accelerated their adoption and familiarity in academic contexts. Similarly, Canva and Beautiful AI function as multifunctional, user-friendly platforms that support content creation, an activity central to lecturers' daily workflow, which explains their high recognisability and aligns with Chen et al.'s (2020) assertion that lecturers are more aware of AI tools that directly streamline instructional design and material preparation. In contrast, the relatively low awareness of tools such as Mindgrasp and ClassPoint reflects the literature's observation that lesser-known or niche AI solutions often receive limited dissemination and institutional promotion. This is consistent with observations by Agi et al. (2024) and Ukeh and Anih (2024), who found that lecturers in Nigerian universities often have moderate awareness but limited exposure to emerging AI platforms, due in part to infrastructural constraints, lack of training, and uneven access to professional development opportunities.

The contrast in awareness levels also underscores the role of perceived pedagogical relevance and technological visibility, themes widely discussed in the literature. Tools such as TeachBetter.ai and Brisk AI, though potentially transformative, are relatively new and specialised, which mirrors Subaveerapandiyan et al.'s (2023) argument that AI integration in education remains in early stages and is slowed by gaps in knowledge, awareness, and institutional readiness. The findings, therefore, resonate with Karim and Mahphoth (2025), who reported that although lecturers generally view AI positively, their awareness and use tend to gravitate toward tools that are easy to use, widely publicised, and clearly beneficial to instructional practice. Contextually, the disparity in awareness among the lecturers highlights a broader structural issue noted by Bamidele (2019) and Nchunge et al. (2013): in many developing contexts, AI adoption is shaped by infrastructural limitations, uneven digital literacy, and limited institutional support, resulting in selective uptake of only the most prominent tools. Thus, the findings not only reflect current global adoption trends but also illuminate systemic barriers that shape lecturers' exposure to emerging AI technologies in the Nigerian higher-education landscape.

Readiness for the adoption of AI for teaching by lecturers

The study's finding that lecturers exhibit moderate readiness toward Chatbots, MagicSchool.ai, Canva, and Khanmigo aligns with literature indicating that tools with higher visibility, multifunctionality, and clear pedagogical relevance tend to receive stronger acceptance in higher education. For instance, Chen et al. (2020) observed that teachers are increasingly familiar with AI tools that support structured lesson planning and instructional design, while Karim and Mahphoth (2025) similarly reported strong lecturer acceptance of AI applications perceived as easy to use and directly beneficial to teaching effectiveness. This resonates with the relatively high readiness for Chatbots and Canva, which are widely disseminated and integrated into teaching discourse. Additionally, the finding mirrors Madu and Musa's (2024) conclusion that lecturers often possess moderate awareness and digital competence regarding AI, enough to support engagement with commonly known AI tools. The stronger readiness for these tools also reflects broader global trends where AI applications that enhance personal productivity, streamline preparation, and provide adaptive instructional support, such as Khanmigo and MagicSchool.ai, are viewed as augmentative rather than disruptive to lecturers' professional autonomy (Chen, Hu & Wang, 2024; Mogavi et al., 2024).

In contrast, the significantly lower readiness toward Brisk AI, Sendsteps.ai, and TeachBetter.ai corresponds with literature highlighting persistent gaps in exposure, training, and infrastructural support for less mainstream AI tools within Nigerian tertiary institutions. Agi et al. (2024) and Ukeh and Anih (2024) reported that even when lecturers demonstrate moderate awareness of AI, actual utilisation of advanced or specialised applications remains low due to limited institutional promotion and inadequate technological infrastructure. This aligns with Yakubu's (2025) observation that AI use in many Nigerian universities is still minimal, often constrained by unfamiliarity and insufficient digital literacy. Moreover, the low readiness for such tools may also reflect the concerns documented by Ogundimu (2024) and Rudolph et al. (2023), who note that perceived complexity, ethical worries, and fears of job displacement reduce willingness to adopt emerging AI systems. Thus, the pattern of higher readiness for widely publicised, user-friendly AI tools and lower readiness for niche or newer applications underscores the continued influence of awareness, perceived utility, infrastructural constraints, and psychological reservations on lecturers' adoption of AI for teaching.

Challenges hindering the adoption of AI for teaching by lecturers

The findings indicate that insufficient technological resources and erratic power supply constitute the foremost barriers to AI adoption, aligning with documented infrastructural deficits within Nigerian and other developing-country educational environments. Similar studies have emphasized that inadequate funding, poor ICT infrastructure, and unstable electricity significantly hamper technology integration, thereby restricting lecturers' capacity to fully engage with AI-enhanced pedagogies (Bamidele, 2019; Nchunge et al., 2013). The prominence of infrastructural challenges in the present study thus reinforces the argument that AI adoption is heavily contingent upon reliable digital ecosystems and supportive institutional conditions. Additionally, the apprehension surrounding job displacement mirrors previous reports that lecturers fear AI may undermine the authenticity of academic labour or reconfigure professional roles, thus generating resistance to adoption (Ogundimu, 2024; Wang & Liu, 2023). These collective concerns reflect broader global debates on the implications of automation for academic identity, pedagogical agency, and employment security.

Furthermore, the findings that lack of creative thinking and ethical concerns impede adoption resonate with existing literature highlighting the pedagogical and moral complexities associated with AI use in higher education. Scholars have observed that AI tools, though capable of enhancing efficiency, may inadvertently diminish originality, critical thinking, and learners' imaginative capacities if over-relied upon (Rudolph et al., 2023; AIContentfy, 2023). Ethical concerns raised by respondents such as issues of bias, data privacy, and the integrity of AI-generated content are consistent with arguments that AI lacks the credible emotional and contextual understanding that human educators bring to teaching (Eiriemiokhale et al., 2024; Hosseini et al., 2023). These findings therefore suggest that beyond infrastructural deficits, lecturers' hesitation is also shaped by deeper epistemic and ethical considerations, underscoring the need for comprehensive institutional frameworks, training, and policies to ensure responsible, context-appropriate, and pedagogically sound integration of AI in teaching.

Relationship between lecturers' awareness of teaching styles AI can be adopted for and awareness of AI that can be adopted for teaching

The finding of a positive and statistically significant relationship between lecturers' awareness of AI-supported teaching styles and their awareness of AI tools aligns with existing literature that emphasizes the interdependence of knowledge about pedagogical applications and familiarity with digital innovations. Several scholars note that awareness is foundational to meaningful engagement with AI in educational contexts. For instance, Fry and Lenhart (2018) describe awareness as an understanding of technological tools and their potential influence on professional activities, suggesting that increased familiarity with AI-enabled teaching approaches naturally enhances recognition of relevant AI tools. Similarly, Chen et al. (2020) found that lecturers who are knowledgeable about how AI supports structured lesson planning, assessment, and content generation are also more likely to be informed about the corresponding tools that perform these functions. Thus, the moderate positive correlation identified in this study supports the notion that conceptual awareness of AI-supported pedagogies and practical awareness of AI tools develop concurrently as part of lecturers' broader digital competence.

However, the study's results also highlight details that contrast with broader literature, particularly regarding variability in lecturers' exposure to and understanding of AI tools. While global studies indicate increasing awareness of AI in higher education, Nigerian-based evidence shows uneven levels of familiarity. For example, Madu and Musa (2024) reported only moderate awareness of AI among lecturers, and Agi et al. (2024) similarly noted that although lecturers demonstrate some awareness of AI applications, utilisation remains low. These patterns suggest that while awareness of teaching styles may promote awareness of AI tools, as evidenced in the present study, the breadth and depth of this awareness are not uniform. Additionally, disparities in exposure due to infrastructural limitations, training gaps, or institutional support constraints (Ukeh & Anih, 2024; Yakubu, 2025) may explain the wider variation observed in awareness of tools compared to teaching styles. Consequently, the positive relationship identified in the findings should be interpreted within the broader context of structural and contextual factors that shape how lecturers come to understand and engage with AI in their teaching practice.

Relationship between lecturers' awareness of teaching styles AI can be adopted for and readiness to adopt AI for teaching

The finding of a statistically significant negative correlation between lecturers' awareness of AI-adoptable teaching styles and their readiness to adopt AI for teaching contrasts with much of the existing literature, which generally positions awareness as a precursor to adoption. Studies such as Madu and Musa (2024) and Karim and Mahphoth (2025) report that lecturers with moderate to high awareness of AI tools tend to hold favourable views toward adopting them for instructional purposes, suggesting a positive linkage between knowing about AI and willingness to use it. However, the present study's inverse relationship aligns with literature indicating that increased awareness may heighten lecturers' understanding of AI's limitations, risks, and contextual challenges. For example, scholars such as Wang and Liu (2023) and Hosseini et al. (2023) highlight concerns over accuracy, ethical dilemmas, and potential impacts on academic integrity, while Barua (2023) and AIContentfy (2023) underscore limitations in originality, bias, and reliability. Thus, greater familiarity with AI's pedagogical applications may expose lecturers to the complexities and ethical concerns surrounding its use, thereby tempering readiness despite moderate awareness levels.

The relatively high but varied readiness score observed in the study reflects a similar pattern reported in earlier work showing inconsistency in lecturers' willingness to integrate AI due to contextual and infrastructural constraints. Ukeh and Anih (2024), Agi et al. (2024), and Yakubu (2025) reveals low usage of AI tools by Nigerian lecturers despite growing awareness, largely due to limited institutional support, inadequate training, infrastructural deficits, and fears of job displacement, factors also echoed in the present study's discussion of challenges. Moreover, Fitzpatrick (2025) and Chen et al. (2024) emphasize that while AI holds transformative potential for personalised learning and instructional support, its successful adoption requires adequate resourcing, strong policy frameworks, and sustained professional development. Taken together, this contextualizes the negative association found: heightened awareness may coexist with a clearer recognition of practical, ethical, and pedagogical barriers, resulting in decreased readiness to adopt AI in settings where enabling conditions are weak or unevenly distributed.

Relationships among lecturers' awareness of AI, readiness to adopt AI and teaching styles AI can be adopted for

The positive and statistically significant influence of lecturers' awareness of AI tools on their awareness of AI-supported teaching styles aligns with existing scholarship that emphasizes the pivotal role of awareness in fostering meaningful technology integration. As Fry and Lenhart (2018) note, awareness involves not only familiarity with digital tools but also an understanding of their pedagogical implications, which supports the finding that greater awareness enhances lecturers' recognition of diverse AI-enabled instructional approaches. Similarly, Chen et al. (2020) observed that teachers who are knowledgeable about AI applications tend to use them for lesson planning, assessment, and instructional design, reflecting a pattern in which awareness expands educators' capacity to identify relevant teaching strategies. This is also consistent with Madu and Musa's (2024) conclusion that higher levels of AI awareness correlate with greater digital competence among lecturers. Thus, the observed positive coefficient in the regression model reinforces established literature showing that awareness serves as a precursor to informed and detailed pedagogical application of AI.

In contrast, the significant negative relationship between lecturers' readiness to adopt AI and their awareness of AI-compatible teaching styles diverges from the assumption that readiness and awareness always operate synergistically. While readiness might imply willingness or intention to adopt AI tools, studies such as Agi et al. (2024) and Ukeh and Anih (2024) document persistent gaps between readiness and effective utilisation, particularly in contexts where lecturers face practical uncertainties or institutional constraints. The inverse relationship revealed in the analysis may suggest that lecturers who perceive themselves as "ready" may not necessarily engage deeply with the pedagogical dimensions of AI, focusing instead on adoption as a procedural or compliance-driven act rather than a pedagogically informed one. Furthermore, Yakubu (2025) noted that lecturers with limited utilisation of AI may nonetheless express high readiness, a pattern attributable to superficial familiarity unaccompanied by pedagogical insight. These findings collectively contextualise the negative coefficient, indicating that readiness may, in practice, reflect an abstract willingness rather than pedagogical preparedness.

Overall, the contrasting directions of the two predictors highlight the complex interplay between awareness and readiness within AI-supported teaching. Whereas awareness appears grounded in concrete knowledge that enhances lecturers' understanding of AI-aligned teaching styles, readiness is shaped by broader psychological, infrastructural, and contextual factors that may not correlate with pedagogical depth. Challenges identified in the literature such as inadequate digital literacy, fear of job displacement, ethical concerns, and institutional constraints (Rudolph et al., 2023; Ogundimu, 2024; Eiriemiokhale et al., 2024) may further explain why increased readiness does not translate into expanded awareness. Consequently, the findings underscore the need for professional development strategies that integrate awareness-building with practical skill development, ensuring that readiness is grounded not only in willingness but also in pedagogical competence and contextual understanding.

Conclusion

This study investigated lecturers' awareness and readiness for the adoption of AI for teaching in Nigeria, and the findings reveal a complex but insightful landscape. Overall, lecturers demonstrated moderate to high awareness of AI tools, particularly widely known applications such as Chatbots, Canva, and Beautiful AI, yet showed much lower awareness of emerging or specialised tools like Mindgrasp, ClassPoint, TeachBetter.ai, and Brisk AI. Similarly, lecturers expressed higher awareness of AI-supported teaching styles such as personalised learning, intelligent tutoring systems, and predictive analytics, while exhibiting reservations toward gamification and automated assessment. These patterns highlight that lecturers readily recognise AI innovations that enhance instructional decision-making and efficiency but remain cautious about tools perceived to challenge core pedagogical autonomy or evaluative responsibilities.

Findings on readiness show that while lecturers indicate moderate readiness to adopt popular AI tools, their readiness does not consistently translate into deeper pedagogical understanding or broad adoption intentions. This was reinforced by the statistical results: although awareness of AI tools positively predicted awareness of teaching styles AI can be adopted for, readiness showed a significant negative relationship with awareness of AI-supported teaching styles. This indicates that lecturers who felt more "ready" to adopt AI were not necessarily more informed about its pedagogical applications, possibly due to concerns about ethical issues, technological limitations, job displacement, and institutional constraints. The regression and ANOVA results further confirmed that awareness and readiness jointly accounted for a

meaningful, though not exclusive, portion of the variance in lecturers' understanding of AI-compatible teaching styles, signifying that other contextual factors including infrastructure, training, and policy support play critical roles.

The study also identified significant challenges that impede AI adoption, especially inadequate technological resources, erratic power supply, ethical concerns, insufficient training, fear of job loss, and limited creative thinking. These barriers underscore structural, psychological, and pedagogical constraints that continue to limit AI integration within higher education. Collectively, the findings suggest that while lecturers possess a foundational awareness of AI and express willingness to adopt certain AI tools, genuine integration remains hindered by infrastructural deficits, uneven exposure, and lingering apprehensions. Therefore, enhancing AI adoption requires comprehensive institutional investment in digital infrastructure, targeted professional development, ethical guidelines, and continuous sensitization efforts. Such measures will not only strengthen lecturers' competence and confidence but also ensure that AI adoption becomes pedagogically meaningful, context-appropriate, and sustainable across tertiary institutions in Nigeria.

Recommendations

Based on the findings, this study recommends that:

1. Management of Nigerian tertiary institutions should strengthen their lecturers' awareness and exposure to AI Tools by organising periodic capacity-building workshops to expose lecturers to both widely known and less popular AI tools such as Mindgrasp, ClassPoint, Brisk AI, and TeachBetter.ai. This can also be encouraged through peer-learning communities where early adopters can share practical experiences, demonstrations, and best practices with colleagues.
2. Management of Nigerian tertiary institutions should integrate AI literacy programmes into professional development activities to improve lecturers' understanding of AI-supported teaching styles, including personalised learning, predictive analytics, and intelligent tutoring systems.
3. Management of Nigerian tertiary institutions should be improving technological infrastructure and institutional support. This can be achieved by establishing clear institutional policies and frameworks guiding AI adoption, ethical use, data privacy, and academic integrity.
4. Management of Nigerian tertiary institutions should collaborate with agencies and bodies to organise sensitisation programmes to address fears of job displacement by clarifying that AI is a support tool intended to enhance, not replace lecturers' professional roles. This should be supported by encouraging critical and creative engagement with AI tools to prevent over-reliance and preserve originality and innovation in teaching.
5. Management of Nigerian tertiary institutions should promote blended learning approaches where AI tools complement rather than replace human-centred teaching strategies. This can be strengthened by encouraging lecturers to experiment with low-stakes AI applications, such as formative assessments, lesson-planning aids, and automated feedback tools, before scaling up to more complex uses.
6. Regulating bodies and agencies concerned with AI should collaborate with AI developers and ed-tech organisations to conduct further research on AI in teaching, particularly discipline-specific effectiveness studies and investigations into the negative readiness–awareness relationship revealed in the findings.

Reference

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Leveraging Artificial Intelligence for Innovative Library Services in 21st Century Nigeria: An Empirical Study

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Abstract

The increasing advancement of digital technologies has created the need for Nigerian libraries to reposition and upgrade their services to remain relevant in the 21st century. Artificial Intelligence (AI) has emerged as one of the transformative technologies capable of improving library operations and information service delivery. This study examined the level of awareness of AI applications among librarians in Nigerian libraries, determined the extent of AI utilisation in library service delivery, examined the perceived benefits of AI adoption, and identified the challenges hindering effective AI adoption in Nigerian libraries. The study adopted a descriptive survey research design. The population comprised librarians in selected academic and public libraries in Nigeria. A purposive and convenience sampling technique was used to select ten libraries across four geo-political zones of the country, while 150 librarians were selected as respondents. Data were collected using a self-designed structured questionnaire, and the responses were analysed using descriptive statistics such as frequencies, percentages, and mean scores. The findings revealed that librarians demonstrated moderate awareness of AI applications such as automated cataloguing, intelligent search systems, virtual reference services, and AI-powered recommender systems. However, the utilisation of AI in library service delivery was generally low. The study also found that librarians perceived AI as beneficial in enhancing service efficiency, improving user satisfaction, supporting learning and research, and increasing the professional relevance of librarians. Furthermore, challenges such as poor ICT infrastructure, inadequate funding, lack of technical expertise, inadequate training opportunities, and unreliable power supply hindered effective AI adoption in Nigerian libraries. The study concludes that although AI adoption in Nigerian libraries is still at an emerging stage, librarians possess positive perceptions towards its potential in transforming library services. The paper recommends continuous capacity-building programmes for librarians, increased investment in digital infrastructure, development of institutional and national AI policies, and the integration of AI-related courses into Library and Information Science curricula.

Keywords: Artificial Intelligence, Innovative Library Services, Librarianship, Nigeria, 21st Century Libraries

Introduction

The 21st century has transformed the manner in which information is created, organised, accessed, disseminated, and utilised across different sectors of society. Libraries, as custodians of knowledge and information resources, are increasingly required to adapt to rapidly evolving digital technologies in order to remain relevant and effective in meeting users' information needs. The growing volume of digital information, changing user expectations, and the demand for faster and more efficient services have compelled libraries to explore innovative technologies capable of improving service delivery. One of the emerging technologies influencing contemporary library operations is Artificial Intelligence (AI).

Artificial Intelligence refers to the ability of computer systems and machines to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making (Russell, 2010). In library and information science, AI technologies include machine learning, natural language processing (NLP), expert systems, robotics, and computer vision. These technologies support various library operations through tools such as automated cataloguing systems, intelligent search and discovery platforms, AI-powered chatbots for virtual reference services, plagiarism detection software, and recommender systems for personalised information services (Adeyeye & Oladokun, 2023; Sahabi & Otobo, 2022). The integration of these AI-driven tools into library services has the potential to improve operational efficiency, enhance user satisfaction, and increase access to information resources.

In Nigeria, libraries comprise academic, public, school, and special libraries, all of which play important roles in supporting education, research, and national development. Academic libraries, in particular, are expected to support teaching, learning, and research activities in tertiary institutions through effective information service delivery. However, many Nigerian libraries continue to experience challenges such as inadequate funding, insufficient ICT infrastructure, limited technological skills among librarians, and poor policy support for technological innovation (Uchechukwuka, 2024; Okello-Obura & Ssekitto, 2022). These challenges have slowed the integration of emerging technologies such as AI into library operations and services.

Globally, libraries are increasingly adopting AI technologies to improve information retrieval, automate routine operations, provide virtual user support, and enhance access to digital resources. Despite this growing global trend, empirical studies examining the actual adoption and utilisation of AI in Nigerian libraries remain limited. Existing studies have largely focused on the prospects and theoretical applications of AI in libraries, with limited attention given to librarians' awareness, level of utilisation, perceived benefits, and challenges affecting AI adoption in Nigerian libraries. Consequently, there is insufficient empirical evidence regarding the current state of AI adoption in Nigerian libraries.

Therefore, this study investigates the level of awareness of AI applications among librarians in Nigerian libraries, examines the extent of AI utilisation in library service delivery, explores the perceived benefits of AI adoption, and identifies the challenges hindering effective AI adoption in Nigerian libraries.

Objectives of the Study

The specific objectives of this study are to:

1. Assess the level of awareness of AI applications among librarians in Nigerian libraries.
2. Determine the extent of AI utilisation in delivering library services in Nigeria.
3. Examine the perceived benefits of AI adoption for library services among Nigerian librarians.
4. Identify the challenges hindering effective AI adoption in Nigerian libraries.

LITERATURE REVIEW

Conceptual Framework: Artificial Intelligence in Libraries

Artificial Intelligence (AI) is an umbrella term for technologies that allow machines to undertake tasks that would normally be performed by human intelligence. In libraries, AI is most meaningful when broken down into its component technologies: machine learning (ML), natural language processing (NLP), expert systems, computer vision and robotic process automation (RPA) (Ojobor *et al.,* 2025). These technologies have unique capabilities that can be applied to improve library services.

Machine learning (ML) algorithms allow computers to learn from data without being explicitly programmed, and are useful in library applications such as automated subject indexing, circulation anomaly detection, and content recommendation. (Adeyeye & Oladokun, 2023). NLP, meanwhile, enables natural language interaction with computers and powers applications like conversational chatbots for reference services, automated abstracting, and sentiment analysis of user reviews (Maiga *et al*., 2023). Expert systems mimic the reasoning of human experts and have been used in reference interviewing, collection development and knowledge management (Adigun & Igboechesi, 2024).

The integration of these AI technologies with library services is leading to the emergence of what has been described as the "intelligent library" - an evolving information ecosystem that is context sensitive, provides predictive information services and enables human-machine collaboration (Aslam, Batcha & Naz, 2022).

Global Applications of AI in Libraries

AI technologies are increasingly being used in libraries across developed countries to improve service delivery and access to information resources. In countries such as the United States, the United Kingdom, and Australia, academic libraries have adopted AI-powered search and discovery systems like Ex Libris Primo and EBSCO Discovery Service. These systems use machine learning algorithms to improve search accuracy and provide personalised recommendations to users based on their previous searches and information needs (Breeding, 2021). Similarly, the British Library has experimented with natural language processing (NLP) tools for automatic metadata generation, while the National Library of Singapore uses AI chatbots to provide round-the-clock virtual reference services for library users (Gupta & Margam, 2021).

AI has also improved cataloguing and collection management processes in libraries. Automated cataloguing systems and authority control tools help librarians organise bibliographic records more efficiently and reduce the time required for routine cataloguing tasks (Marchionini, 2020). In addition, libraries now use predictive analytics tools to support collection development decisions by analysing circulation records, interlibrary loan requests, and citation data (Adeyeye & Oladokun, 2023). AI technologies such as speech recognition, text-to-speech systems, and image recognition tools have further improved access to library resources for users with disabilities (Hussain, 2020).

Despite these global developments, the adoption of AI technologies in many African libraries is still at an early stage. Studies conducted in Kenya, Ghana, and South Africa indicate that although librarians are increasingly aware of the potential benefits of AI, actual implementation remains limited due to inadequate ICT infrastructure, insufficient funding, and lack of technical expertise among library professionals (Okello-Obura & Ssekitto, 2022; Adjei & Twum-Darko, 2021). Similar challenges are evident in Nigerian libraries, where the adoption and utilisation of AI technologies remain relatively low despite growing awareness of their potential benefits.

AI in Nigerian Libraries

AI is still in its infancy in Nigerian libraries. One of the first systematic reviews of ICT integration in Nigerian university libraries was conducted by Uchechukwuka, (2024), who reported that while libraries have achieved moderate levels of internet penetration and database purchase, they have yet to adopt advanced ICT technologies like AI and machine learning in most of their systems. They attributed this to a lack of funding, institutional resistance, and the lack of a national digital library policy. These findings have been corroborated by other studies. Mesagan & Hossana, (2025) conducted a survey of librarians in federal university libraries in South-East Nigeria and found less than 10% of the respondents had used any AI-powered library application. Likewise, (Ajani et al., 2022) reported that while most academic librarians in Lagos State were familiar with the concept of AI, they were unable to name the AI tools used in their libraries. These findings suggest a gap between awareness and utilisation, which the current study aims to measure and understand.

Conversely, a few Nigerian universities, especially those with a higher research output and international partnerships, have pioneered AI-powered services. The University of Lagos Library and Kenneth Dike Library at the University of Ibadan have reportedly experimented with AI-based cataloguing modules as part of library management system upgrades (Tella, 2022). Such ad hoc experiments, however, do not have the scale, sustainability and documentation to be used as models for the broader profession.

METHODOLOGY

This study adopted a descriptive survey research design to examine the awareness, utilisation, perceived benefits, and challenges of Artificial Intelligence (AI) adoption among librarians in Nigerian libraries. The population of the study comprised librarians working in selected academic and public libraries in Nigeria. Using purposive and convenience sampling techniques, six academic libraries and four public libraries across selected geo-political zones in Nigeria were chosen for the study. A total of 150 librarians were selected as respondents. Data were collected through a self-designed structured questionnaire divided into sections covering demographic information, awareness of AI applications, extent of AI utilisation, perceived benefits, and challenges of AI adoption. The instrument was validated by experts in Library and Information Science and Educational Technology, while a pilot study produced a Cronbach's alpha reliability coefficient of 0.86. Descriptive statistics, including frequencies, percentages, and mean scores, were used to analyse the data with the aid of the Statistical Package for the Social Sciences (SPSS) version 25.0.

RESULTS AND DISCUSSION

4.1 Demographic Characteristics of Respondents

Table 1 shows the profile of the 150 respondents. The majority of the respondents were males (80; 53.3%) with 70 (46.7%) females, suggesting a fairly equal gender distribution. With respect to educational level, the majority had a Master's degree (68; 45.3%) followed by Bachelor's degree in Library Science (48; 32.0%), PhD holders (22; 14.7%), and those with HND/OND qualifications (12; 8.0%). This indicates that most respondents had the requisite professional qualifications to understand the topic of the study.

In terms of years of experience, the largest group, with 50 respondents (33.3%), had 6-10 years of experience. Respondents with 11-15 years of experience (26.0%; 39) and those with 1-5 years and 16 or more years of experience (22.0%; 33 and 18.7%; 28) respectively, constituted the other major groups. Based on the type of library in which respondents work, it is evident that most of the participants were drawn from academic libraries (98; 65.3%), while the rest were from public libraries (52; 34.7%).

Level of Awareness of AI Applications

Table 2 presents the respondents' level of awareness of AI applications used in library services. The findings indicate a moderate level of awareness of AI applications among librarians, with an overall mean score of 2.90 on a 3-point scale. Respondents showed higher awareness of Automated Cataloguing and Classification, AI-Based Plagiarism Detection Tools, and Intelligent Search Systems. This may be attributed to the increasing use of tools such as Turnitin and automated cataloguing software in academic libraries.

However, awareness was relatively lower for advanced AI applications such as Predictive Analytics for User Behaviour and Machine Learning for Collection Development. This suggests that many librarians are still unfamiliar with more advanced and data-driven AI technologies used in modern library operations. The findings therefore indicate that awareness of AI applications in Nigerian libraries is still concentrated around basic and commonly used AI tools, while knowledge of more advanced AI technologies remains limited.

Table 2: Level of Awareness of AI Applications among Respondents (N = 150)

AI Application	Highly Aware (%)	Aware (%)	Not Aware (%)	Mean
Automated Cataloguing and Classification	38 (25.3)	72 (48.0)	40 (26.7)	3.42
Intelligent/AI-Enhanced Search Systems	31 (20.7)	68 (45.3)	51 (34.0)	3.15

Virtual Reference Services (Chatbots)	28 (18.7)	61 (40.7)	61 (40.7)	2.98
AI-Powered Recommender Systems	24 (16.0)	57 (38.0)	69 (46.0)	2.87
Natural Language Processing (NLP) Tools	20 (13.3)	52 (34.7)	78 (52.0)	2.63
Machine Learning for Collection Development	17 (11.3)	45 (30.0)	88 (58.7)	2.51
Predictive Analytics for User Behaviour	14 (9.3)	40 (26.7)	96 (64.0)	2.44
AI-Based Plagiarism Detection Tools	33 (22.0)	65 (43.3)	52 (34.7)	3.21
Overall Mean				**2.90**

Note: Scale — Highly Aware = 3, Aware = 2, Not Aware = 1. Source: Field Survey, 2025

Extent of AI Utilisation in Library Services

Table 3 below shows the distribution of respondents based on their self-reported level of AI adoption in providing library services. These results reveal a bleak situation of AI utilisation in Nigerian libraries. A mere 6 respondents (4.0%) reported 'Very High' AI utilisation and 19 (12.7%) reported "High" utilisation. Most reported either 'Low' (52; 34.7%) or 'Not at All' (35; 23.3%) AI use, with 38 respondents (25.3%) reporting a 'Moderate' level of use.

Overall, this suggests that 58.0% of respondents have libraries that have low or no AI utilisation. This is concerning, in view of the impactful possibilities of AI and the global trends in library technology. The low levels of utilisation confirm the findings of previous studies by Mesagan & Hossana, (2025) and Okonkwo and Ajala (2023) and demonstrate that Nigerian libraries are far behind global standards in terms of AI utilisation. It is interesting to note the difference between awareness (overall mean = 2.90) and utilisation (58% report low or no use), which suggests that even with awareness, utilisation is not occurring, and there are no systemic factors enabling it.

Table 3: Level of AI Utilisation in Library Service Delivery (N = 150)

Level of Utilization	Frequency	Percentage (%)	Cumulative (%)
Very High	6	4.0	4.0
High	19	12.7	16.7
Moderate	38	25.3	42.0
Low	52	34.7	76.7
Not at All	35	23.3	100.0
Total	**150**	**100.0**	

Source: Field Survey, 2025

Perceived Benefits of AI Adoption

Table 4 shows respondents' views on the benefits of using AI in libraries. The mean response of 4.22 (on a 4-point scale) suggests that respondents strongly believe that AI has many benefits for library services. 'AI enhances efficiency of library services' (mean = 4.41) was rated highest, followed by 'AI improves user satisfaction' (mean = 4.33) and 'AI promotes research and learning' (mean = 4.31). These ratings demonstrate an awareness amongst Nigerian librarians of the benefits that AI can bring in improving service efficiency and user satisfaction.

The least highly rated (but still highly rated) benefit was 'AI reduces operational costs over time' (mean = 3.98). This is likely to reflect the perception in a resource-constrained setting that the costs of AI adoption are high; librarians may be unsure about the long-term cost-benefit ratio of AI adoption in this context. The overall high mean scores for the benefits items suggest that the low adoption of AI in Nigerian libraries is not due to a professional skepticism of the value of AI but rather to other barriers.

Table 4: Perceived Benefits of AI Adoption for Library Services (N = 150)

Perceived Benefit	SA (%)	A (%)	D (%)	SD (%)	Mean
AI enhances efficiency of library services	82 (54.7)	53 (35.3)	10 (6.7)	5 (3.3)	4.41
AI improves user satisfaction	74 (49.3)	58 (38.7)	12 (8.0)	6 (4.0)	4.33
AI promotes research and learning	71 (47.3)	60 (40.0)	13 (8.7)	6 (4.0)	4.31
AI enhances professional relevance of librarians	65 (43.3)	62 (41.3)	15 (10.0)	8 (5.3)	4.23
AI enables 24/7 service availability	68 (45.3)	57 (38.0)	16 (10.7)	9 (6.0)	4.23
AI reduces workload of librarians	60 (40.0)	64 (42.7)	18 (12.0)	8 (5.3)	4.17
AI enables personalised information services	58 (38.7)	61 (40.7)	20 (13.3)	11 (7.3)	4.11
AI reduces operational costs over time	52 (34.7)	58 (38.7)	25 (16.7)	15 (10.0)	3.98
Overall Mean					**4.22**

Note: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision criterion: Mean ≥ 2.50 = Agreed. Source: Field Survey, 2025

Challenges Hindering AI Adoption

Table 5 shows the respondents' ratings of the barriers to the adoption of AI in Nigerian libraries. The mean score of 4.35 across all items reflects a high level of agreement that the challenges are indeed critical. The highest mean rating was given to Poor ICT infrastructure (mean = 4.52), followed by Unreliable power supply (mean = 4.45), Inadequate funding (mean = 4.48), Lack of technical expertise (mean = 4.44) and Absence of AI-specific training programs (mean = 4.40). This suggests an endemic infrastructure and human resource gap that hampers the use of advanced technologies in Nigerian libraries.

The other high rating for 'Lack of institutional support/policy' (mean = 4.36) and 'Absence of national AI policy for libraries' (mean = 4.33) also highlights the role of governance in technology use. Without clear institutional directives and resource allocation for AI deployment, librarians - no matter how keen - lack the mandate and resources to implement technology change. While the lowest-rated, 'Resistance to change among library staff' (mean = 4.09) and 'Data privacy and ethical concerns' (mean = 4.04) are still important, highlighting the need for change management and ethical training in addition to technical training.

Table 5: Challenges Hindering AI Adoption in Nigerian Libraries (N = 150)

Challenge	SA (%)	A (%)	D (%)	SD (%)	Mean
Poor ICT infrastructure	95 (63.3)	42 (28.0)	9 (6.0)	4 (2.7)	4.52
Inadequate funding for AI technologies	91 (60.7)	44 (29.3)	11 (7.3)	4 (2.7)	4.48
Lack of technical expertise among librarians	88 (58.7)	46 (30.7)	10 (6.7)	6 (4.0)	4.44
Absence of AI-specific training programmes	84 (56.0)	48 (32.0)	12 (8.0)	6 (4.0)	4.40
Lack of institutional support/policy	80 (53.3)	50 (33.3)	14 (9.3)	6 (4.0)	4.36
Absence of national AI policy for libraries	78 (52.0)	51 (34.0)	14 (9.3)	7 (4.7)	4.33
Resistance to change among library staff	60 (40.0)	55 (36.7)	24 (16.0)	11 (7.3)	4.09
Data privacy and ethical concerns	54 (36.0)	58 (38.7)	27 (18.0)	11 (7.3)	4.04
Unreliable power supply	89 (59.3)	45 (30.0)	10 (6.7)	6 (4.0)	4.45
Overall Mean					**4.35**

Note: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree. Decision criterion: Mean ≥ 2.50 = Significant challenge. Source: Field Survey, 2025

Discussion

The results of this study paint a mixed picture of AI in Nigerian libraries: a profession that is fairly aware of and very positive about AI, but one in which sustained use is still the exception. This gap between awareness, positive attitude and actual use is explained by the Technology Acceptance Model (TAM) used in this study. Although participants rated the perceived usefulness of AI highly (as reflected in the high means for PU and PEOU), the factors that would enable PU and PEOU to translate into adoption - infrastructure, training and institutional policy - are largely absent.

The fact that awareness is highest for automated cataloguing and plagiarism detection, and lowest for predictive analytics and machine learning for collection development, is a reflection of the diffusion of AI knowledge in the Nigerian library community. This finding is in line with the global trend in AI adoption in libraries, where automation of process tasks has typically led to more advanced analytical AI applications (Breeding, 2021; Marchionini, 2020). In Nigeria, we are starting from much earlier on the diffusion curve.

The prominence of infrastructure-related issues - poor ICT infrastructure, unstable power supply and lack of funding - in the findings is consistent with the literature on technology adoption in the developing world (Heeks, 2018; Nkrumah, 2020). These challenges cannot be addressed by individual libraries or librarians; they need to be addressed by coordinated action from government, higher education and the library professional associations. The National Universities Commission (NUC) and the Tertiary Education Trust Fund (TETFund) in Nigeria, for example, have a mandate and funding that can be focused on building AI infrastructure in academic libraries.

The high level of agreement among respondents that AI can improve the efficiency, effectiveness and relevance of library services, as well as the job prospects of librarians, is reassuring and a vital factor in the adoption process. Positive attitudes and enthusiasm in the profession is a necessary (but not sole) condition for adoption. The challenge for library managers, policymakers and educators is to build on this enthusiasm by ensuring the infrastructure support that will enable librarians to translate knowledge and positive attitudes into effective and sustainable AI practice.

Conclusion

This research has offered empirical evidence on the level of awareness, usage, benefits and difficulties in adopting AI in Nigerian libraries. The study shows that AI utilisation in the Nigerian library is in its infancy but not without hope. There is significant awareness of the main applications of AI, especially among academic librarians, and an overwhelmingly positive perception of the impact of AI on library service delivery. But the level of adoption is limited, constrained by infrastructural, financial, human resource and policy gaps.

The research argues that the adoption of AI is critical to the strategic reorientation of Nigerian libraries as innovative, responsive and developmental institutions. Libraries that choose not to embrace AI may find themselves becoming even more marginal in an information milieu that is increasingly reliant on smart, personalised and timely information ecosystems. The way forward involves the concerted efforts of librarians, library administrators, university administrators, government institutions and professional bodies. All have a role to play in establishing thenecessary environment for successful, ethical and sustainable implementation of AI in Nigerian libraries.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Since the study found that librarians demonstrated only moderate awareness of AI applications, library associations and Library and Information Science (LIS) schools should organise regular workshops, seminars, and training programmes to improve librarians' awareness and understanding of emerging AI technologies and their applications in library services.
2. Given the low level of AI utilisation in Nigerian libraries, library management and government agencies should invest in relevant AI tools and digital infrastructure such as automated cataloguing systems, intelligent search platforms, reliable internet connectivity, and stable power supply to support effective AI integration in library operations.
3. Considering that librarians perceived AI as beneficial for improving service delivery, user satisfaction, and research support, libraries should gradually integrate AI-powered services such as chatbots, recommender systems, and automated information retrieval tools to enhance the quality and efficiency of library services.
4. As the study identified inadequate funding, poor ICT infrastructure, lack of technical expertise, and insufficient policy support as major barriers to AI adoption, the government, educational institutions, and professional library bodies should develop supportive policies, provide adequate funding, and establish continuous capacity-building programmes to facilitate sustainable AI adoption in Nigerian libraries.

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LEVERAGING ARTIFICIAL INTELLIGENCE FOR REFERENCE SERVICE DELIVERY IN ACADEMIC LIBRARIES: A SYSTEMATIC REVIEW

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Abstract

This study examines the application of artificial intelligence (AI) in reference service delivery within academic libraries through a systematic review of the literature. Guided by three objectives, the study adopts a qualitative research method and applies the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure methodological rigor. Peer-reviewed journal articles and conference papers published between 2020 and 2025 were retrieved from Scopus, Web of Science, and Google Scholar, and systematically analyzed. The findings provide a comprehensive overview of the types of AI tools available for reference services, their specific areas of application, and the challenges associated with their adoption in academic libraries. Evidence from the review indicates that AI technologies play a significant role in enhancing reference service delivery, particularly in answering users' queries, providing instant and proactive information services, and improving service efficiency. However, the effective implementation of AI is constrained by challenges such as inadequate funding, limited AI expertise, infrastructural deficits, and policy gaps. The study concludes that AI has considerable potential to promote equitable, timely, and user-centered reference services in academic libraries. It further highlights important implications for library practice and policy and offers theoretical and practical recommendations for the strategic integration of AI into reference service delivery in academic libraries.

Keywords: Artificial intelligence, reference service, academic libraries, users' queries, systematic review.

Introduction

Academic libraries have generally been the leading edge of implementing cutting-edge technologies. Academic libraries have integrated various digital tools to support research, learning, and information access. Among the technologies reshaping information service delivery in academic libraries today is Artificial Intelligence (AI). Traditionally, reference services in academic libraries have relied on face-to-face interactions, manual catalog searches, and librarian-mediated information

retrieval. The integration of AI into library environments has enabled librarians to automate repetitive processes, enhance data-driven decision- making, and provide more personalized and efficient information services (Ali et al., 2021; Echedom & Okuonghae, 2021; Yusuf et al., 2022).

In recent times, AI has become instrumental in transforming traditional operations and services of libraries such as cataloguing, classification, information retrieval, and user engagement (Ogungbero et al., 2025; Praveenraj et al., 2025; & Satheesh et al., 2024). It supports reference services, enhances digital resource discovery, improves administrative efficiency, and contributes to professional development among librarians (Cox, 2024; Zondi et al., 2024). Artificial intelligence technologies such as chatbots, virtual reference assistants, natural language processing tools, recommender systems, and machine learning algorithms are increasingly being integrated into reference service operations. These tools enable libraries to provide round-the-clock support, automate routine reference queries, improve search and discovery processes, and deliver tailored information services to diverse user populations.

Preliminary evidence suggests that artificial intelligence has gained considerable attention and application across various library operations, including cataloguing, circulation, and digital resource management. However, despite this growing interest, existing literature indicates a noticeable gap in comprehensive studies that specifically examine the deployment of AI for reference service delivery in academic libraries. Most available studies tend to address AI adoption in libraries broadly, without providing a focused synthesis of the types of AI tools available, their specific applications in reference services, and the challenges associated with their implementation. Consequently, there remains limited consolidated evidence to guide librarians, policymakers, and academic library administrators on effective strategies for integrating AI into reference service delivery. In response to this gap, the present study undertakes a systematic review to examine the availability of AI tools, their usage patterns, and the challenges affecting their adoption for reference service delivery in academic libraries. The study seeks to provide direction for informed decision-making and strategic planning in AI-driven reference service delivery.

Objectives

The systematic literature review is guided by the following objectives:

1. To identify available AI tools for reference service delivery in academic libraries
2. To determine the AI tools used for reference service in academic libraries
3. To identity the challenges associated with the use of AI for reference service delivery in academic libraries

Methodology

The study adopted the Preferred Reporting Items for the Systematic Review and Meta-Analysis (PRISMA) guidelines to conduct a systematic review of literature on the application of artificial intelligence for reference service delivery in academic libraries. Moher et al. (2009) explained that PRISMA provides a structured and standardized approach for publishing evidence-based research, which assists in a rigorous appraisal of the literature. The framework featured four key stages, which include identification of relevant studies, screening of retrieved records, assessment of eligibility, and inclusion of studies that meet predefined criteria. During the identification stage, relevant studies were retrieved from selected academic databases (Scopus, Web of Science, and Google Scholar) using predefined search terms related to artificial intelligence and reference service delivery in academic libraries. The screening stage involved the removal of duplicate records and the assessment of titles and abstracts to determine their relevance to the study objectives. Systematic literature reviews have been increasingly applied in information and library science disciplines, as evident in studies by Lee et al. (2023) and Mabona et al. (2024).

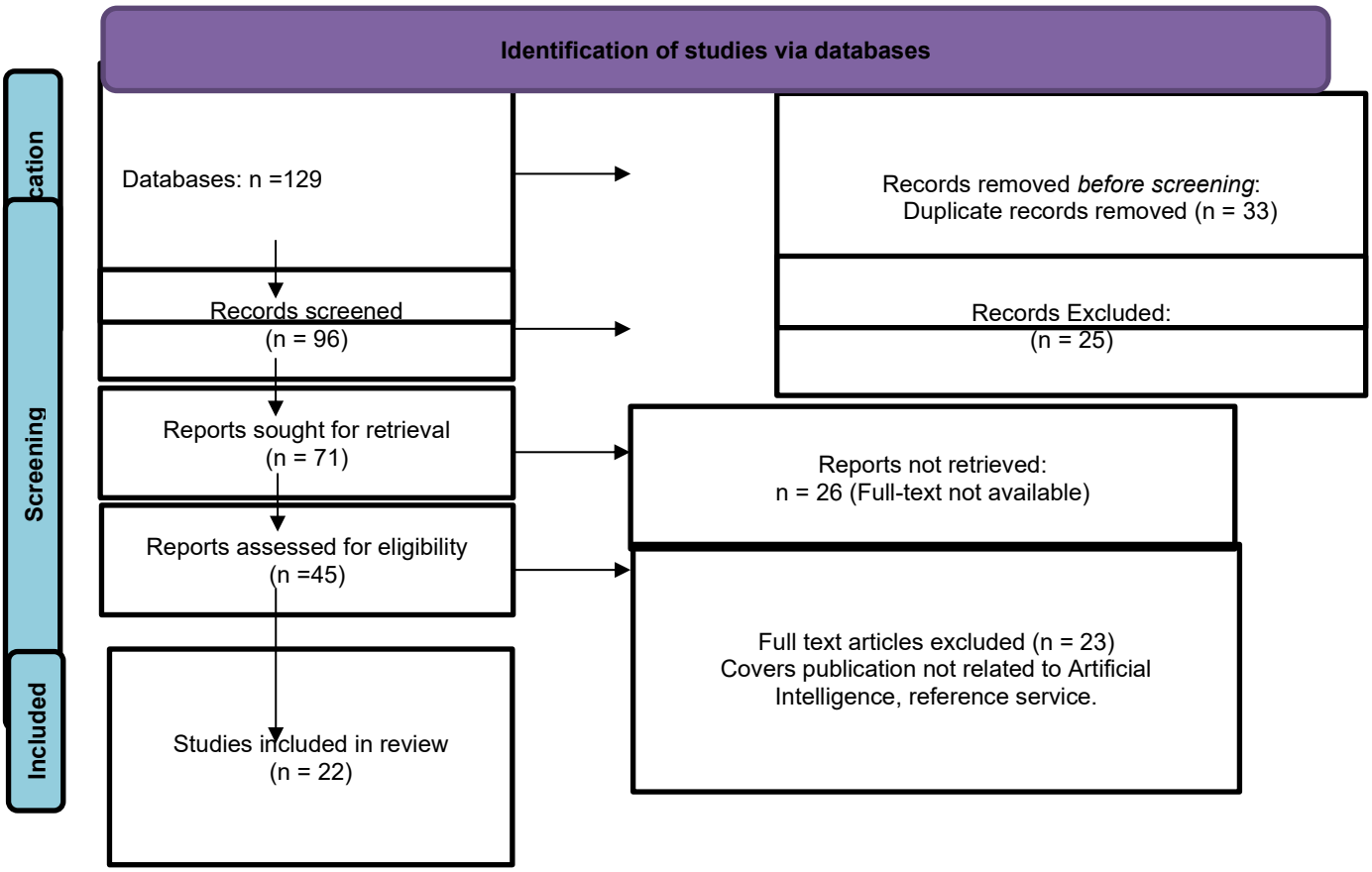
Databases and selection criteria

This research utilized conference proceedings and English-language articles published in reputable journals using the databases of Scopus, Web of Science, and Google Scholar. This also informed the choice of databases. The researchers conducted an initial pilot search of the databases to determine whether the articles were relevant. This systematic literature review focuses on the implementation of Artificial Intelligence for reference service delivery in an academic library. The article search was restricted to peer-reviewed articles published between 2020 and 2025, as they were deemed most relevant to the study. Records from three selected databases were downloaded and systematically organized using an online Google Sheet for effective data management and analysis. The search string include; Boolean Keywords (AND, OR). Search keywords: “Artificial intelligence”, OR “AI”, “Generative AI”, “ChatGPT” OR “DeepSeek”, OR “intelligent library” AND “reference service delivery”, information service”, “users’ queries”, AND “academic libraries”). While the whole search process was rigorous and progressive, the researchers limited the filter to Library and Information Science publications to retrieve specific articles from Library and Information Science abstracts related to Artificial Intelligence (AI) for reference service delivery in academic libraries. This strategy facilitated the

retrieval of relevant articles. The preliminary search yielded a total of 129 peer-reviewed journal articles and conference proceedings, which were subsequently imported into a Google Excel spreadsheet for organization and screening. The PRISMA information flow diagram for the search protocol was adopted to illustrate and document the study selection process (Faulkner & Reiter, 2025). After removing 33 duplications, the researchers collectively reviewed the titles and abstracted the articles by screening 96 literature reviewed. The researchers also reviewed systematically and excluded 25 articles. In addition, 26 articles were removed because the researchers did not have access to them and 23 full-text articles that do not cover articles related to artificial intelligence and reference service delivery were also excluded. At the end, 22 articles were found eligible for the review (see Figure 1). The study relied on Liu and Liu (2023) checklist for quality assessment, which includes five areas: research objectives, research methods, discussion of findings, research questions, and suggestions for future research.

The researchers assessed these against the quality assessment and gave 2 points per area, while some received 1 point based on the evaluation (Yes (2 points), Partial (1 point), and No (0 points)). The researchers included articles that scored five or higher (on a 10-point scale) in the study. The authors resolved conflicts vis-` a-vis inclusion and exclusion criteria based on relevance, year of publication, authenticity of the reported data (peer-reviewed and conference proceedings), and language used. Researchers ensure the validity and accuracy of search data by cross-checking. The three researchers performed these processes together and repeated to ensure data accuracy and reliability. The researchers conducted the screening and eligibility assessments three times within a week, and they met a third time to complete the process. The final papers considered for final analysis and synthesis were 22 articles (Fig. 1).

Fig 1. Procedure for Inclusion and Exclusion



RESULTS

As indicated in Table 1, the study focused on 22 articles published between 2020 and 2025, consisting of 19 peer-reviewed articles and 3 conference papers.

Table 1: Studies included for Review

S/n	Authors	Year	Title	Outlet	Methodology	Type of paper
	Yakubu, S., Yunusa, A. A., Abubakar, S. S., & Rahmat, I. A	2025	Adoption of artificial intelligence (ai) tools for effective reference service delivery in academic libraries.	Lafia journal of library and information science	Literature review	Journal article
	Egunjobi, R. A., Ogunniyi, S. O., & Ajakaye, J. E.	2022	Challenges and Prospects of Reference Services in Federal University Libraries in South-West, Nigeria	Library Philosophy and Practice	Empirical Research	Journal article
	Babayi, B. U., & Liviticus, A.	2025	Adoption and utilization of artificial intelligence (ai) tools foreffective online reference services delivery in university libraries in North-central, Nigeria	Lafia Journal of Library and Information Science	Empirical Research	Journal article
	Garba, A	2024	Adoption of Chatbots for Reference and Information Service Delivery in Nigerian University Libraries.	International Conference on Library and Information Science	Literature Review	Conference proceedings
	Awogbami M. O.	2024	Professional competencies for digital reference services in academic libraries.	Journal of Library Services and Technologies,	Literature Review	Journal article
	Verkaa, U. G., Enenche, H. O., & Igyuve, S. M	2024	Effect of integration of artificial intelligence in service delivery	Journal of ICT Development, Applications and Research	Literature Review	Journal article
	OSO, O. O., Adeoye, A. A., & KolawoLE, M. S. G.	2025	Motivation To Use Artificial Intelligence Tools By Librarians In Tertiary Institutions In Oyo State, Nigeria.	International Journal of Information Resource Management (IJIRM)	Survey	Journal article
	Safana, A. S., & Fari, S. A.	2024	Application of artificial intelligence (AI) for information services delivery:	Samaru Journal of Information Studies	Literature Review	Journal article
	Fagbola, O. O., & Egbebi, O. F.	2025	Librarians' readiness towards artificial intelligence utilization for service delivery in university libraries	QScience Jist,	Literature Review	Journal article
	Molaudzi, A. I., & Ngulube, P	2025	Use of artificial intelligence innovations in public academic libraries	IFLA Journal	Literature Review	Journal article
	Ajani, Y. A., Tella, A., Salawu, K. Y., & Abdullahi, F	2022	). Perspectives of librarians on awareness and readiness of academic libraries to integrate artificial intelligence for library operations and services in Nigeria.	Internet Reference Services Quarterly	Literature Review	Journal article
	Bello, H., & ABDULSALAM, Z.	2023	Steps to improving library services through artificial intelligence in Nigerian libraries	Lokoja Journal of Information Science Research,	Literature Review	Journal article
	Isiaka, A. O., Olarongbe, S. A., & Olaitan, M.	2024	Perceived awareness and usefulness of artificial intelligence technology for efficient library operations in university libraries in Kwara State	Journal of Library Services and Technologies, 6(1), 120-134.	Literature Review	Journal article

	Oseji, N. A., Adekoya, O. M., & Sani, J.	2021	Integration of artificial intelligence into library and information workflow for enhanced services in developing economies	Ahmadu Bello University Library Complex International Conference Book of Proceedings	Literature Review	Conference Proceeding
	Yusuf, T. I., Adebayo, O. A., Bello, L. A., & Kayode, J. O.	2022	Adoption of artificial intelligence for effective library service delivery in academic libraries in Nigeria	Library Philosophy and Practice (e-journal),	Literature Review	Research Paper
	Akinyemi, O	2023	Enhancing academic library service delivery using artificial intelligence (AI)	Library Philosophy and Practice (e-journal),	Literature Review	Research Paper
	Zondi, N. P., Epizitone, A., Nkomo, N., Mthalane, P. P., Moyane, S., Luthuli, M., ... & Phokoye, S.	2024	A review of artificial intelligence implementation in academic library services	South African Journal of Libraries and Information Science,	Literature Review	Journal article
	Tella, A.	2023	Application of artificial intelligence for reference services in academic libraries: A global overview through a systematic review of literature.	Journal of library resource sharing,	Systematic Review	Journal article
	Abba, T.	2024	Use of artificial intelligence technologies in rendering library services: An empirical evidence from university libraries in Africa.	African Journal of Library, Archives and Information Science,	Literature Review	Journal article
	Sultana, R., & Atikuzzaman, M	2025	Are Academic Libraries of Bangladesh Ready to Implement Artificial Intelligence? Finding Answers from LIS Professionals	International Information & Library Review,	Literature Review	Journal article
	Masinde, J. M., Mugambi, F., & Wambiri, D. M.	2024	Exploring the current landscape of artificial intelligence adoption in Kenyan academic libraries	Proceedings of the 17th International Conference on Theory and Practice of Electronic Governance	Literature Review	Conference Proceeding
	Odigie, I. O	2024	Exploring the awareness, use and challenges facing the integration of artificial intelligence in library services by librarians in university libraries in North-Central, Nigeria	Communicate: Journal of Library and Information Science,	Literature Review	Journal article

Table 2: AI tools available for reference service delivery in academic libraries

Findings	Authors	Frequency	Percentage
General AI	Yakubu et al.(2025); Verkaa et al. (2024); Safana & Fari (2024); Fagbola & Egbebi (2025); Ajani et al. (2022); Bello & Abdulsalam (2023); Oseji et al.(2021); Yusuf et al. (2022); Zondo et al (2024); Tella (2023); Sultana & Atikuzzaman (2025); Odigie (2024)	12	54.54
Chatbot	Egunjobi et al. (2022); Garba (2024); Awogbami (2024); Molaudzi & Ngulube (2025); Isiaka et al. (2024); Akinyemi, O. (2023); Abba (2024); Masinde et al. (2024)	8	36.36

ChatGPT	Babayi & Liviticus (2025); Oso et al. (2025); Abba (2024); Odigie (2024)	4	18.18
Grammarly	Babayi & Liviticus (2025); Oso et al. (2025); Abba (2024)	3	13.63
Face Recognition	Isiaka et al. (2024)	1	4.54

Table 2 indicates the AI tools available for reference service delivery in academic libraries. Data further shows that General AI (55.54%) are regarded as the most available AI tools in academic libraries, followed by Chatbot (36.36%), ChatGPT(18.18%), Grammarly (13.63%), and Face Recognition (4.54%). This implies that there is a growing level of adoption and usage of General AI for reference service delivery in academic libraries. This can be attributed to the compliance of libraries to the use of emerging technologies in this era of the 5th industrial revolution. Chatbots, making up (36.36%) of the tools, also show substantial adoption. This indicates that libraries are using them to offer 24/7 virtual help to users. Furthermore, the availability of ChatGPT (18.18%) and Grammarly (13.63%) indicates a gradual integration of specialized AI tools aimed at improving user engagement and academic support. ChatGPT is mostly used for conversational reference support, guiding literature searches, and helping with research. Face recognition technology, although the least available with (4.54%) indicates emerging interest in advanced AI applications related to security, user authentication, and access control within library environments. However, the adoption of these AI tools contributes to improved academic productivity in reference service delivery.

Table 3: AI tools used for reference service in academic libraries

Findings	Authors	Frequency	Percentage
Face to face consultation	Egunjobi et al. (2022);	1	4.54
Answering of reference queries	Babayi & Liviticus (2025); Fagbola & Egbebi (2025); Isiaka et al. (2024); Akinyemi, O. (2023); Abba (2024); Sultana &Atikuzzaman (2025)	6	27.27
Instant and proactive information services	Garba (2024); Awogbami (2024); Safana & Fari (2024);); Fagbola & Egbebi (2025); Ajani et al. (2022); Bello &Abdulsalam (2023); Oseji et al.(2021; Yusuf et al. (2022); Zondo et al (2024); Tella (2023); Odigie (2024); Masinde et al. (2024)	12	54.54
Serials services	Verkaa et al. (2024)	1	4.54
Intelligent search and discovery	Oso et al. (2025).	1	4.54

Results in Table 3 show that the majority of AI tools are being used for instant and proactive information services (54.54), where users receive alerts, notifications, and resource recommendations without making direct requests. Answering of reference queries (27.27%), AI tools support reference librarians by taking care of routine and repetitive reference queries, allowing professional staff to focus on more complex information needs that require human judgment and subject expertise. intelligent search and discovery (4.54%), and serial services (4.54%). The implications of this finding are that AI tools have continued to meet the needs of users in a timely manner as this is the core mandate of librarianship. The high level of usage suggests that AI-powered systems such as chatbots and virtual reference assistants have become essential in supporting users' information needs beyond traditional service hours. However, the adoption and usage of AI into reference and information services positions academic libraries to remain relevant and competitive in the digital information environment.

Table 4: Challenges associated with the use of AI for reference service delivery in academic libraries

Findings	Authors	Frequency	percentage
Lack of AI expertise or skills	Yakubu et al.(2025); Babayi & Liviticus (2025); Ajani et al. (2022); Bello &Abdulsalam (2023); Tella (2023); Odigie (2024); Masinde et al. (2024); Sultana &Atikuzzaman (2025)	8	36.36
Resource constraints	Yakubu et al.(2025); Egunjobi et al. (2022)	2	9.09
User acceptance	Yakubu et al.(2025);	1	4.54

Epileptic power supply	Egunjobi et al. (2022); Ajani et al. (2022); Bello & Abdulsalam (2023); Isiaka et al. (2024)	4	18.18
Inadequate funding	Babayi & Liviticus (2025); Egunjobi et al. (2022); Garba (2024); Verkaa et al. (2024); Safana & Fari (2024); Ajani et al. (2022); Bello & Abdulsalam (2023); Isiaka et al. (2024); Yusuf et al. (2022); Zondo et al. (2024); Sultana & Atikuzzaman (2025)	11	50
Lack of library policies	Egunjobi et al. (2022); Verkaa et al. (2024)	2	9.09
Limited/ Obsolete equipment and infrastructure	Babayi & Liviticus (2025); Egunjobi et al. (2022); Garba (2024);); Safana & Fari (2024); Yusuf et al. (2022); Odigie (2024)	6	27.27
Poor internet access	Egunjobi et al. (2022); Verkaa et al. (2024); Tella (2023);	3	13.63
High cost of adoption and maintenance of AI tools	Babayi & Liviticus (2025); Isiaka et al. (2024); Tella (2023);	3	13.63
Privacy issues	Garba (2024); Sultana &Atikuzzaman (2025)	2	9.09
Fear of Job lost or Polorisation	Safana & Fari (2024); Ajani et al. (2022); Isiaka et al. (2024); Yusuf et al. (2022); Masinde et al. (2024)	5	22.72

Table 4 discusses the challenges associated with the use of AI tools for reference service delivery in academic libraries. Data reveals that the reoccurring challenges associated with the use of AI tools for reference services ranged from inadequate funding (50%) which constitutes the most significant challenge suggesting that most academic libraries lack the financial capacity to acquire and sustain AI driven system. Lack of AI expertise of skills (36.36%) also emerge as a major challenge which indicated that insufficient training of professional development hinders effective implantation of AI tools. Limited/obsolete equipment and infrastructure (27.27%), this implies that deployment of outdated software and hardware system may also hinders effective utilization of AI tools in the libraries. Fear of job loss or polarization (22.72%), this perception may create resistance to adoption of AI tools among library staff. Epileptic power supply (18.18%) remains a notable challenge mostly in developing countries. Poor internet access and high cost of adoption and maintenance of AI tools (13.63%) limits the accessibility of AI tools and also increase operational expenses. The least challenges ranged from resources constraints, privacy issues, and user acceptance indicated that they are not perceived as major challenges though they exist.

Discussion

The study explored the availability, usage and challenges associated with AI tools for reference service delivery in academic libraries using a systematic review of literature. Results from literature covered in this study showed that General AI are most prevalent for reference service delivery (Yakubu et al. 2025; Verkaa et al. 2024; Safana & Fari, 2024; Fagbola & Egbebi, 2025; Ajani et al., 2022; Bello &Abdulsalam, 2023; Oseji et al. 2021; Yusuf et al., 2022; Zondo et al. 2024; Ayinde et al. 2026; Tella 2023; Sultana &Atikuzzaman, 2025; Odigie 2024). The findings also reported that Chatbot (Egunjobi et al., 2022; Garba, 2024; Awogbami, 2024; Molaudzi & Ngulube, 2025; Isiaka et al., 2024; Akinyemi, 2023; Abba, 2024; Masinde et al, 2024), ChatGPT (Babayi & Liviticus, 2025; Oso et al., 2025; Abba, 2024; Odigie, 2024), Grammarly (Babayi & Liviticus, 2025; Oso et al., 2025; Abba, 2024); and Face recognition (Isiaka et al., 2024) are available in academic libraries under study for reference service.

In addition, literature also noted that AI tools are being used for instant and proactive information resources. This is supported by Garba (2024), Awogbami (2024), Safana and Fari (2024), Fagbola and Egbebi (2025), Ajani et al. (2022), Bello and Abdulsalam (2023), Oseji et al.(2021), Yusuf et al. (2022), Zondo et al (2024), Ayinde et al. (2026), Tella (2023), Odigie (2024) and Masinde et al. (2024). The findings also showed that AI tools can be used for answering reference queries (Babayi & Liviticus, 2025; Fagbola & Egbebi, 2025; Isiaka et al., 2024; Akinyemi, 2023; Ayinde et al., 2026; Abba, 2024; Sultana & Atikuzzaman, 2025), intelligent search and discovery (Oso et al., 2025; Ayinde et al., 2026), serials services (Verkaa et al., 2024) and face-to-face consultations (Egunjobi et al., 2022).

Despite the effective usage of AI tools for reference service in academic libraries, there are several challenges facing the full usage and implementation of AI tools for reference service delivery in academic libraries. Literature observed

that inadequate funding affects the use of AI for reference services in academic libraries. This aligns with the findings of Babayi and Liviticus (2025), Egunjobi et al. (2022), Garba (2024), Verkaa et al. (2024), Safana and Fari (2024), Ajani et al. (2022), Bello and Abdulsalam (2023), Isiaka et al. (2024), Yusuf et al. (2022), Zondo et al (2024), and Sultana and Atikuzzaman (2025). The findings noted that lack of AI expertise or skill also emerge as a major challenge which indicated that insufficient training of professional development hinders effective implantation of AI tools (Yakubu et al.,2025; Babayi & Liviticus , 2025; Ajani et al., 2022; Bello &Abdulsalam 2023; Tella, 2023; Odigie, 2024; Masinde et al., 2024; Sultana &Atikuzzaman, 2025). In addition, it was observed that limited or obsolete equipment and infrastructure impedes the use of AI tools for reference services (Babayi and Liviticus, 2025; Egunjobi et al. 2022; Garba, 2024; Safana and Fari, 2024; Yusuf et al., 2022; Odigie, 2024). Also, fear of job lost or polarization was another problem as indicated by previous studies which stated that perception may create resistance to adoption of AI tools among library staff (Safana & Fari, 2024; Ajani et al., 2022; Isiaka et al., 2024; Yusuf et al., 2022; Masinde et al., 2024). The finding further revealed that Epileptic power supply remains a notable challenge mostly in developing countries as indicated in; (Egunjobi et al., (2022), Ajani et al., (2022), Bello and Abdulsalam (2023), Isiaka et al., (2024). Poor internet access as one of the challenges limits the accessibility of AI tools and also increases operational expenses. (Egunjobi et al., 2022; Verkaa et al., 2024; Tella, 2023). Notably, high cost of adoption and maintenance of AI tools as indicated in Babayi and Liviticus (2025), Isiaka et al., (2024), and Tella, (2023). Lack of library policies (Egunjobi et al., 2022; Verkaa et al., 2024), privacy issues (Garba, (2024); Sultana and Atikuzzaman, (2025), and User acceptance (Yakubu et al. (2025), are the minor challenges that influenced the usage, adoption and implementation of AI tools for reference service delivery in academic library. In all, the finding suggests that the effective adoption of AI tools for reference service delivery in academic libraries is largely dependent on improved funding, capacity building, infrastructural development, and supportive institutional policies to address both technical and human-related challenges.

Conclusion

This paper has demonstrated that artificial intelligence has become an increasingly important enabler of reference service delivery in academic libraries, particularly within the context of the Fifth Industrial Revolution. The findings reveal a steady shift from traditional, labour-intensive reference practices toward more automated, responsive, and user-centered service models. The high availability of general AI tools and chatbots indicated libraries' growing recognition of AI as a strategic solution for addressing the rising demand for instant, accurate, and round-the-clock information support. Furthermore, the dominance of AI applications in instant and proactive information services indicates a significant shift in reference service delivery, ranging from proactive service provision to anticipatory and personalized information support. This finding further means that academic libraries are repositioning themselves as knowledge hubs capable of meeting users' evolving information needs beyond physical and temporal constraints. This development not only strengthens user engagement but also reinforces the relevance of academic libraries in an increasingly digital scholarly environment.

However, the study also reveals that the full potential of AI in reference services remains constrained by significant institutional and infrastructural challenges. Inadequate funding emerged as the most critical barrier, affecting the acquisition, deployment, and sustainability of AI-driven systems for reference service delivery. Closely linked to this challenge is the shortage of AI-related skills among library professionals, which limits effective utilization and innovation. Additionally, infrastructural deficits such as obsolete equipment, unstable power supply, and poor internet connectivity further impede seamless AI integration, particularly in developing contexts. The study also highlights the human dimension of AI adoption, notably librarians' concerns about job displacement and role polarization. While AI enhances operational efficiency, these perceptions reflect underlying anxieties about professional relevance and job security. As a result, AI should therefore be viewed not as a replacement for professional expertise, but as a complementary tool that augments librarians' capabilities and enables higher-value reference service delivery. Generally, the findings affirm that artificial intelligence has a significant impact on reference service delivery in academic libraries by improving service speed, accessibility, personalization, and operational efficiency. Academic libraries that strategically invest in these areas are more likely to harness AI effectively and remain competitive in the digital knowledge economy.

Recommendations

Based on the findings and conclusions of the study, the following recommendations have been proposed:

1. University management and government regulatory bodies should prioritize sustainable funding models for more advanced AI integration in academic libraries. This includes allocating dedicated budgets for the acquisition, maintenance, and upgrading of AI-driven reference systems, as well as improving digital infrastructure such as internet bandwidth and power supply stability. Increased financial commitment will enable libraries to move beyond pilot-level adoption to full-scale implementation, thereby enhancing the effectiveness and continuity of AI-powered reference services.
2. Library management, in collaboration with professional associations such as the Nigerian Library Association (NLA) and international library bodies, should implement continuous training and re-skilling programmes focused on AI literacy, data management, and digital reference competencies. Regular workshops, certification programmes,

and hands-on training will equip librarians with the technical and ethical skills required to effectively operate AI tools. This approach will also help reduce staff resistance and job insecurity by repositioning librarians as AI-enabled information professionals rather than passive technology users.

3. Library administrators, in alignment with the university management, should develop comprehensive institutional AI policies that guide the ethical use, privacy protection, data security, and accountability of AI applications in reference services. Clear policy frameworks will ensure the responsible deployment of AI tools, protect users' personal information, and promote transparency in automated decision-making processes.

Limitations and Suggestions for Further Study

This study is subject to certain limitations that should be considered when interpreting the findings. First, the review was largely based on peer-reviewed journal articles and conference proceedings, which may have led to the exclusion of relevant evidence from grey literature such as institutional reports, policy documents, and practitioner-based publications. As a result, some practical insights and experiential perspectives outside formal academic publishing may not have been fully captured. Second, the inclusion of studies published between 2020 and 2025 restricted the scope of the review and may have resulted in the omission of earlier relevant works that could provide additional historical context on the evolution of artificial intelligence in reference service delivery. Finally, the review was limited to literature published in the English language, which may have excluded valuable studies reported in other languages and potentially introduced language-related bias into the findings.

Based on the limitations identified above, future studies should consider expanding the scope of literature covered by incorporating institutional reports, policy documents, technical white papers, and professional practice reports. This will provide a more comprehensive understanding of real-world AI implementation experiences and capture practical perspectives that may not be reflected in peer-reviewed publications and conference proceedings. Additionally, researchers are encouraged to extend the publication time frame beyond 2020–2025 to include earlier foundational studies on artificial intelligence in academic libraries. Further research should also explore non-English language publications to reduce language bias and enhance the global representativeness of findings. Including studies from diverse linguistic and regional contexts will provide a more balanced perspective on AI adoption, challenges, and best practices across different academic library environments.

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LEVERAGING ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE INFORMATION SERVICE DELIVERY IN ACADEMIC LIBRARIES IN KEBBI STATE, NIGERIA

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Abstract

This study empirically examines the extent to which artificial intelligence (AI) is being leveraged to enhance sustainable information service delivery in Academic Libraries. Study investigates the level of awareness of AI technologies among librarians in Academic libraries in Kebbi State, identify areas of library services where AI is currently applied, Examine the perceived benefits of AI for sustainable information service delivery, identify challenges militating against effective AI adoption in Academic libraries and Propose strategies for enhancing AI integration in Academic Library services. The study adopted descriptive survey research using 152 population. Data were collected through structured questionnaires administered to librarians and information professionals in selected libraries in the area under study. Findings reveal that while awareness of AI technologies among Academic Librarians is relatively high, actual implementation remains at a moderate to low level due to challenges such as inadequate ICT infrastructure, limited technical skills, insufficient funding, and absence of clear institutional policies on AI adoption. However, libraries that have adopted basic AI-driven tools reported improvements in service efficiency, user satisfaction, and operational sustainability. The study concludes that leveraging AI holds significant potential for sustainable library service delivery in Academic Libraries if deliberate investments are made in capacity building, infrastructure development, and policy formulation. The Study recommended that strategic collaboration among library stakeholders, continuous professional training, and the development of national guidelines by the Academic Library Association to support responsible and effective AI integration in libraries.

Keywords: Artificial Intelligence, Information Services, Sustainability, Academic Libraries.

1. Introduction

The rapid advancement of information and communication technologies (ICTs) has transformed library and information services globally. Libraries are increasingly expected to provide innovative, efficient, and user-centered services that support teaching, learning, and research in a digital environment. Consequently, traditional manual operations are gradually being replaced by technology-driven systems designed to improve information access, service efficiency, and user satisfaction (Breeding, 2018).

Among emerging technologies, artificial intelligence (AI) has gained significant attention for its potential to transform library operations and service delivery. AI refers to computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, and decision-making (Russell & Norvig, 2021). In libraries, AI technologies such as machine learning, natural language processing, expert systems, and chatbots are increasingly being applied to automate cataloguing and classification, enhance information retrieval, provide virtual reference services, and support personalized information services (Cox et al., 2019).

The growing emphasis on sustainable information service delivery has further increased the relevance of AI in librarianship. Sustainable information service delivery refers to the ability of libraries to continuously provide efficient, adaptable, and quality services despite financial, technological, and environmental challenges (IFLA, 2019). Through automation and intelligent systems, AI can help libraries reduce operational costs, improve service continuity, and respond more effectively to changing user expectations.

In Nigeria, academic libraries continue to face challenges that threaten sustainable service delivery. These include inadequate funding, obsolete infrastructure, limited technological facilities, insufficient technical expertise, and declining patronage (Aina & Olorunfemi, 2021). The increasing demand for instant and remote access to information has also placed additional pressure on libraries to modernize their services. Although awareness of AI technologies among librarians is gradually increasing, the actual implementation of AI applications in many Nigerian academic libraries remains low and uneven (Okiki, 2020).

The situation is particularly evident in Kebbi State, where many academic libraries still operate with limited ICT infrastructure, inadequate digital resources, unstable power supply, and insufficient staff training in emerging technologies. These limitations affect the ability of libraries to provide efficient and sustainable information services to students, researchers, and other users. Despite the growing global adoption of AI in library operations, there is limited empirical evidence on the extent to which academic libraries in Kebbi State are leveraging AI technologies to improve service delivery and sustainability.

Existing studies on AI in librarianship in Nigeria have largely focused on awareness and prospects at the national level, with little attention given to state-specific realities and implementation challenges within academic libraries in Kebbi

State. This creates a knowledge gap regarding the current level of AI adoption, areas of application, perceived benefits, and barriers to implementation in the state's academic libraries.

Against this background, this study examines the extent to which artificial intelligence is being leveraged for sustainable information service delivery in academic libraries in Kebbi State, Nigeria. Specifically, the study investigates librarians' awareness of AI technologies, areas of AI application, perceived benefits, and challenges affecting implementation. The findings of the study are expected to provide evidence-based recommendations for library administrators, policymakers, and professional bodies toward effective integration of AI for sustainable library services.

2. Statement of the Problem

Academic libraries are expected to provide efficient, innovative, and sustainable information services that support teaching, learning, and research in higher institutions. However, many academic libraries in Nigeria continue to experience challenges such as inadequate technological infrastructure, poor funding, limited automation, and insufficient digital competencies among library personnel, which affect effective service delivery (Aina & Omeluzor, 2020; Okiki, 2020). These challenges have limited the capacity of libraries to adequately respond to the changing information needs and expectations of users in the digital age.

Artificial intelligence (AI) technologies have increasingly been adopted in libraries across developed countries to improve operational efficiency, enhance information retrieval, support virtual reference services, and promote sustainable library services (Cox et al., 2019). In contrast, studies in Nigeria indicate that the adoption of AI in academic libraries remains relatively low and uneven, with most libraries still operating at basic levels of automation and lacking advanced AI-driven applications such as chatbots, recommender systems, and predictive analytics (Adewumi & Salami, 2021; Okiki, 2020). Existing evidence further suggests that many academic libraries continue to depend on manual or semi-automated systems due to inadequate ICT facilities, unstable electricity supply, poor internet connectivity, and limited technical expertise (Aina & Olorunfemi, 2021).

The situation is more pronounced in Kebbi State, where academic libraries operate within an environment characterized by infrastructural deficits, inadequate funding, and limited access to emerging technologies. Preliminary observations indicate that several academic libraries in the state still face difficulties in providing timely, technology-driven, and user-centered services capable of meeting contemporary academic and research demands. Despite the growing global and national discourse on AI in librarianship, there is little empirical evidence on the extent to which academic libraries in Kebbi State are leveraging AI technologies to improve sustainable information service delivery.

Most existing studies on AI in Nigerian libraries have focused on general awareness, prospects, and challenges at the national level, with limited attention given to state-specific realities and practical implementation issues in Kebbi State. Consequently, there is inadequate empirical data on librarians' awareness of AI technologies, areas of application, perceived benefits, and barriers affecting AI adoption in academic libraries within the state. The absence of such evidence limits informed policy formulation, strategic planning, and effective investment in AI-driven library services. It is against this background that this study investigates the extent to which artificial intelligence is being leveraged for sustainable information service delivery in academic libraries in Kebbi State, Nigeria, with a view to providing empirical evidence that can guide library administrators, policymakers, and professional bodies in developing effective strategies for AI integration.

3. Objectives of the Study

The main objective of this study is to empirically examine the use of artificial intelligence for sustainable information service delivery in academic libraries in Kebbi State. The specific objectives are to:

1. Determine the level of awareness of AI technologies among librarians in Academic libraries in Kebbi State.
2. Identify areas of library services where AI is currently applied.
3. Examine the perceived benefits of AI for sustainable information service delivery.
4. Identify challenges militating against effective AI adoption in Academic libraries.
5. Propose strategies for enhancing AI integration in Academic Library services in Kebbi State.

2. Literature Review

Concept of Artificial Intelligence

Artificial Intelligence (AI) refers to the capability of computer systems to perform tasks that normally require human intelligence such as learning, reasoning, decision-making, language understanding, and problem-solving. Russell and Norvig (2021) describe AI as the development of intelligent agents capable of perceiving their environment and taking actions that maximize the achievement of specific goals. AI technologies commonly applied in information environments include machine learning, natural language processing, robotics, expert systems, neural networks, and intelligent agents.

The development of AI has evolved from traditional rule-based systems to advanced data-driven models capable of adapting to user behavior and processing large volumes of data in real time. This evolution has increased the relevance of AI in library and information services, especially in the management of digital collections and online user services.

According to Cox, Pinfield, and Rutter (2019), AI is increasingly becoming an important component of smart libraries because it enables libraries to provide efficient, responsive, and personalized information services.

In the context of librarianship, AI is not intended to replace librarians but to complement professional expertise through automation and intelligent support systems. AI-driven technologies allow libraries to process information more efficiently, reduce repetitive manual operations, and improve access to information resources. Breeding (2018) argues that the emergence of AI represents a major shift in library operations because libraries are gradually transitioning from traditional repositories of information to digitally intelligent service institutions.

Artificial Intelligence Applications in Library and Information Services

The application of AI in library and information services cuts across technical services, reader services, and administrative functions. In technical services, AI is applied in automated cataloguing, indexing, classification, metadata generation, and authority control. Machine learning algorithms can analyze bibliographic records and automatically assign subject headings and classification numbers with minimal human intervention. This reduces cataloguing errors and improves processing speed.

Natural language processing technologies are also widely utilized in information retrieval systems. AI-powered search engines improve retrieval accuracy by understanding user intent and semantic relationships between search terms. According to Huang and Rust (2021), intelligent retrieval systems enhance user satisfaction because they provide more relevant search results compared to conventional keyword-based systems.

In public services, AI applications are increasingly visible through chatbots and virtual reference assistants. These systems provide instant responses to user inquiries, guide users in locating information resources, and support remote access to library services. Chatbots are particularly useful in academic libraries where users require 24-hour access to information support services. Recommender systems also analyze user search histories and borrowing patterns to provide personalized suggestions for books, journals, and electronic resources.

AI has further been applied in collection management and decision-making processes. Predictive analytics tools assist librarians in identifying information needs, forecasting resource demand, and making evidence-based collection development decisions. According to Issa, Adebayo, and Oyewole (2022), AI-driven analytics improve resource utilization and support strategic planning in libraries.

Despite these benefits, the level of AI implementation differs significantly between developed and developing countries. Libraries in developed countries have made substantial progress in deploying intelligent systems because of adequate infrastructure, stable electricity, skilled personnel, and sustainable funding. In contrast, libraries in developing countries continue to face infrastructural and institutional barriers that limit effective adoption of AI technologies.

Sustainable Information Service Delivery in Libraries

Sustainable information service delivery refers to the ability of libraries to continuously provide relevant, efficient, and adaptable information services over time despite economic, technological, and institutional challenges. The International Federation of Library Associations and Institutions (IFLA, 2019) emphasizes that sustainability in libraries involves the efficient management of resources, adoption of appropriate technologies, environmental responsibility, and continuous improvement of service quality.

In academic libraries, sustainability is closely linked to the ability to support teaching, learning, and research through uninterrupted access to information resources. Sustainable libraries must therefore adapt to changing user needs, technological advancements, and digital learning environments. AI contributes significantly to sustainability by automating repetitive operations, reducing operational costs, and improving service efficiency.

AI technologies also promote sustainability through continuous service availability. Chatbots and intelligent virtual assistants allow libraries to provide reference services beyond normal working hours, thereby improving accessibility and user engagement. Furthermore, AI-driven systems enhance decision-making processes through data analytics and usage forecasting, enabling libraries to allocate resources more effectively.

However, sustainable AI integration requires institutional commitment, technical expertise, policy support, and continuous staff development. Without these factors, AI implementation may become fragmented and difficult to sustain in the long term.

Empirical Review

Empirical studies on AI in libraries have expanded considerably in recent years. Studies conducted in developed countries generally report positive outcomes associated with AI adoption. Breeding (2018) found that libraries in the United States and Europe increasingly utilize AI technologies for discovery systems, metadata management, and user support services. The study revealed that AI improved operational efficiency, enhanced access to digital resources, and increased user satisfaction. Similarly, Cox et al. (2019) investigated the implications of AI for academic libraries in the United Kingdom and found that AI technologies improved research support services, digital scholarship, and information retrieval processes. The authors observed that libraries implementing AI-based systems experienced greater service responsiveness and better management of electronic resources. While these studies demonstrate the effectiveness

of AI in advanced library environments, their findings may not be directly applicable to developing countries where infrastructural and financial conditions differ significantly.

In Africa, Manda and Backhouse (2018) examined digital transformation initiatives in African information institutions and reported that although awareness of AI technologies is increasing, practical implementation remains limited. Their study identified poor internet connectivity, unstable power supply, inadequate ICT infrastructure, and shortage of skilled personnel as major barriers affecting technology adoption in African libraries. Similarly, Issa et al. (2022) observed that most African academic libraries remain at preliminary stages of AI adoption despite recognizing its importance for sustainable service delivery. The study further noted that insufficient institutional support and inadequate funding hinder the deployment of intelligent library systems.

In Nigeria, several empirical studies have examined AI awareness and adoption in libraries. Okiki (2020) investigated emerging technologies in Nigerian university libraries and found that many libraries still depend on basic automation systems with limited utilization of advanced AI applications such as chatbots, recommender systems, and predictive analytics. The study identified inadequate funding, lack of technical expertise, and obsolete infrastructure as major barriers to implementation. Aina and Omeluzor (2020) also reported that librarians in Nigerian academic libraries generally possess positive perceptions toward AI technologies, but actual adoption remains low because many institutions lack the required digital infrastructure and staff competencies. Their findings indicate a gap between awareness and practical implementation.

Adewumi and Salami (2021) further revealed that the absence of institutional and national policy frameworks for AI integration contributes to fragmented and uncoordinated implementation efforts in Nigerian libraries. According to the study, many libraries adopt isolated technologies without comprehensive long-term strategies for sustainability.

Although these studies provide important insights into AI adoption in Nigerian libraries, most were conducted in federal universities and urban academic environments, particularly in southern Nigeria. Very limited empirical attention has been given to academic libraries in northern states such as Kebbi State, where infrastructural and technological realities may differ considerably.

Academic libraries in Kebbi State operate within environments characterized by limited ICT infrastructure, unstable electricity supply, inadequate internet facilities, insufficient funding, and shortage of technologically skilled personnel. These conditions may significantly affect the adoption and sustainability of AI-driven library services. However, existing literature provides little empirical evidence regarding the actual level of AI awareness, areas of application, perceived benefits, and implementation challenges within academic libraries in the state.

Furthermore, most previous studies focused mainly on awareness and prospects of AI rather than empirically examining how AI contributes to sustainable information service delivery in specific institutional contexts. There is also limited comparative analysis of how different categories of academic libraries within Kebbi State are responding to emerging AI technologies.

Challenges of AI Adoption in Academic Libraries

Several studies identify infrastructural, financial, organizational, and human resource challenges affecting AI adoption in academic libraries. Inadequate funding remains one of the most significant barriers because AI technologies require substantial investment in hardware, software, internet facilities, and technical maintenance.

Poor power supply and unstable internet connectivity also negatively affect AI implementation, especially in developing countries. According to Manda and Backhouse (2018), unreliable digital infrastructure limits the effective deployment of intelligent systems in African libraries.

Another major challenge is the shortage of ICT-skilled librarians capable of managing AI-driven systems. Many librarians lack training in data analytics, machine learning applications, and digital technologies required for modern library operations. Resistance to technological change among library staff further slows AI integration.

Policy-related challenges also affect implementation efforts. The absence of institutional policies and national frameworks for AI adoption results in fragmented implementation and lack of strategic direction. Ethical concerns such as data privacy, algorithmic bias, and fears of job displacement are additional issues associated with AI integration in libraries.

In Kebbi State, these challenges may be more severe because many institutions operate under significant infrastructural and financial constraints. Consequently, empirical investigation is necessary to understand the peculiar realities affecting AI adoption and sustainable information service delivery within the state's academic libraries.

Artificial Intelligence and the Changing Role of Librarians

The emergence of AI is transforming the traditional roles of librarians. Rather than functioning solely as custodians of printed information resources, librarians are increasingly expected to serve as digital information managers, research support specialists, and facilitators of knowledge access. AI technologies automate repetitive technical operations, thereby allowing librarians to focus more on user education, digital literacy training, research support, and information management. According to Cox et al. (2019), the future relevance of librarians depends largely on their ability to adapt to emerging digital technologies and develop competencies in AI-related applications.

Continuous professional development is therefore essential for effective AI integration in libraries. Librarians require skills in digital technologies, data management, information analytics, and AI system management to remain effective in modern information environments.

The reviewed literature reveals growing global interest in the application of artificial intelligence in library and information services. Existing studies generally agree that AI improves operational efficiency, enhances information retrieval, and promotes sustainable service delivery. However, the majority of these studies were conducted in technologically advanced countries with adequate infrastructural support.

In Nigeria, available studies have focused mainly on AI awareness, prospects, and general challenges of adoption in university libraries. Most studies concentrated on institutions located in southern Nigeria, with little empirical attention given to northern states such as Kebbi State. Existing literature also provides limited evidence regarding the actual extent of AI utilization, specific areas of application, perceived benefits, and implementation challenges within academic libraries in Kebbi State. Furthermore, previous studies rarely examine AI adoption from the perspective of sustainable information service delivery, particularly within the unique infrastructural and institutional realities of Kebbi State. Consequently, there is insufficient empirical evidence to guide policymakers, library administrators, and professional bodies in developing effective strategies for AI integration in the state's academic libraries. This study therefore fills the identified gap by empirically investigating how artificial intelligence is being leveraged for sustainable information service delivery in academic libraries in Kebbi State, Nigeria.

3. Methodology

Research Design

This study adopted a descriptive survey research design. The descriptive survey design was considered appropriate because it enables the researcher to collect empirical data from a relatively large population and describe existing conditions, opinions, attitudes, and practices regarding the utilization of artificial intelligence (AI) in academic libraries. The design is suitable for studies that seek to obtain factual information and analyze relationships among variables without manipulating them. It also allows for the collection of quantitative data required to examine librarians' awareness of AI technologies, areas of application, perceived benefits, and challenges affecting sustainable information service delivery in academic libraries in Kebbi State, Nigeria.

Population of the Study

The population of the study comprised all librarians and information professionals working in the 7 federal and state-owned academic libraries in the tertiary institutions in Kebbi State, Nigeria. The target population included professional librarians, para-professionals, and library officers directly involved in library and information service delivery. These categories of staff were considered appropriate because they possess relevant knowledge and practical experience regarding the adoption and utilization of AI technologies in library operations.

Sample Size and Sampling Technique

A sample size of 180 respondents was selected for the study. The study employed a stratified random sampling technique to ensure adequate representation of respondents from all academic libraries in tertiary institutions across Kebbi State. The stratification was based on the different categories of academic institutions, including universities, polytechnics, and colleges of education. The choice of stratified random sampling was justified because it enhances representativeness and reduces sampling bias by ensuring that all relevant subgroups within the population are fairly represented. Within each stratum, respondents were selected randomly to provide equal chances of participation. Out of the 180 questionnaires distributed, 152 were correctly completed and returned, representing a response rate of 84.4%. The response rate was considered adequate for data analysis and generalization of findings.

Instrument for Data Collection

Data for the study were collected using a structured questionnaire developed by the researcher based on the objectives of the study and insights obtained from related literature. The questionnaire was divided into sections covering demographic information, awareness of AI technologies, areas of AI application in libraries, perceived benefits of AI adoption, and challenges affecting AI implementation.

The questionnaire adopted a four-point Likert scale ranging from Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The instrument was considered suitable because it enabled respondents to express their opinions and experiences systematically and facilitated quantitative analysis of responses. To ensure validity, the instrument was subjected to expert review by specialists in Library and Information Science and research methodology. Their observations and suggestions were incorporated into the final version of the questionnaire to improve clarity, relevance, and adequacy of the items.

Procedure for Data Collection

The researchers personally visited the selected academic libraries in Kebbi State to administer the questionnaires with the assistance of designated contact persons within the institutions. Respondents were informed about the purpose of the study and assured of confidentiality and anonymity of the information provided. The direct administration method

was adopted to enhance response rate and ensure proper completion of the questionnaires. Respondents were given adequate time to complete the instrument, after which the completed copies were retrieved for analysis.

Procedure for Data Analysis

The data collected were analyzed using descriptive statistics, including frequencies, percentages, and mean scores. Frequencies and percentages were used to analyze demographic data and summarize respondents' opinions, while mean scores were used to answer the research questions relating to awareness, areas of application, benefits, and challenges of AI adoption in academic libraries. A decision mean of 2.50 was established as the benchmark for acceptance or rejection of questionnaire items on the four-point Likert scale. Any item with a mean score of 2.50 and above was considered accepted, while items with mean scores below 2.50 were regarded as rejected.

4. Data Analysis and Interpretation

Table 1: Demographic Characteristics of Respondents (n = 152)

S/N	Variable	Category	Frequency	Percentage (%)
	Gender	Male	89	58.6
		Female	63	41.4
	Years of Experience	1–5 years	34	22.4
		6–10 years	57	37.5
		Above 10 years	61	40.1

Source: Field Survey, 2026

The data in the table revealed that the majority of respondents were Male with 89 (58.6) drawn from academic libraries in the area under study with over six years of professional experience, indicating reliable exposure to evolving library technologies. Table 1 shows that the majority of respondents were male (58.6%), with a significant portion drawn from academic libraries (51.3%). Additionally, 77.6% of respondents had six or more years of professional experience.

The high representation from academic libraries reflects their dominant presence in the Academic Library system and the critical role they play in supporting higher education and research (Aina & Olorunfemi, 2021). The experience profile suggests that the respondents have sufficient exposure to library operations, including ICT adoption and evolving service models. This supports the reliability of their responses regarding awareness, application, and challenges of AI in libraries. The demographic profile aligns with previous studies in Nigeria, where academic librarians are often the primary participants in technology adoption research (Okiki, 2020; Adewoyin et al., 2021).

Research Question 1: Level of Awareness of AI Technologies

Table 2: Awareness of Artificial Intelligence among Librarians N = 152

S/N	AI Awareness Statements	Frequency	Mean	Std. Dev	Decision
1	I am familiar with AI concepts	122	3.21	0.68	Accepted
2	I understand AI applications in libraries	112	2.94	0.74	Accepted
3	I have received training on AI tools	88	2.31	0.81	Rejected
4	AI knowledge is essential for Academic librarians	130	3.43	0.59	Accepted
	Grand Mean				2.97

Source: Field Survey, 2026

Table 2 reveals a high mean score (grand mean = 2.97) for AI awareness among respondents, with strong recognition of the importance of AI for modern librarianship. However, formal training on AI tools scored lower (mean = 2.31), indicating a knowledge practice gap.

These findings demonstrate that while librarians in Nigeria are aware of AI concepts and its potential benefits, structured capacity-building and professional training remain inadequate. This aligns with studies by Aina and Omeluzor (2020) and Okiki (2020), which highlight that awareness does not necessarily translate into effective implementation due to limited training opportunities. The results suggest that professional development programs focused on AI skills are essential for bridging the gap between knowledge and practice, enabling librarians to deploy AI tools effectively for service sustainability. The implication of this finding is that academic libraries may struggle to effectively integrate AI technologies into service delivery despite librarians' positive awareness and perception of AI. Without structured training programmes and professional development initiatives, AI adoption may remain theoretical rather than practical. The findings imply the need for library management, professional bodies, and government agencies to organize regular workshops, seminars, and ICT-based training programmes to improve librarians' practical AI competencies and readiness for digital transformation.

Research Question 2: Areas of library services where AI is currently applied.

Table 3: Areas Where AI is Applied in Academic Libraries N = 152

1	Area of Application	Frequency	Mean	Decision
1	Automated cataloguing	109	2.88	Accepted
2	OPAC and search optimization	114	3.01	Accepted
3	Virtual reference/chatbots	96	2.54	Accepted
4	Recommender systems	84	2.21	Rejected
5	Predictive analytics	79	2.09	Rejected
	Grand Mean =		2.55	Accepted

Source: Field Survey, 2026

The findings in Table 3 reveal that AI application in academic libraries is concentrated mainly in basic automation services such as automated cataloguing, OPAC optimization, and virtual reference services. However, more advanced AI applications like recommender systems and predictive analytics recorded low mean scores and were rejected by respondents. This finding agrees with Adewuyi and Salami (2021), who reported that most Nigerian academic libraries utilize AI primarily for routine automation functions while advanced intelligent systems remain largely underutilized due to infrastructural and financial constraints. It can therefore be deduced that AI adoption in academic libraries is still at an elementary stage and largely restricted to basic operational activities rather than advanced intelligent services. The implication of this finding is that academic libraries may not fully benefit from the transformative capabilities of AI in areas such as personalized information services, predictive decision-making, and strategic planning. This may limit innovation and reduce the effectiveness of user-centered service delivery.

Research Question 3: Benefits of AI for Sustainable Service Delivery

Table 4: Perceived Benefits of AI Adoption N = 152

S/N	Benefits	Frequency	Mean	Decision
1	Improved service efficiency	124	3.26	Accepted
2	Faster information retrieval	121	3.18	Accepted
3	Enhanced user satisfaction	115	3.02	Accepted
4	Reduced operational cost	107	2.67	Accepted
5	Long-term service sustainability	117	3.09	Accepted
	Grand Mean =		3.04	Accepted

Source: Field Survey, 2026

Respondents strongly agreed that AI enhances efficiency, sustainability, and user experience, confirming its relevance to modern librarianship. Table 3 indicates that AI is primarily applied in automated cataloguing (mean = 2.88), OPAC optimization (mean = 3.01), and virtual reference services (mean = 2.54), whereas recommender systems (2.21) and predictive analytics (2.09) remain largely unimplemented. This result reflects a limited, basic level of AI adoption in Academic Libraries. While automation in cataloguing and search optimization has been adopted to some extent, advanced AI applications that enhance user personalization, predictive decision-making, and strategic planning are rare. This trend corroborates findings from Adewuyi and Salami (2021), who observed that Academic Libraries mostly rely on basic automated tools and have yet to fully embrace the potential of intelligent systems. The uneven adoption underscores the influence of infrastructure constraints, financial limitations, and policy gaps in restricting advanced AI integration. It can therefore be deduced that librarians perceive AI as an important technological tool capable of improving library operations and enhancing sustainable service delivery. The implication of this finding is that positive perception among librarians can facilitate future AI adoption and implementation in academic libraries. When librarians recognize the benefits of AI, they are more likely to support technological innovation and digital transformation initiatives.

Research Question 4: Challenges to AI Adoption

Table 5: Challenges Hindering AI Adoption

S/N	Challenges	Frequency	Mean	Decision
1	Inadequate ICT infrastructure	130	3.41	Accepted
2	Insufficient funding	128	3.38	Accepted
3	Lack of technical skills	124	3.27	Accepted
4	Resistance to change	110	2.89	Accepted
5	Absence of AI policy	119	3.12	Accepted

	Grand Mean		3.21	Accepted

Source: Field Survey, 2026

Infrastructure and funding emerged as the most critical barriers, followed closely by skills deficits and policy gaps. Table 4 reveals that respondents strongly perceive AI as beneficial for service efficiency (3.26), faster information retrieval (3.18), enhanced user satisfaction (3.02), and long-term service sustainability (3.09). The grand mean (3.04) confirms a generally positive perception of AI benefits.

The findings demonstrate that Academic Librarians recognize AI as a strategic tool for sustainable service delivery, even if practical implementation remains limited. The positive perception aligns with international studies showing that AI improves operational efficiency, resource accessibility, and overall service quality (Breeding, 2018; Cox et al., 2019). Within the Nigerian context, the results suggest that AI has the potential to address persistent inefficiencies, enhance user experience, and support sustainable service delivery, provided that systemic barriers are addressed. It can therefore be deduced that the successful implementation of AI in academic libraries is significantly constrained by infrastructural, financial, technical, and administrative challenges. The implication of this finding is that without adequate funding, technological infrastructure, technical expertise, and supportive institutional policies, academic libraries may find it difficult to effectively adopt and sustain AI-driven services.

Research Question 5: Strategies that can enhance the use of AI for sustainable library services

Table 6: Strategies for Enhancing AI Integration

S/N	Strategies	Frequency	Mean	Decision
1	Provision of adequate ICT infrastructure	130	3.43	Accepted
2	Continuous staff training on AI tools	128	3.37	Accepted
3	Increased funding for AI initiatives	122	3.22	Accepted
4	Development of institutional AI policies	122	3.22	Accepted
5	Collaboration with ICT experts and partners	119	3.14	Accepted
	Grand Mean		3.30	Accepted

Source: Field Survey, 2026

Table 6 shows that respondents strongly agreed on the major strategies for enhancing AI integration in academic libraries, with a grand mean of 3.30, indicating overall acceptance. The most important strategy identified was the provision of adequate ICT infrastructure (mean = 3.43), followed by continuous staff training on AI tools (mean = 3.37), increased funding for AI initiatives (mean = 3.32), development of institutional AI policies (mean = 3.22), and collaboration with ICT experts and partners (mean = 3.14).

The findings imply that successful AI adoption in academic libraries depends on strong technological facilities, skilled personnel, sufficient funding, supportive policies, and strategic partnerships. This result aligns with previous studies such as Oladokun and Aina (2021), who emphasized the need for ICT infrastructure, and Emezie and Nwaigwe (2020), who highlighted staff training as essential for digital transformation in libraries. It can therefore be deduced that effective AI integration in academic libraries requires a combination of technological readiness, human capacity development, financial support, institutional policy frameworks, and strategic collaboration. The implication of this finding is that academic libraries that invest in infrastructure, staff development, funding, and collaborative partnerships are more likely to achieve sustainable AI implementation and improved service delivery.

Conclusion

The study concludes that artificial intelligence has considerable potential to enhance sustainable information service delivery in Academic Libraries. Although awareness of AI is relatively high, its practical application remains limited due to systemic challenges. Addressing these challenges is essential for Academic Libraries to remain relevant and sustainable in the 21st-century information environment. The empirical evidence confirms that artificial intelligence is a viable tool for achieving sustainable information service delivery in Academic Libraries. However, without deliberate investments in infrastructure, training, and policy frameworks, its potential will remain underutilized.

Recommendations

Based on the findings, the study recommends that:

1. Library management should invest in modern ICT infrastructure to support AI technologies.
2. Continuous training and capacity-building programmes should be organized for librarians.
3. Government and funding agencies should prioritize financial support for library automation and AI initiatives.
4. Professional bodies should develop national guidelines and policies for AI adoption in libraries.
5. Libraries should collaborate with ICT experts and institutions to facilitate sustainable AI integration.

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LIBRARIES AND DEMOCRACY IN NIGERIA: OUR FUTURE, THE STATE OF LIBRARIES AND LIBRARIANSHIP IN NORTH CENTRAL NIGERIA

BY

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Abstract

Libraries are expected to support democratic participation through access to information, civic literacy, and public enlightenment, yet many libraries in North Central Nigeria continue to face infrastructural and institutional challenges that may limit this role. The main objective of this study was to investigate the state of libraries and librarianship in North Central Nigeria, with emphasis on infrastructure, ICT facilities, collections, staff qualifications, working conditions, and democratic service delivery. The study adopted a survey research design. The target population comprised 820 librarians and library staff drawn from public, academic, and special libraries across the six states of the North Central zone. A stratified random sampling technique was used to select a representative sample. Data were collected through a structured questionnaire and analysed using frequencies, percentages, mean scores, chi-square, and regression, where applicable. Findings revealed that library infrastructure was generally poor, with inadequate buildings, unstable power supply, poor internet connectivity, and weak automation systems. ICT facilities were unevenly distributed, while print and digital collections were outdated and insufficient. Although librarians possessed moderate professional qualifications, opportunities for in-service training and staff development were inadequate, and working conditions were generally unfavourable. Libraries provided voter education, civic literacy, and access to government information, but these services were irregular and underfunded, thereby limiting democratic participation. The study concludes that libraries in North Central Nigeria have democratic potential but are constrained by structural and institutional weaknesses. It recommends increased government funding, improved ICT infrastructure, regular staff development, policy reforms, and formal civic information programmes linked to electoral and governance cycles.

Keywords: Libraries, librarianship, democracy, ICT, North Central

Introduction

The relationship between libraries and democratic governance represents one of the most enduring yet under-examined dimensions of civic infrastructure in developing nations Pateman & Williment, 2022). In Nigeria, where democratic consolidation remains an ongoing project more than two decades into the Fourth Republic, public libraries stand as critical institutions for nurturing informed citizenry, assisting access to government information, and preserving the cultural memory essential for national cohesion (Dryzek, (2024). The North Central geopolitical zone, comprising Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and the Federal Capital Territory, presents a particularly definite situation for examining this relationship, given its historical position as a bridge between Nigeria's northern and southern regions, its ethnic diversity, and its difficult political upsurges (Ojo & Adekanye, 2022). Democracy, in its substantive conception, requires more than periodic elections and institutional arrangements; it demands an educated populace capable of critical engagement with public affairs, access to diverse information sources, and platforms for purposeful discourse (Sen, 2020; Dryzek, 2021).

In Nigeria, however, the library sector faces significant challenges that threaten its democratic potential. Decades of underfunding, inadequate policy attention, and the digital divide have reduced many public libraries to decrepit conditions, particularly in regions outside the commercial centres of Lagos and the political centre of Abuja (NBS, 2023; Haruna, 2025). The North Central zone, despite housing the nation's capital and significant educational institutions, parades obvious irregularities in library infrastructure. While the National Library of Nigeria maintains a headquarters in Abuja and university libraries in Jos, Ilorin, and Makurdi hold substantial collections, rural and community libraries remain severely underdeveloped (World Bank 2023; Oyelaran-Oyeyinka & Lal, 2020). This uneven development raises fundamental questions about equitable access to information and the ability of libraries to serve as democratic infrastructure across the entire region.

This study "Libraries and Democracy in Nigeria: Our Future, Our Hope: The State of Libraries and Librarianship in North Central Nigeria" therefore, seeks to investigate how library systems can salvage their democratic mandate through innovation, policy advocacy, and community-centric change, recognizing that the future of Nigerian democracy depends significantly on the ability of its information institutions including libraries to foster comprehensive civic participation, preserve indigenous knowledge systems, and bridge the gap between government and governed (Oyelaran-Oyeyinka & Lal, 2020; Mchombu, 2023).

Statement of the Problem

Libraries in North Central Nigeria face critical challenges that undermine their role as democratic pillars. Despite constitutional guarantees of citizens' right to information (1999 Constitution, Section 22), as amended, North Central Nigeria's libraries suffer chronic neglect that wears down their democratic contributions. Recent assessments reveal only 28% of university libraries maintain functional digital repositories, with power outages averaging 18 hours daily, ebbing

service delivery (USPF, 2025). Funding allocations have plunged 37% since 2022, forcing closures like the Benue State Library Annex and staff reductions across Nasarawa branches (NLA, 2025).

Librarians report skill obsolescence, with only 22% trained in AI-driven reference services despite NITDA mandates (NLA, 2025). This absence manifested in democratic loss during the 2023 elections, library-facilitated voter education reached <5% of North Central youth, relating to 41% abstaining rates (INEC, 2024). Issues like policy division, similar to NUC guidelines, ignore library-specific digital benchmarks and/or security disruptions from banditry, which affected some libraries in states in this region in 2025 (National Library of Nigeria, 2025). Thus, distortion increases unhindered, civic literacy declines, and Nigeria's democratic rankings plunge. This study, therefore, aims at investigating libraries and democracy in North Central Nigeria and reducing the risk of libraries becoming relics, thus losing their mandate as democracy's knowledge watchmen. Hence, the following research questions.

1. What is the current state of library infrastructure, ICT facilities, and collections in North Central Nigeria?
2. What are the professional qualifications and training opportunities of librarians in North Central Nigeria?
3. To what extent do libraries in North Central Nigeria provide services that support democratic participation, for example, voter education, access to government information, and civic literacy?

Literature Review

Library infrastructure and digital integration

The literature shows that library infrastructure in North Central Nigeria is generally weak, with many libraries affected by poor buildings, unstable power supply, limited internet access, outdated furniture, and weak automation systems. Recent evidence also indicates that digital integration remains uneven because many libraries still lack reliable ICT facilities needed for effective service delivery and online access. Pareman & Williment (2022) posited that these conditions reduce the capacity of libraries to respond to changing information needs and limit their role in civic engagement, including public understanding and access to government information. Studies from North-Central Nigeria further suggest that, although public libraries have the potential to support community transformation, their impact is constrained by poor funding and inadequate resources. Overall, the literature indicates that libraries in the region possess democratic potential, but infrastructure and ICT weaknesses continue to restrict their contribution to civic education and participation. Infrastructure remains irregular, with some institutions showing moderate ICT development while others continue to depend largely on print-based services (UNESCO, 2023).

Digital integration is also still inadequate in many libraries. Although awareness of ICT has increased, actual access to modern systems such as online catalogues, electronic databases, cloud storage, and digital preservation tools remains low in many institutions. Research on digitization infrastructure in North-Central library settings reports shortages of servers, storage systems, OCR tools, and skilled personnel, making it difficult for libraries to transition fully into digital service delivery (INEC, 2024, Nwofor & Iloah, 2025). Similarly, public library studies in Nigeria show that some libraries have introduced computers and internet services, but adoption is still inhibited by poor funding, weak electricity supply, and a low repairs culture. Civic engagement programs are another important dimension of library service. Libraries are expected to organize reading drives, information literacy sessions, voter education forums, community discussions, and other public education activities. However, available studies suggest that such programs are still inadequate in many parts of North Central Nigeria (USPF, 2025). Academic libraries usually adopt ICT faster than public libraries because they often receive greater institutional support, have stronger research demands, and serve more technology-oriented users. Public libraries, by contrast, are more likely to experience funding gaps and frame deficits that slow digital development (IFLA, 2021).

State location also matters because library development in Nigeria is not evenly distributed. Some states have stronger educational infrastructure, better government support, and more active library administration than others. This creates variation in ICT adoption, service quality, and access. Studies in North-Central Nigeria show that institutions in better-resourced environments are more likely to provide internet services, digital resources, and user support than those in less-supported locations (IFLA 2022; IFLA 2023). These differences suggest that location and state-level policy environments shape how libraries function in practice. Funding remains one of the strongest predictors of ICT adoption and access to services. Where funding is inadequate, libraries cannot purchase hardware, subscribe to databases, maintain systems, or train staff. Studies on ICT use in Nigerian libraries consistently identify funding as a major constraint, along with unstable electricity and lack of technical support.

Qualifications and training levels

Librarians need regular training in ICT, digital literacy instruction, database management, and user engagement strategies. This is especially necessary in a fast-changing information environment where users depend on libraries for both traditional and digital services. Studies on ICT adoption in libraries show that staff attitude and lack of technical competence can slow implementation, even when equipment is available (NCC Publications, 2022). Therefore, policy without training is unlikely to produce lasting improvement. Public-private partnerships also appear in the literature as a practical strategy for addressing resource shortages. Alliance with government agencies, development partners, telecom firms, and non-governmental organisations can help libraries improve frame, expand internet access, and support civic education programs (UNDP, 2023). Also, libraries should be united into wider national development and

democratic education frameworks so that they are not treated as optional institutions. Nigerian scholarship increasingly argues that libraries should be seen as part of a democratic frame, not simply as storage spaces for books (NLA, 2025).

The literature shows that libraries in Nigeria, and mainly in North Central Nigeria, remain important for democratic input, but they face serious constraints in terms of funding, digital integration, and policy support. Current studies have examined ICT adoption, digitisation, service quality, and policy issues clearly, but fewer studies have brought these issues together in a single area investigation focused on libraries as democratic institutions. There is also inadequate recent empirical work comparing how library type, state location, and funding shape ICT adoption and public access within North Central Nigeria (Haruna 2025). This forms a clear research breach. The present study addresses that gap by examining frame, digital integration, civic engagement, demographic variation, morale, and democratic education on a unified basis. By doing so, it adds to both library science literature and policy discussions on democratic sustainability in Nigeria.

Libraries, democracy, and development in Nigeria

Libraries are widely recognised as social institutions that support education, informed citizenship, and democratic participation. In developing societies, public, academic, and special libraries help people access reliable information, build digital skills, and participate more effectively in civic life (Ezema 2024). In Nigeria, however, libraries often struggle with poor funding, weak infrastructure, and uneven policy support, which limits their ability to contribute fully to national development and democratic sustainability. Recent research shows that libraries remain important for preserving access to knowledge, but their effectiveness is reduced when physical facilities, ICT tools, and professional support systems are inadequate Mchumbu (2023).

Libraries also serve as platforms for information democracy by reducing inequality in access to knowledge. This role is especially important in a situation where misinformation, low civic awareness, and digital exclusion can weaken public participation. Nwofor (2015) posited that a sustainable democracy depends not only on elections and political institutions but also on the availability of trusted information spaces that help citizens interpret issues, question authority, and make informed decisions. Aiyebelehin, at el (2018) opined that public libraries, in particular, are expected to support this function through reading promotion, community education, and access to current information resources. Further empirical studies on libraries' democratic roles emphasise voter education, government information access, and civic literacy as core services supporting participatory democracy (FME, 2024). In Nigeria, research highlights public and academic libraries' potential despite infrastructural challenges, with North Central-specific evidence emerging from regional surveys. Empirical evidence shows Nigerian public libraries contribute moderately to voter education through literacy programs and election information dissemination. Salman (2018) surveyed public libraries and found voter education/information literacy programs prevalent, though inadequate due to ICT deficits; 68% of respondents reported occasional seminars, recommending ICT integration for nationwide coverage.

Research Methodology

This study adopted a cross-sectional survey research design to assess the democratic roles of libraries and librarianship in North Central Nigeria. The target population consisted of 820 librarians and library staff in public, academic, and special libraries across the six North Central states of Benue, Kogi, Kwara, Nasarawa, Niger, and the Federal Capital Territory, Abuja, drawn from library staff listings and institutional records available in the selected libraries. A stratified random sampling technique was used to ensure representation across library types and states. Using Taro Yamane's sample size formula, a sample of 269 was obtained, and 280 questionnaires were distributed to allow for non-response.

The instrument for data collection was a structured questionnaire titled *State of Libraries and Librarianship Questionnaire (SLLQ)*. The questionnaire was adapted from relevant studies on library infrastructure, ICT use, staff development, and democratic service delivery, with modifications to suit the objectives of the present study. It consisted of sections on demographic information, infrastructure, ICT facilities, collections, staff qualifications, working conditions, and democratic services. The instrument was subjected to face and content validity by three experts in Library and Information Science. A pilot test was conducted in a nearby library setting outside the study area, and the Cronbach's alpha coefficient of 0.87 indicated acceptable reliability. Data were collected through direct administration of the questionnaire with the assistance of research aides and retrieved after completion.

Ethical approval was obtained from the appropriate institutional authority, and informed consent was secured from all participants. Respondents were assured of confidentiality, anonymity, and voluntary participation. Data were analysed using frequencies, percentages, mean scores, chi-square, and regression at a 0.05 significance level.

The population distribution is shown in Table 1.

Table 1: Population Distribution by Library Type and State

Library Type	Benue	Kogi	Kwara	Nasarawa	Niger	FCT	Total
Public	85	72	68	61	79	95	460
Academic	42	38	45	41	47	52	265
Special	28	24	21	19	22	1	135

Library Type	Benue	Kogi	Kwara	Nasarawa	Niger	FCT	Total
Total	155	134	134	121	148	148	860

Data were collected using a structured questionnaire titled "Libraries and Democratic Roles Questionnaire (LDRQ)." The instrument contained four sections: Section A: Demographic data. Section B: Library infrastructure (8 items). Section C: Digital integration (7 items). Section D: Civic engagement programs (6 items). Data were analysed using SPSS version 27 at α = 0.05 significance level: Descriptive Statistics: Frequencies, percentages, means, standard deviations.

Inferential Statistics: Chi-square test (associations). One-way ANOVA with Tukey HSD post-hoc (group differences)

RQ1 Current State of Library Infrastructure, ICT Facilities, and Collections

This section examines the current condition of library frames, ICT facilities, and collections in North Central Nigeria, since these are central to understanding how well libraries can support access to information and democratic participation. It provides a brief basis for the analysis that follows by showing whether the libraries are equipped to meet users' information needs.

Main descriptive (from Q7-12; n=210): Infrastructure adequacy (Q7, mean=2.3/5): Mostly inadequate (65% rated 1-2). Seating capacity (Q8): Mean 45 persons (SD=32); rural libraries averaged 18. Functional user computers (Q9): Mean 4.2 (SD=5.1); 42% had 0. Internet (Q10): 38% none, 45% unreliable, 17% reliable/high-speed. Budget (Q11): 52% <₦500k; ANOVA showed significant differences by state (F(6,203)=4.2, p=0.001). Plateau/FCT had the highest (>₦2M mean), and Niger/Benue had the lowest.

Metric	Mean (SD)	% Inadequate (1-2/5)	By Location (Rural vs Urban)
Physical space (Q7)	2.3 (1.1)	65%	Rural: 1.9; Urban: 2.8
Computers (Q9)	4.2 (5.1)	42% (0 computers)	Rural: 1.8; Urban: 7.1
Budget category (Q11)	-	52% (<₦500k)	Rural: 68%; Urban: 39%

Interpretation: Infrastructure is critically underdeveloped, especially in rural areas and low-budget states. One-way ANOVA (Q9 by library type): Academic libraries had the most computers (mean=8.1, F (4,205)=6.3, p<0.001 vs. school libraries at 1.2).

RQ2 Qualifications and Training Level of Librarians.

This section examines the qualifications and training levels of librarians in North Central Nigeria, as these factors influence service quality, professional competence, and effective library service delivery. Main descriptive (from Q5, Q13-17; n=210): Qualifications (Q5): 28% Diploma/HND, 42% BLS/Bachelor, 22% MLS, 8% PhD. Staff: Mean 3.1 professional librarians (SD=2.4), 4.8 para-professionals. Training (Q15): 35% never, 22% yearly, 43% every 2-3 years. Job satisfaction (Q16, mean=2.8/5): 48% dissatisfied (1-2). Top challenges (Q17, multiple select): Funding (82%), staffing (61%), and training (55%).

Metric	Distribution	By Library Type
Highest qualification (Q5)	Diploma/HND: 28%; MLS+: 30%	Academic: 65% MLS+; Public: 35%
Training frequency (Q15)	Never: 35%	Special: 18%; School: 52%
Satisfaction (Q16)	Mean 2.8 (1.2)	Academic: 3.2; School: 2.3

Librarians are underqualified (60% below MLS) with infrequent training and poor settings. Descriptive highlight funding/staffing gaps; satisfaction correlates negatively with rural site (r=-0.32, p=0.001).

RQ3 Extent of Services Supporting Democratic Participation

Democracy Support Index (Q18-22 composite, mean=2.1/5, SD=1.0): Voter/civic programs (Q19): Mean 1.8 (72% never/rarely). Free INEC info access (Q22): Mean 2.0 (55% never). Agreement on libraries' democratic role (Q23): Mean 4.2/5 (85% agree/strongly agree).

Service Frequency (1-5 Scale)	Mean (SD)	% Never/Rarely (1-2)	Significant ANOVA
Govt docs access (Q18)	2.4 (1.2)	58%	Type: Academic > Public (F=5.1, p=0.001)
Voter education (Q19)	1.8 (1.0)	72%	Location: Urban > Rural (F=7.2, p<0.001)
Town halls (Q20)	2.2 (1.1)	62%	-
Fake news training (Q21)	1.9 (1.0)	68%	Qual: MLS+ > Diploma (interaction F=3.8, p=0.01)
Index Total	2.1 (1.0)	62%	State: FCT > others (F=4.5, p<0.001)

Service Frequency (1-5 Scale)	Mean (SD)	% Never/Rarely (1-2)	Significant ANOVA
Libraries essential? (Q23)	4.2 (0.9)	5% disagree	-

Services are minimal (index <3/5), despite high perceived importance. Two-way ANOVA (Q19: qualification × location) showed MLS librarians in urban areas scored highest (mean=2.5 vs. rural diploma=1.4, $F=4.1$, $p<0.01$). Pearson correlation: Index positively with budget ($r=0.41$, $p<0.001$) and computers ($r=0.37$, $p<0.001$). Thematic analysis (Q24-25, n=187 responses):

Obstacles: Funding shortages (42%), poor ICT/infrastructure (31%), and low patronage/political neglect (18%). Desired changes: Increased government funding (35%), ICT upgrades/training (28%), and policy for civic roles (22%).

Discussion of Findings

The findings on RQ1 show that library infrastructure, ICT facilities, and collections in North Central Nigeria are generally inadequate, with poor buildings, unstable electricity, limited internet access, and outdated materials. This agrees with IFLA's position that libraries support democracy only when they provide reliable access to information and public knowledge. It also confirms earlier Nigerian studies showing that weak physical and digital infrastructure reduces library effectiveness and limits user access to current information. In democratic terms, these deficiencies weaken libraries' ability to serve as centres for civic awareness, public engagement, and access to government information (Ojo & Adekanyi, 2022).

For RQ2, the study found that many librarians possess moderate professional qualifications, but opportunities for in-service training and staff development are inadequate. This suggests that the human resource base is present, but capacity building is insufficient for the demands of modern library service. The literature indicates that librarians need constant training in digital literacy, user education, and civic information services if they are to support democratic participation effectively. Without such training, libraries may struggle to translate their democratic potential into meaningful public service (Pateman & Williment, 2022).

Regarding RQ3, the findings revealed that working conditions are generally harsh, and this limits motivation, service innovation, and program delivery. This supports the argument that poor funding and weak institutional support undermine library alertness and reduce the stability of democratic services such as voter education and civic literacy. The relationship between library conditions and democracy is therefore direct: when staff are poorly supported and resources are scarce, democratic service delivery becomes irregular and inadequate Dryzek (2021).

Overall, the findings corroborate the literature that libraries promote democracy most effectively when they are well funded, well-staffed, and adequately equipped. In North Central Nigeria, however, structural weaknesses continue to constrain this role, leaving libraries with a democratic promise but inadequate practical impact.

Conclusion

Libraries in North Central Nigeria represent a wasted hope for democracy but are troubled by a decaying frame, undertrained staff, and minor civic engagement. Revitalisation could strengthen democratic participation, placing libraries as supports of an informed citizenry. In conclusion, libraries in North Central Nigeria hold immense potential to foster democratic values and civic engagement. However, their current state of disorder, lack of resources, and insufficiently trained staff bound their capacity to serve as true community centres. Curbing these challenges through targeted investment, professional development, and community outreach can transform libraries into vibrant centres of knowledge and participation. By empowering libraries, stakeholders can help cultivate a more informed, engaged, and democratic society, ensuring these institutions fulfil their vital role of democratic development in Nigeria.

Recommendations

1. **Invest in Infrastructure and Democratic ICT:** State governments should allocate dedicated annual capital funding to refurbish library buildings, install solar-powered electricity and internet connectivity, and acquire current civic and governance collections. Establishing selected "Democracy Desks" within libraries will ensure these infrastructure gains directly support voter education, public engagement, and access to government information.
2. **Mandate Continuous Professional Development:** Library authorities should require and fund yearly in-service training for librarians through partnerships with the National Library of Nigeria and the Independent National Electoral Commission. Training should target digital literacy, civic information services, and voter education programme delivery to equip existing staff with the expert skills needed for democratic service.
3. **Enact Statutory Funding and Welfare Protections:** Federal and state governments should pass policies that formally integrate public libraries into national democratic frameworks through ring-fenced operational grants and improved staff welfare. These statutes should mandate minimum funding benchmarks and regular civic programming, ensuring that favourable working conditions translate into sustained, high-quality democratic service delivery.

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LIBRARIES AND LIBRARIANS AS DIGITAL NAVIGATORS: TRANSFORMING PERCEPTIONS IN NIGERIA'S INFORMATION AGE.

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Abstract

The rapid evolution of Information and Communication Technologies (ICTs) has transformed the global information landscape, redefining the traditional roles of libraries and librarians. In Nigeria, libraries are increasingly shifting from physical repositories of books to dynamic digital knowledge hubs. This paper examines the evolving role of librarians as "digital navigators" in Nigeria's information age, highlighting the transformation of professional responsibilities, emerging competencies, and changing public perceptions. Using a conceptual and literature-based approach, the study explores how librarians facilitate digital literacy, manage digital resources, and bridge the digital divide. It also identifies key challenges such as inadequate funding, infrastructural deficits, and skills gaps. The paper concludes that repositioning librarians as digital navigators is essential for national development and recommends strategic investment in capacity building, ICT infrastructure, and policy support.

Keywords: Digital libraries, digital literacy, librarians, Nigeria, information age, digital navigation.

Introduction

The emergence of the digital information age has significantly altered how information is created, stored, accessed, and disseminated. Libraries, once regarded primarily as custodians of books and other printed materials, are now evolving into technologically driven information centers. This shift is particularly important in Nigeria as a nation, where ICT adoption continues to expand across educational and professional sectors. Traditionally, librarians and other library staff were perceived as gatekeepers of books. However, the digital revolution has necessitated a transformation in both function and perception. Librarians are now expected to act as intermediaries between users and complex digital information systems. This evolving role has given rise to the concept of librarians as digital navigators—professionals who guide users in locating, evaluating, and utilizing digital information effectively.

Digital libraries refer to organized collections of digital content accessible via electronic means. They include e-books, databases, multimedia resources, and institutional repositories. The emergence of digital libraries is driven by the need to manage the "information explosion" resulting from technological advancement. Thiruppathi(2024) went further to state that A digital library is a virtual collection of information resources that can include e-books, research articles, multimedia files, historical archives, and other digital materials, accessible via the internet or specialized applications. Unlike traditional libraries, which rely on physical collections, that digital libraries allow users to search, retrieve, and interact with information remotely, breaking geographical and temporal barriers. They are designed to support education, research, and lifelong learning by providing organized and efficient access to vast collections of materials

On the other hand, digital navigators are professionals who assist individuals in accessing and using digital tools and information resources. In the library context, they help users overcome barriers related to technology, information literacy, and access (Attah, 2021). Digital navigators provide personalized, ongoing support to help community members overcome barriers to digital access. They assist with securing affordable internet, connecting devices, and developing digital skills necessary for education, employment, healthcare, and other essential services . Services can be delivered in-person**,** by phone, email, video chat, or through community-based organizations**,** often embedded in trusted local institutions like libraries, schools, and senior center. Digital navigators also **access** individual needs, recommend resources, and follow up to ensure clients achieve their digital goals. Some navigators specialize in areas such as healthcare, higher education, or support for people with disabilities, returning citizens, or caregivers (Niyi, 2023). They often provide multilingual and culturally competent support to reach diverse communities

The information age is characterized by the rapid production and dissemination of information facilitated by ICTs. It demands new competencies from both information providers and users. The Information Age, also known as the Digital Age, is a period characterized by the rapid expansion of information technology and the Internet, fundamentally changing how individuals access and share information. This era began with the creation of the World Wide Web and gained momentum with the development of personal computers by companies like Microsoft and Apple, making technology more accessible to the general public (Barth-Nengia & Uchendu,2024). As a result, people can now find and disseminate information more quickly than ever before.

According to Ogunode, Somadina, and Yahaya (2021), the *information age (digital age) is* characterized by the spread of the Internet and <u>information technology</u>. In the information age, individuals are able to access more information than

ever before at faster speeds than history previously allowed. The information age truly began with the creation of the World Wide Web. However, its advantages began to spread with the advent of the personal computer, which was improved and advanced by technology companies such as Microsoft and Apple. Although the information age ushered in many advantages, it also introduced problems, such as invasion of privacy and the spread of inaccurate information.

Evolution of Libraries in Nigeria

Libraries in Nigeria have undergone significant transformation from traditional print-based systems to hybrid and digital models. The integration of ICT has enabled libraries to provide remote access to information resources, online catalogues, and electronic databases. Studies show that Nigerian academic libraries are increasingly adopting digital tools to meet the needs of modern users. This evolution reflects global trends and underscores the necessity for libraries to remain relevant in a technology-driven society.

Libraries in the territory, that is today known as Nigeria came into existence as a result of colonialism. Libraries were highly influenced by the colonialists and they were developed in line with the needs and interests of the colonial masters. Public libraries and other libraries in Nigeria were established with the ideology of the colonial masters in mind. In Lagos there was a private library known as Tom Jones library which established between 1910 and 1920. Tom Jones was a wealthy Nigerian merchant who established library for the people of Lagos. Herbert Macaulay and Henry car also had libraries (Ugocha, 2011).

The evolution of libraries in Nigeria is a fascinating journey that reflects the nation's rich cultural heritage, colonial history, and the relentless pursuit of knowledge. Libraries have served as vital institutions for preserving information, fostering education, and promoting literacy in Nigerian society. Before the advent of formal libraries, knowledge in Nigeria was preserved through oral traditions and local practices. Elders and scholars played a crucial role in transmitting knowledge from generation to generation(Oyedum, 2006).

Following Nigeria's independence in 1960, there was a renewed focus on developing libraries as tools for national development and education. The government recognized the importance of libraries in fostering literacy and information dissemination. Ugocha(2011) highlighted the different levels of libraries that was established in Nigeria;

- **National Library of Nigeria:** Established in 1964, the National Library aimed to coordinate library services nationwide and promote reading culture.
- **State and Local Government Libraries:** Various states established libraries to cater to the educational needs of their residents.
- **University Libraries:** Higher education institutions began to develop extensive library collections to support academic research and learning.

The late 20th century saw the integration of technology into library services. The introduction of computers and digital resources transformed how libraries operated, allowing for improved cataloging, access to a broader range of resources, and the emergence of digital libraries.

Today, libraries in Nigeria are evolving to meet the needs of a diverse population. They are no longer just repositories of books but are becoming community hubs that offer various services:

- **Information and Communication Technology (ICT) Centers:** Many libraries now provide access to computers and the internet, bridging the digital divide.
- **Community Engagement Programs:** Libraries host workshops, literacy programs, and cultural events to engage the community.
- **Digital Libraries:** Initiatives to digitize collections are underway, making resources accessible to a broader audience.

Changing Roles of Librarians in the Digital Information Age

In the digital era, librarians are mainly focused on digital library services and 24/7 faster delivery of information using mobile technologies based tools/apps (Library Wiki, WhatsApp, Library App and Digital Library Apps etc) to fulfill user expectations on their mobile devices anywhere and anytime. Currently, library professionals are also known as key evolving specialties in modern librarianship: digital librarians, system librarians, repository managers, digital curators, information managers and knowledge managers (Nilesh, 2025). The digital librarian plays a new dynamic role to easily accessing of ICT infrastructures and ICT enable services which held digital information including abstracts, indexes, full-text databases, sound and video recording in the digital formats. Digital librarianship mainly focuses on the concept

of library professionals who are working in the digital library. The digital information management systems have changed the way the librarian acquires, processes, stores and delivers information to users in the 21st century. The various role and responsibilities of a digital librarian have also been discussed in support of high quality academic and research facilities in the digital environment.

As technology rapidly transforms the way we access information, and resources are increasingly available online and in digital formats, the established role of the library as a physical space housing racks of books is looking increasingly out of step with the needs of students and researchers. Hamza et.al.(2025) stated that, allied with technology, library users' needs and preferences are helping to drive the change in libraries. Students, researchers and teachers now expect to be able to access information around the clock, from almost anywhere in the world and via a growing number of devices, from laptops to phones. As the information technologies are changing day-today and growing at a tremendous speed, the knowledge society is becoming more complex, competitive and dependent on technological changes and information explosion. The need for e-information services to the users are also growing and becoming very essential. The impact of web based e-learning and teaching environment has influenced every facet of library and information services in academic libraries and providing new opportunities and challenges to the library professional for involvement in the knowledge based society including electronic and multimedia publishing, Internet based-information services, global networking, web based digital resources etc.The digital age has expanded the scope of librarianship beyond traditional functions such as cataloguing and circulation. Some of the expected roles are;

1. Information Management and Curation. Librarians now manage both physical and digital collections, ensuring accessibility and organization of vast information resources.
2. Digital Literacy Facilitation. Librarians play a critical role in teaching users how to effectively search, evaluate, and use digital information. it is the duty of the librarians to enlighten library users on various information sources and access tools. Users in this current age required information beyond the books on the shelves. Information like; access pointer, digital tools, various sources and necessary restrictions in the use of digital resources.
3. Technology Integration. Modern librarians utilize digital tools such as databases, virtual learning platforms, and AI-driven systems to enhance service delivery. Technology integration is to make sure tech is used effectively to support learning, research, access to information. According to Ogunbadede and Egitaghab (2026),the involves;

- Digital resources- how to managing e-books, databases, online journals and digital archives.
- Training users on how to use the library software and databases.
- Innovation- introducing makerspaces, coding programs etc.
- Collaboration with various bodies to integrate tech and digital content into the curriculum.

4. Research Support Services. Research support services are the help and resources libraries and institutions provide to assist users with their research work from start to finish. They assist researchers in data management, referencing, plagiarism detection, and access to scholarly resources. Olayemi et.al. (2025) insisted that Librarians should be equipped to assist the users with the following;

- information discovery,
- reference management.
- Literature review support
- Data services
- Publishing support
- Research impact
- Institutional repository
- Research consultations
- Copyright and ethics

5. Knowledge Preservation. Digital knowledge preservation is about making sure digital information stays accessible and usable long term, even as tech changes. Libraries continue to preserve cultural and intellectual heritage through digitization initiatives. Panji (2023) expanded roles highlight the transition of librarians into multifaceted information professionals. The core duties of the librarians comprises;

- Digitization- ability to convert physical materials into digital formats to prevent loss and improve access.

- Digital archiving-having knowledge of storing born-digital content and digitized materials in secure repositories.
- Metadata creation-
- Backup and disaster recovery-
- Digital Curation-
- Managing institutional repositories-
- Advocacy policy- ability to develop policies for digital preservation and educating users on why it matters.

Librarians as Digital Navigators in the Nigeria digital age.

The concept of librarians as digital navigators emphasizes their role in guiding users through complex digital environments. Librarians as digital navigators stand at the point to guide users and researchers through the complex online world to find, evaluate and use information effectively. It is a newer way to describe the modern librarians' role beyond just books. According to Idubor and Ogunbodede (2024), As digital navigators, librarians are expected to engage in the following;

- Bridging the Digital Divide. In Nigeria, disparities in access to technology persist. Librarians help bridge this gap by providing access to digital tools and training users. Librarians functions in several ways to assist users with low tech skills to access e-government services, apply for jobs online, use email, or set up devices.
- Enhancing Information Literacy. Digital navigation involves teaching users how to critically evaluate online information, reducing misinformation and improving research quality. Librarians as information analyst should show library users on how to spot misinformation, fact-check, evaluate websites, and understand algorithms/bias in search results.
- Supporting Lifelong Learning: Libraries provide access to online courses, e-resources, and learning platforms, promoting continuous education.
- Facilitating Access to E-Government and Services: Librarians assist citizens in accessing online government services, job applications, and digital platforms.
- Supports digital tools- librarians should assume the position of training the users on e-books, citation managers, data tools, learning platforms, and other software for school, work, or personal use.
- Connects to resources- links people to online courses, telehealth, digital archives and community services they might not find on their own.

Changing Perceptions of Librarians in Nigeria

Historically, librarians were often viewed as passive custodians of books. However, this perception is gradually changing due to technological advancements. For a long time, many people in Nigeria saw librarians as just "book keepers" or the person who stamps books and stay in a quiet room. That perception is shifting fast. Nilesh (2025) highlighted the various perceptions;

Old perception vs New reality

	OLD VIEW	**NEW REALITY**
1	Book custodian	Information specialist+ digital navigator.
2	Passive quiet role	Active teacher, trainer, and tech facilitator
3	Work only with print books	Manages e-resources, databases, repositories, makerSpace.
4	Limited to library building	Embedded in classrooms, online platforms,community outreach.
5	Clerical work	Research support, data managenment, digital literacy expert.

It is very paramount to note that in the current digital era in Nigeria information age, modern librarians are no more seen and recognized as book holders but now recognized as:

- Information specialists
- Digital educators
- Research partners
- Technology facilitators

Librarians in Nigeria are rebranding as ICT-compliant information professionals, research partners, and digital inclusion champions. The more they lead tech projects, teach, and show impact, the more the "book keeper" stereotype fades. Some key factors that brought about the change and thereby making them digital navigators (Edet & Alex-Nmecha, 2023);

- Technology integration: University and public libraries now run digital repositories, e-libraries, and virtual services. Librarians manage NUC virtual libraries, TETFund e-resources, and institutional repositories. This involves the use of various digital devices and software packages that required technological skills and capacity. Considering the efficiency and effectiveness of this integration, librarians are expected to upskill and re-skill in order to be productive in the current information age.
- Information literacy demand: With misinformation and fake news issues, librarians are now key in teaching students and the public how to evaluate online info.
- NLA & LRCN advocacy– The Nigerian Library Association and Librarians' Registration Council of Nigeria push professionalization, emphasizing librarians as knowledge managers, not just shelvers.
- Academic requirements – Universities require librarians to have MLIS/PhD and publish research. Many now teach GST courses on use of library and ICT.
- Community roles – Public librarians run digital skills programs, support JAMB/UTME CBT prep, and provide e-government access for communities.
- COVID-19 impact – Lockdowns forced libraries online. Librarians who delivered e-resources and Zoom trainings changed minds about their relevance.

Despite this progress, some misconceptions persist, particularly in underfunded public library systems where outdated infrastructure affects service delivery.

Digital Competencies Required for Librarians

Technology advancement has experienced a rapid increase in digital era, but not all librarians possess the qualified competencies to address the associated challenges. To function effectively as digital navigators, librarians must acquire new skills, including (Furfuri (2025):

- ICT proficiency
- Data management and analytics
- Information literacy instruction
- Cybersecurity awareness
- Use of digital library systems

Research indicates that Nigerian librarians possess basic digital competencies but still require advanced skills development for effective productivity in today's digital information era.

Challenges Facing Libraries and Librarians in Nigeria

In the dynamic milieu of the 21st century, libraries are confronted with multifaceted challenges in the provision of contemporary library services. The advent of digital technologies has revolutionized information consumption patterns, necessitating libraries to integrate digital resources and engage with a tech-savvy audience. This transition, however, presents hurdles related to technology adoption, digital literacy, and the imperative to meet evolving user expectations. Libraries must navigate the delicate balance between traditional print collections and the burgeoning digital sphere while ensuring equitable access for all. These challenges ranges from;

Inadequate Funding

Limited financial resources hinder the acquisition of modern technologies and infrastructure. Poor funding of digital system in Nigerian libraries has hampered the development of digital education in the nation. libraries are underfunded in Nigeria and this affects" all programmes including the digitalization programme in the sector. Dada et al.(2022) noted

that inadequate financing and allocation for digital technology at libraries have resulted in an insufficient supply of digital facilities, equipment, and materials. This has affected the needed transformation for the libraries and librarians.

Poor ICT Infrastructure

Unstable internet connectivity and power supply affect digital service delivery thereby limiting the needed transformation in the current digital information age in Nigeria. This has gotten to the alarming stage where most institutions find it difficult host an active server for a year (Guardian, 2022). The cost of subscription is on a high side.

Skills Gap

There is a need for continuous training and professional development among librarians.

Resistance to Change

Some professionals are slow to adapt to new technologies and practices. Another challenge to the digitalization of the information system in Nigeria by libraries and librarians is resistance to change by most librarians in the sector. Many key librarians across the country are afraid of changing from the old ways of doing things to new and modern methods. This is normal in all human activities and life processes, as people tend to be comfortable and hold on to the old ways of doing things rather than adopt new processes (Titus, 2018).

Policy and Institutional Constraints

Lack of supportive policies limits innovation and growth in the library system. Poor policy implementation has been a challenge to the changing perception of the librarians in Nigeria. To realize the international goals of having libraries and librarians as digital navigators in Nigeria, the federal government has to developed different ICT policies and digital policies to enable the development of digital education system in Nigeria.

High Cost of Maintenance:

High-tech digital facilities needs maintenance always. The sustainability and survival of digital facilities depend on high maintenance culture from users. The maintenance of these technological facilities is very expensive to carry out. Ogunode (2020) submitted that the cost implication required for maintaining ICT facilities is high and this made many administrators limit the time allocation for internet services within the university environment.

Strategies for Enhancing the Role of Libraries and Librarians

- Training and professional development initiatives. Regular organization of capacity building programs librarians and other library staff will go a long way to enhance their roles in our system. Librarians will actively function as the digital navigators in the present day information age when they are adequately equipped with the necessary knowledge (Akinyenre, 2022).

- Community engagement and outreach programs: community engagement and outreaches will enhance the change in the perception of libraries and librarians.
- Collaboration with educational institutions and technology provider: full collaboration with bodies that matters in the digital information system will enhance librarians' transformation into the digital information era.

Opportunities in the Digital Age

Despite challenges, the digital age presents numerous opportunities:

- Expansion of digital collections.
- Collaboration with global information networks.
- Integration of artificial intelligence in library services.
- Increased visibility and relevance of libraries.
- Emerging technologies such as AI and data systems are shaping the future of librarianship, requiring enhanced digital literacy for readiness.

Recommendations

To strengthen the role of librarians as digital navigators, the following measures are recommended:

- Investment in ICT Infrastructure: Government and institutions should prioritize funding for digital library development.
- Capacity Building: Continuous training programs should be implemented for librarians.
- Policy Development: National policies should support digital transformation in libraries.

- Public Awareness Campaigns: Efforts should be made to improve public perception of librarians by introducing regular community engagement either by physical or social media.
- Collaboration: Libraries should partner with educational institutions and technology organizations in the development of libraries and librarians' skills.

Conclusion

The transformation of libraries in Nigeria reflects the broader changes brought about by the digital age. Librarians are no longer mere custodians of books but active digital navigators who facilitate access to information and empower users with essential skills. While challenges remain, the opportunities for growth and impact are significant. By embracing innovation and redefining professional roles, librarians can continue to play a crucial role in Nigeria's information society.

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LIBRARY AND INFORMATION SCIENCE EDUCATION AND PROFESSIONAL DEVELOPMENT IN GOMBE STATE UNIVERSITY

By

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Abstract

Library and Information Science (LIS) education plays a crucial role in preparing professionals capable of managing information resources and supporting knowledge development in contemporary societies. The emergence of digital technologies, open access publishing, and electronic information systems has transformed the traditional roles of libraries and information professionals, thereby influencing the structure and orientation of LIS education worldwide. This paper examines the state of Library and Information Science education and professional development in North-East Nigeria with particular reference to Gombe State University. Using a conceptual and analytical approach grounded in the scholarly literature, the paper reviews the evolution of LIS education globally and in Nigeria, highlighting its role in training competent information professionals. It further examines the LIS programme at Gombe State University and its contribution to professional capacity development in the region. The study also explores emerging global trends in LIS education. It discusses key challenges affecting LIS education and professional development, including inadequate funding, technological gaps, and the need for curriculum modernization. The paper concludes that strengthening LIS education through curriculum innovation, integration of emerging technologies, and enhanced professional development initiatives is essential for improving library services and information management at Gombe State University.

Keywords: Library and Information Science Education, Professional Development, Academic Libraries, Higher Education, Gombe State University

Introduction

Information has become one of the most important resources in modern societies. The rapid expansion of knowledge production, technological innovation, and global information networks has significantly transformed how information is created, organized, and accessed. Libraries and information centres, therefore, play an essential role in facilitating access to knowledge and supporting educational, research, and development activities.

Library and Information Science (LIS) is the academic discipline concerned with the systematic organization, management, and dissemination of information resources. Bates and Maack (2010) describe LIS as a field concerned with "the processes of collecting, organizing, storing, retrieving, and disseminating recorded knowledge." This description underscores the central role of librarians and information professionals in knowledge organization and information access.

Historically, librarians were primarily responsible for maintaining and organizing collections of printed materials. However, technological advancements have transformed the information landscape and expanded the responsibilities of librarians. Rubin (2016) notes that librarians now play broader roles that include "facilitating access to digital information resources and guiding users in navigating complex information environments" (p. 6).

The digital transformation of libraries has therefore reshaped the competencies required of information professionals. According to Bawden and Robinson (2012), the emergence of digital information systems has significantly influenced both the theory and practice of information science. As a result, LIS education has evolved to incorporate new areas such as digital libraries, information architecture, knowledge management, and data curation.

Universities play a critical role in providing this professional training. LIS programmes across the world are continuously revising their curricula to reflect technological developments and emerging information needs. In Nigeria, LIS education has expanded considerably as universities establish programmes to produce skilled librarians and information specialists.

In North-East Nigeria, institutions such as Gombe State University have established LIS programmes to support the training of library and information professionals and to strengthen information services in the region. This paper, therefore, examines the state of LIS education and professional development in North-East Nigeria with a particular focus on the LIS programme at Gombe State University.

Concept of Information

Information is a fundamental concept in Library and Information Science because it constitutes the primary resource that libraries organize, manage, and disseminate. Scholars have conceptualized information from different perspectives, including communication, knowledge representation, and information systems, reflecting its multidimensional nature.

Bawden and Robinson (2022) define information as processed or structured data that becomes meaningful to users. According to the authors, "information may be understood as data that have been organized, structured, or interpreted so that they acquire meaning and value for the recipient." This definition distinguishes information from raw data by emphasizing organization, interpretation, and meaning, while highlighting librarians' responsibility for making information accessible and usable.

Similarly, Floridi (2019) conceptualizes information as "well-formed, meaningful, and truthful data," stressing that information must possess quality, coherence, and truthfulness to support knowledge creation. This perspective is particularly relevant in the digital era, where misinformation and disinformation require information professionals to promote the authenticity and reliability of information resources.a

From a user-centred perspective, Case and Given (2016) argue that information is any content that reduces uncertainty or increases understanding. Likewise, Rowley and Hartley (2017) describe information as data processed into a meaningful form that is valuable for current or future decision-making, emphasizing its strategic role in supporting teaching, learning, research, innovation, and evidence-based decisions, particularly in academic libraries.

Recognizing information as a strategic resource, Emasealu (2022) observes that "in the twenty-first century, information has become as significant as such natural resources as oxygen, water, and land." While this underscores the importance of information for socio-economic development and technological advancement, it also highlights challenges such as information overload, misinformation, and unequal access, making effective information management and information literacy increasingly essential.

The literature demonstrates a broad consensus that information is processed, meaningful, and valuable knowledge that enhances understanding and informed decision-making. In the context of this study, information is regarded as meaningful knowledge that is created, organized, communicated, and utilized to support research, learning, innovation, and effective decision-making.

Concept of Information Science

Information Science is an interdisciplinary field that studies information, its properties, and the processes involved in its organization, storage, retrieval, dissemination, and use. Drawing from disciplines such as computer science, communication, cognitive science, management, and Library and Information Science, it provides the foundation for effective information management and knowledge dissemination.

Bawden and Robinson (2022) define Information Science as "the discipline concerned with the principles and practices involved in the organization, storage, retrieval, and use of information." This definition emphasizes the discipline's core functions of developing efficient systems and techniques for managing information resources, which are essential for supporting research productivity and knowledge dissemination in academic libraries.

Beyond information management, Information Science examines how information flows among people, organizations, and technologies. It encompasses the collection, organization, storage, retrieval, dissemination, and use of information to facilitate knowledge creation and informed decision-making. This broader perspective reflects the evolution of the discipline from a document-centred field to one that increasingly addresses human information behaviour, organizational knowledge management, and digital technologies.

Contemporary scholars also emphasize the sociotechnical nature of Information Science. Humr and Canan (2025) argue that modern Information Science must consider the interaction between technology, society, and information systems, recognizing that emerging technologies such as artificial intelligence, big data, machine learning, and digital repositories are reshaping the discipline. However, effective information services require balancing technological innovation with users' information needs, ethical considerations, digital inclusion, and information governance.

From the foregoing, it shows that Information Science has evolved into an interdisciplinary discipline integrating people, information, and technology. While traditional perspectives focus on information organization and retrieval, contemporary views emphasize digital technologies, user behaviour, and societal contexts. For this study, Information

Science provides the theoretical and professional foundation for understanding how information resources and emerging technologies can be effectively managed to enhance research, scholarly communication, and knowledge dissemination.

Concept of Information Science Education

Information Science Education refers to the formal academic training designed to prepare professionals for careers in information management, librarianship, digital information services, and knowledge organization. It involves the development of theoretical knowledge, technical skills, and professional competencies required for managing information resources across diverse information environments.

According to Olubiyo (2021), Library and Information Science (LIS) education equips students with the professional skills needed to manage library resources and information services effectively. The author explains that the competencies required for cataloguing, classification, indexing, and information service delivery are acquired through formal academic training. This perspective underscores the foundational role of LIS education in producing competent information professionals capable of organizing and facilitating access to knowledge. However, the emphasis on traditional technical competencies reflects only one dimension of professional preparation. Contemporary information environments increasingly require graduates to possess additional competencies in digital technologies, data analytics, research support, and artificial intelligence applications. Therefore, while traditional library skills remain indispensable, they are no longer sufficient to meet the demands of modern information practice.

Similarly, Emasealu (2022) emphasizes that LIS education develops information literacy, research competencies, and ethical information use among students. This broader conceptualization expands the objectives of LIS education beyond technical operations by recognizing its contribution to lifelong learning, critical thinking, and responsible information use. The inclusion of research writing and information literacy is particularly significant because information professionals are increasingly expected to support scholarly communication, evidence-based decision-making, and knowledge creation within academic institutions. Consequently, LIS education serves not only the library profession but also the wider research ecosystem.

Information Science Education has evolved considerably due to technological advancement. Modern programmes increasingly incorporate digital libraries, information technology, research data management, digital scholarship, and artificial intelligence into their curricula. According to Wyman and Imamverdiyev (2019), LIS education globally is undergoing significant transformation as programmes integrate digital competencies and interdisciplinary knowledge. This evolution reflects the changing expectations placed upon information professionals in the digital age. Rather than functioning solely as custodians of printed collections, contemporary librarians are expected to manage complex digital infrastructures, support research data, facilitate open science initiatives, and deploy emerging technologies. These developments demonstrate that Information Science Education must remain dynamic and responsive to technological innovation if it is to remain professionally relevant.

From the foregoing review, it is evident that Information Science Education has evolved from a discipline centred primarily on traditional librarianship to one that integrates technology, information management, research support, and digital innovation. Although scholars emphasize different dimensions of the discipline, there is broad consensus that contemporary LIS education must produce professionals who possess both traditional library competencies and emerging digital skills. This conceptual understanding provides the educational context within which the present study is situated.

Historical Development of LIS Education

The historical development of Library and Information Science (LIS) education reflects the evolving roles of libraries in meeting society's changing information needs. Understanding this evolution provides important context for contemporary developments in the profession.

Formal LIS education began with the establishment of the first library school by Melvil Dewey in 1887. Early programmes focused primarily on cataloguing, classification, and library administration. Rubin (2016) explains that these technical competencies were emphasized because libraries required systematic methods for organizing rapidly expanding collections. Although this print-oriented approach reflected a collection-centred view of librarianship, it laid the foundation for modern information organization and management practices.

The emergence of Information Science in the mid-twentieth century significantly broadened the scope of LIS education. According to Bawden and Robinson (2012), Information Science evolved in response to the rapid growth of scientific information and the need for more efficient information retrieval systems. This marked a paradigm shift from traditional librarianship to an interdisciplinary field encompassing information organization, retrieval, communication, user behaviour, and concepts drawn from computer science, communication, cognitive psychology, and management.

The digital revolution further transformed LIS education through the emergence of electronic databases, digital libraries, institutional repositories, and online information systems. These developments required educational institutions to redesign curricula to prepare graduates for technology-driven information environments, demonstrating that LIS education has continuously evolved in response to societal and technological changes.

Library and Information Science Education in Nigeria

The development of Library and Information Science (LIS) education in Nigeria reflects the growth of higher education, national information systems, and professional librarianship. According to Aina (2014), the expansion of LIS education was closely linked to the growth of academic libraries and national information institutions, reducing dependence on overseas professional training while fostering indigenous expertise in librarianship and information management.

Today, Nigerian universities offer undergraduate and postgraduate LIS programmes that prepare professionals to manage libraries, archives, and digital information systems. Emasealu (2022) observes that LIS educators also play a vital role in promoting information literacy among students, demonstrating that LIS education now extends beyond training librarians to supporting research, teaching, innovation, and national development.

Despite these advances, LIS education in Nigeria continues to face challenges such as inadequate funding, obsolete infrastructure, limited ICT facilities, and the need for curriculum modernization. These challenges highlight the gap between curriculum expectations and technological realities, underscoring the need to strengthen LIS programmes to produce graduates capable of thriving in the increasingly digital global information environment.

Library and Information Science Education in North-East Nigeria

Library and Information Science (LIS) education in North-East Nigeria has played a vital role in developing professionals for effective information management, knowledge organization, and research support across the region. A major milestone was the establishment of the Department of Library and Information Science, University of Maiduguri, in 1977, which commenced its undergraduate programme in the 1982/1983 academic session. Recognized as the oldest and pioneer LIS school in North-East Nigeria, the department has produced librarians, information scientists, educators, and researchers who have contributed significantly to the development of libraries and information services within the region and Nigeria. According to the University of Maiduguri Department of Library and Information Science, the programme equips graduates with the theoretical knowledge, practical skills, and technological competencies required to manage information resources, digital repositories, and contemporary knowledge systems. This evolution reflects the shift from traditional librarianship to digital information management, emerging technologies, and knowledge creation.

Scholars have emphasized that LIS education is essential for strengthening national information systems and promoting socio-economic development by preparing competent information professionals (Aina, 2014; Ocholla, 2012). Although the expansion of LIS programmes has improved access to professional education in North-East Nigeria, many institutions continue to face challenges, including inadequate ICT facilities, limited funding, insufficient research support, curriculum modernization needs, and shortages of specialists in emerging areas such as artificial intelligence, research data management, digital preservation, and information analytics. Despite these constraints, pioneering institutions such as the University of Maiduguri, together with newer LIS schools, have demonstrated resilience and sustained growth. To remain globally competitive, LIS programmes in the region must continue modernizing their curricula, strengthening technological infrastructure, and enhancing staff development to prepare graduates capable of supporting digital scholarship, scholarly communication, and AI-enabled library services. This need provides an important context for the present study on competencies required for integrating emerging technologies into university library services.

LIS Education at Gombe State University

Gombe State University has emerged as one of the important institutions contributing to the development of Library and Information Science education in North-East Nigeria. The commencement of the LIS Programme in the year 2023 marked a significant milestone in the history of librarianship in Gombe State. As obtained in the CCMAS Curriculum, the LIS programme in Gombe State University combines traditional library science courses with emerging technology-oriented subjects, including information retrieval, digital libraries, library automation, and research methods. Rubin (2016) observes that classification systems remain fundamental because they facilitate efficient access to information resources. While these traditional competencies continue to provide the intellectual foundation of librarianship, the inclusion of digital technologies demonstrates the programme's responsiveness to changes occurring within the information profession. This balance between conventional librarianship and technological innovation reflects contemporary expectations of LIS graduates.

Courses in digital libraries and automation further expose students to modern information systems used within contemporary libraries. Such practical exposure is increasingly important because employers expect graduates to possess both theoretical understanding and operational competence in digital information management. Therefore, the programme contributes not only to academic knowledge but also to workforce readiness within the evolving information society.

Professional Development in Librarianship

Professional development remains an indispensable aspect of librarianship because information technologies, user expectations, and scholarly communication continue to evolve rapidly.

Evans and Alire (2013) argue that continuing professional development enables librarians to adapt to technological changes and emerging user needs. This perspective recognizes that professional competence cannot be sustained solely

through formal education obtained before employment. Rather, continuous learning has become an essential requirement for maintaining professional relevance throughout one's career.

Professional associations further promote lifelong learning through conferences, workshops, seminars, mentoring programmes, and collaborative networks. These activities facilitate knowledge exchange and encourage the adoption of emerging best practices. Consequently, professional development should be viewed not as an optional activity but as an integral component of professional competence within Library and Information Science.

Emerging Technologies in Library and Information Science Education

The rapid advancement of information and communication technologies has transformed library services and Library and Information Science (LIS) education, requiring graduates to acquire competencies in emerging technologies that support digital scholarship, research, and information management.

Artificial Intelligence (AI). Russell and Norvig (2021) define artificial intelligence as "the study of intelligent agents capable of perceiving their environment and taking actions that maximize desired outcomes." In libraries, AI enhances information retrieval, automates cataloguing and metadata generation, personalizes recommendation services, and supports virtual reference. Ojobor, Okafor, and Ugwuanyi (2024) further observe that AI, machine learning, and data analytics are redefining modern library services, making AI competence an essential component of contemporary LIS education. Similarly, Cox, Pinfield, and Smith (2019) note that libraries now provide research data management services throughout the research lifecycle, positioning librarians as research partners and digital scholarship consultants. UNESCO (2021) identifies open science as an inclusive movement promoting accessibility, transparency, and collaboration in research, while Dwivedi et al. (2023) argue that generative AI is transforming knowledge work through human–machine collaboration. Consequently, LIS education must equip graduates with both the technical and ethical competencies needed for responsible AI adoption.

Cloud Computing. Cloud computing has become a strategic infrastructure for delivering scalable and cost-effective library services. The National Institute of Standards and Technology defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources" (Mell & Grance, 2011). Marston et al. (2021) explain that cloud computing now supports artificial intelligence, big data analytics, digital libraries, institutional repositories, and collaborative research environments. Likewise, Sultan (2022) notes that cloud-based services enable ubiquitous access to electronic resources and digital collections. Despite these benefits, concerns relating to security, privacy, vendor dependency, and regulatory compliance require robust governance and skilled professionals to manage cloud infrastructures effectively.

Internet of Things (IoT). The Internet of Things (IoT) is transforming academic libraries by connecting smart devices that collect and exchange data to improve service delivery. According to the International Telecommunication Union (2020), IoT facilitates communication among devices, people, and systems to support intelligent decision-making. Recent applications include smart shelving, automated inventory, environmental monitoring, and space management (Alqahtani et al., 2023). While IoT improves operational efficiency and enables evidence-based decision-making, its implementation also raises concerns regarding cybersecurity, privacy, interoperability, and the need for advanced technical competencies. IoT complements AI by providing real-time data that enhances intelligent library systems and digital resource management.

Blockchain Technology. Blockchain has emerged as a valuable technology for enhancing the security, transparency, and authenticity of digital information systems. Casino, Dasaklis, and Patsakis (2019) define blockchain as a decentralized and distributed digital ledger that records transactions securely and immutably without a central authority. Kouhizadeh, Saberi, and Sarkis (2021) note that blockchain applications now extend to scholarly publishing, copyright protection, digital identity management, research data preservation, and institutional repositories. Although adoption remains constrained by high costs, technical complexity, scalability issues, and limited expertise, blockchain has significant potential to strengthen research integrity, peer review, digital preservation, and trustworthy scholarly communication.

Overall, the literature demonstrates that artificial intelligence, cloud computing, the Internet of Things, and blockchain technology are reshaping Library and Information Science education and professional practice. Consequently, LIS curricula must continually evolve to equip graduates with the technological, ethical, and professional competencies required to support digital scholarship, scholarly communication, and AI-enabled library services.

Challenges Affecting LIS Education and Professional Development

Library and Information Science (LIS) education and professional development in many developing countries continue to face structural, technological, institutional, and policy-related challenges that affect the quality of professional training and the preparedness of graduates for increasingly digital information environments.

One of the most significant challenges is inadequate funding, which limits the provision of modern teaching facilities, current information resources, faculty research, and professional development opportunities. This problem is compounded by inadequate ICT infrastructure, including unreliable internet connectivity, obsolete computer systems, poorly equipped digital laboratories, and limited access to electronic resources. Aina (2014) observes that "the development of library and information services in many African countries is constrained by inadequate funding,

insufficient technological infrastructure, and limited access to digital resources." Consequently, many graduates possess theoretical knowledge but lack the practical technological competencies required in contemporary libraries.

Another major challenge is the shortage of qualified academic staff with expertise in emerging technologies such as artificial intelligence, research data management, digital preservation, information analytics, and cloud computing. Many LIS programmes continue to rely on traditional curricula that have not kept pace with technological innovation, creating a competency gap that affects graduates' employability and their ability to support digital scholarship and knowledge management. This situation is further aggravated by limited research funding, which restricts opportunities for innovation, international collaboration, scholarly publication, and the advancement of LIS education.

Curriculum modernization also remains essential. Rapid developments in artificial intelligence, big data, digital scholarship, open science, cloud computing, and information governance require regular curriculum review. Bawden and Robinson (2012) emphasize that "information technologies introduce new ethical and social challenges that information professionals must understand and manage responsibly." Therefore, curriculum reform should integrate not only technological competencies but also ethical reasoning, digital governance, privacy protection, intellectual property, and responsible AI practices.

The effective integration of emerging technologies is further constrained by inadequate technological infrastructure for practical instruction in areas such as artificial intelligence, digital libraries, institutional repositories, cloud computing, and research data management. As a result, students often have limited opportunities to develop hands-on experience with technologies used in modern information environments.

Ethical and legal concerns also complicate technology adoption, particularly regarding data privacy, intellectual property rights, algorithmic bias, transparency, accountability, and information security. In addition, limited access to continuing professional development programmes restricts practicing librarians' ability to update their competencies in emerging technologies, while organizational resistance to technological change, often driven by inadequate training, limited institutional support, and fear of technological displacement, further slows digital transformation within libraries.

Overall, the literature demonstrates that the challenges affecting LIS education are multidimensional and interconnected, encompassing inadequate funding, poor infrastructure, outdated curricula, insufficient research support, technological skills gaps, ethical concerns, and organizational resistance. Addressing these challenges requires integrated policy reforms, sustained institutional investment, curriculum modernization, technological advancement, and continuous professional development. These issues are directly relevant to the present study because they influence the preparedness of future information professionals to operate effectively in AI-driven and digitally transformed library environments.

Strategies for Strengthening LIS Education and Professional Development

Strengthening Library and Information Science (LIS) education and professional development requires coordinated efforts involving universities, governments, professional associations, regulatory bodies, and international partners. Sustainable improvement depends on integrated policies that respond to the rapidly evolving technological landscape.

A key strategy is continuous curriculum modernization to incorporate emerging areas such as artificial intelligence, digital librarianship, research data management, digital curation, information analytics, cybersecurity, and scholarly communication. Ocholla (2012) emphasizes that "LIS education must remain dynamic to respond to technological and societal changes." Regular curriculum review ensures that graduates acquire competencies aligned with current and future professional demands.

Improving ICT infrastructure is equally critical. Investment in high-speed internet, digital laboratories, institutional repositories, cloud-based information systems, artificial intelligence laboratories, and advanced computing facilities provides students with practical learning opportunities that bridge the gap between theory and professional practice. Similarly, adequate funding enables institutions to recruit qualified academic staff, support research, modernize facilities, subscribe to electronic resources, and strengthen continuous professional development, thereby enhancing educational quality, innovation, and research productivity.

Collaboration with international LIS schools, research institutions, and technology organizations further strengthens professional education through joint research, academic exchanges, curriculum benchmarking, internships, faculty development, and technology transfer. Such partnerships expose students and educators to international best practices while supporting the adaptation of global innovations to local information needs.

Expanding continuing professional development (CPD) is also essential for maintaining professional competence. Workshops, seminars, certification programmes, conferences, online learning, and specialized training enable librarians to remain responsive to technological change. Bawden and Robinson (2012) argue that "continuous professional development is essential for information professionals to remain relevant in rapidly changing knowledge environments," underscoring the importance of lifelong learning as a professional culture.

Interdisciplinary collaboration among LIS departments and related fields such as Computer Science, Data Science, Artificial Intelligence, Information Technology, and Educational Technology broadens graduates' competencies for managing complex digital information systems. Equally important are institutional policies that promote digital transformation through sustained investment in technological infrastructure, faculty development, ethical technology adoption, research support, data governance, cybersecurity, and innovation.

Overall, the literature indicates that strengthening LIS education requires an integrated approach combining curriculum innovation, technological investment, adequate funding, interdisciplinary collaboration, international partnerships, supportive institutional policies, and continuous professional development. Together, these mutually reinforcing strategies enhance the quality of LIS education and prepare graduates to deliver innovative, technology-enabled library and information services in increasingly digital and AI-driven environments.

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Library Automation, Artificial Intelligence and Emerging Technologies in the University of Nigeria, Nsukka Library System

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Abstract

This study examined library automation, artificial intelligence (AI) and emerging technologies in the University of Nigeria, Nsukka (UNN) library system. The study was guided by four research questions and adopted a descriptive survey design. The population comprised library staff and registered library users, while a simple random sampling procedure was used to select respondents. Data were collected with a structured questionnaire titled Library Automation, Artificial Intelligence and Emerging Technologies Questionnaire (LAAIETQ), designed on a four-point Likert scale. Out of 100 copies administered, 92 valid responses were returned and analysed using frequency counts, percentages and mean scores. Findings showed that library automation in the UNN library system was moderate, especially in OPAC, circulation and computer-based cataloguing. AI adoption was low, particularly in the use of chatbots, machine learning and intelligent retrieval tools. Emerging technologies such as cloud computing, RFID and digital repositories were moderately available and utilized, with digital repositories showing the strongest presence. The major barriers were inadequate funding, weak ICT infrastructure and limited staff capacity. The study concludes that the major institutional gap at UNN is not the total absence of technology but the slow movement from partial automation to integrated, intelligent and user-centred digital library services. It recommends targeted funding, phased AI adoption, staff reskilling, stronger ICT infrastructure, policy support and continuous assessment of user experience.

Keywords: Library automation; artificial intelligence; emerging technologies; academic libraries; smart libraries; University of Nigeria, Nsukka.

Introduction

Academic libraries remain central to the intellectual life of universities because they organise, preserve and provide access to knowledge needed for teaching, learning, research and community service. In earlier periods, many academic libraries depended largely on manual procedures for acquisition, cataloguing, circulation, serials control and reference services. That model is no longer adequate for the speed, scale and diversity of information needs in contemporary higher education. Students and researchers increasingly expect quick discovery, remote access, responsive reference support and seamless movement between physical and digital collections. In this context, library automation, artificial intelligence and emerging technologies have become practical conditions for the continued relevance of academic libraries.

Library automation is the application of computer-based systems to routine and professional library operations. It reduces duplication of effort, improves the accuracy of bibliographic records, supports online public access catalogues (OPAC), strengthens circulation control and makes management decisions more evidence-based. Automation also provides the foundation for advanced digital services because AI and smart technologies work better where records, user transactions and resource-management processes have already been digitised. Ikwuanusi, Onunka, Owoade, and Uzoka (2024) emphasised that advanced automation can improve efficiency in academic resource management when libraries deliberately connect technology to service objectives.

Artificial intelligence represents a deeper level of technological transformation. It involves systems that perform tasks associated with human intelligence, including pattern recognition, natural language processing, recommendation, prediction and adaptive response. In library settings, AI can support metadata generation, information retrieval, reference services, user education, collection development and administrative decision-making. Current scholarship shows that AI is becoming a major research and professional concern in librarianship, with attention to service innovation, ethics, staff competence and user-centred implementation (Ayinde et al., 2026; Cox & Wang, 2025; Mwantimwa & Msoffe, 2025).

Emerging technologies such as cloud computing, radio frequency identification (RFID), big data analytics, virtual and augmented reality, mobile applications and institutional repositories are also reshaping academic library service delivery. These technologies support smarter access, better security, improved preservation, remote services, user analytics and flexible learning support. However, the presence of technology does not automatically produce a smart library. Its value depends on funding, connectivity, staff competence, policy direction, ethical safeguards and users' willingness to adopt available services.

This study focuses on the University of Nigeria, Nsukka library system because a large and historically significant university library is expected to reflect both established professional practice and contemporary innovation. A focused institutional study provides useful evidence on the movement of Nigerian university libraries from manual or semi-automated practice towards intelligent, integrated and user-centred service delivery. The study therefore examines the extent of automation, the level of AI adoption, the availability and use of emerging technologies, and the challenges affecting their implementation in the UNN library system.

Statement of the Problem

The rapid development of ICT has changed how academic libraries acquire, organise, retrieve and deliver information. Globally, libraries are moving from manual service models to automated, digital and intelligent systems. Automation improves the efficiency of routine operations; AI supports personalised and predictive services; and emerging technologies create opportunities for smart library environments. Despite these possibilities, many academic libraries in developing contexts still experience uneven adoption and weak integration of these technologies.

In Nigeria, automation has been introduced in many university libraries, but implementation is often incomplete. Some libraries have OPACs but limited back-end integration; some have digital repositories but low visibility and inconsistent updating; while others have acquired software without adequate staff training or maintenance plans. AI adoption remains even more limited. Tools such as chatbots, machine learning-assisted retrieval, automated metadata generation and AI-supported user analytics are not yet common features of routine library service delivery. Studies on Nigerian academic libraries continue to identify poor infrastructure, inadequate funding, limited technical expertise and weak policy support as persistent barriers to AI and emerging technology adoption (Efevberha-Ogodo & Ivwighreghweta, 2023; Eiriemiokhale & Sulyman, 2023; Oton & Kolawole, 2025).

The problem becomes more specific when viewed from the University of Nigeria, Nsukka. As one of Nigeria's leading universities, UNN is expected to provide library services that match the needs of a large and diverse academic community. However, there is limited recent empirical evidence showing the actual extent to which automation, AI and emerging technologies have been adopted and used in its library system. It is not enough to assume technological progress because a university has a major library or a digital presence. What matters is the degree of functional use, the quality of integration, the competence of staff, the experience of users and the barriers that prevent full deployment. This study therefore addresses the gap between the technological expectations placed on a leading academic library and the actual level of adoption, integration and use of automation, AI and emerging technologies in the UNN library system.

Objectives of the Study

The main objective of the study was to examine library automation, artificial intelligence and emerging technologies in the University of Nigeria, Nsukka library system. Specifically, the study sought to:

(1) determine the extent of library automation in the UNN library system;

(2) examine the level of adoption of artificial intelligence in the UNN library system;

(3) identify the emerging technologies available and utilised in the UNN library system; and

(4) investigate the challenges affecting the adoption and use of library automation, AI and emerging technologies in the UNN library system.

Literature Review

The literature review is organized in line with the objectives of the study. It examines the extent of library automation in academic libraries, the level of adoption of artificial intelligence, the availability and utilization of emerging technologies, and the challenges affecting the adoption and use of these technologies in academic library systems.

Extent of Library Automation in Academic Libraries

Library automation refers to the application of computer-based systems, software, networks and databases to the routine and professional operations of libraries. In academic libraries, automation covers acquisition, cataloguing, classification support, circulation, serials control, inventory management, online public access catalogue (OPAC), user registration, report generation and general resource management. The major purpose of automation is to reduce manual routines, improve accuracy, save time, support wider access and enhance the overall quality of library service delivery.

Recent studies show that automation remains one of the most important foundations for digital transformation in academic libraries. Ocloo and King (2022), in their study of integrated library management systems in Ghanaian academic libraries, found that although many academic libraries had adopted integrated library management systems, the systems were not being fully utilized. This implies that the presence of automation software does not automatically mean that library operations are fully automated. A library may have an OPAC or automated circulation module but still depend on manual procedures in acquisition, serials control, inventory or user services.

In Nigeria, the automation of academic libraries has also been uneven. Olubiyo (2021) observed that automation improves library operations and service delivery, but its implementation is often affected by inadequate funding, poor infrastructure, erratic power supply and lack of skilled personnel. Ibrahim (2024) similarly noted that many academic libraries in developing environments still struggle with the full implementation of automated systems because of weak institutional support and limited technical capacity. These studies suggest that the extent of automation should not be measured only by whether a library has installed software, but by the level of functional use across different service units.

The literature therefore shows a gap between nominal automation and operational automation. Nominal automation exists when a library claims to have automated systems, while operational automation exists when those systems are actively used, integrated and sustained in daily library work. This gap is important to the present study because the University of Nigeria, Nsukka library system may have some automated services, but the actual extent of use, integration

and effectiveness requires empirical investigation. The present study therefore addresses this gap by determining the extent of library automation in the UNN library system, especially in OPAC, circulation and computer-based cataloguing.

Level of Adoption of Artificial Intelligence in Academic Libraries

Artificial intelligence refers to the ability of computer systems to perform tasks that normally require human intelligence, such as learning, reasoning, prediction, pattern recognition, natural language processing and decision support. In academic libraries, AI can be used in reference services, intelligent search, automated metadata generation, recommendation systems, plagiarism detection support, predictive analytics, user profiling, collection development and information literacy support.

Okunlaya, Syed Abdullah, and Alias (2022) developed an artificial intelligence library services framework for the digital transformation of university education. Their study shows that AI can support academic libraries by improving service personalization, resource discovery, reference assistance and administrative decision-making. However, the study also indicates that AI adoption requires technical readiness, staff competence and institutional planning. This means that AI should not be treated as a simple technological addition but as a strategic innovation that requires preparation.

In the Nigerian academic library environment, Ajani, Tella, Salawu, and Abdullahi (2022) examined librarians' awareness and readiness to integrate AI into library operations and services. Their findings showed that librarians were becoming aware of AI and its possible benefits, but readiness for full implementation remained limited. Constraints such as poor infrastructure, limited funding, lack of training and weak policy support affected the ability of libraries to adopt AI meaningfully. Eiriemiokhale and Sulyman (2023) also found that university librarians in Kwara State were aware of AI tools such as chatbots, but poor internet connectivity and inadequate expertise limited practical use.

Recent global studies also show that AI has become a major issue in librarianship. Mwantimwa and Msoffe (2025) found that generative AI is increasingly relevant to library operations and service delivery, especially in reference services, content support, user education and knowledge organization. Cox and Wang (2025) observed that AI is now an emerging research agenda in libraries, with growing attention to ethics, literacy, policy and professional transformation. Ayinde, Ebiefung, and Oladokun (2026) further reviewed AI adoption in academic libraries and reported that AI has strong potential for improving reference services, information retrieval and user engagement, but that adoption is still affected by funding limitations, poor infrastructure and inadequate librarian training.

The gap in the literature is that many studies focus on awareness, perception and possibilities of AI, while fewer studies examine the actual level of AI adoption in specific university libraries. There is also limited evidence on whether AI tools such as chatbots, machine learning-supported retrieval and AI-assisted library operations are part of daily service delivery in Nigerian university libraries. This study addresses that gap by examining the level of AI adoption in the University of Nigeria, Nsukka library system.

Emerging Technologies Available and Utilized in Academic Libraries

Emerging technologies are new or rapidly developing technologies that can transform how libraries organize, preserve, provide access to and deliver information services. In academic libraries, such technologies include cloud computing, radio frequency identification (RFID), institutional repositories, mobile applications, big data analytics, Internet of Things, virtual reality, augmented reality and blockchain. These technologies are closely connected to the smart library concept, where library services become more flexible, data-driven, responsive, interactive and user-centred.

Dube and Keita (2024) explain that digital transformation in African academic libraries has improved access to electronic resources, research visibility, user engagement and knowledge preservation. Their study shows that emerging technologies can help academic libraries move beyond the traditional reading-room model by supporting remote access, digital scholarship and improved service efficiency. However, they also emphasize that such transformation depends on adequate infrastructure, institutional support, digital skills and sustainability planning.

Institutional repositories are among the most visible emerging technologies in academic libraries. They support the preservation, organization and dissemination of theses, dissertations, journal articles, conference papers and other institutional research outputs. Cloud computing also supports remote storage, access and management of library services. RFID improves circulation, book tracking, inventory management and security. Big data analytics can help libraries understand user behaviour, resource use and service patterns, while mobile technologies support access to library services beyond the physical library building.

However, the literature also shows that availability does not always mean utilization. A library may have an institutional repository that is not regularly updated, an RFID system that is not fully connected to circulation services, or cloud-based services that users do not understand. This means that the study of emerging technologies must go beyond listing the technologies available in a library. It must also examine the level of actual use, integration and impact on service delivery.

The gap here is that many studies discuss emerging technologies broadly without clearly separating availability from utilization. Some studies identify technologies that libraries possess, but do not show whether staff and users actually use them effectively. This study addresses that gap by identifying the emerging technologies available and utilized in the University of Nigeria, Nsukka library system, particularly cloud computing, RFID and digital repositories.

Challenges Affecting the Adoption and Use of Library Automation, AI and Emerging Technologies

The adoption and use of library automation, AI and emerging technologies are influenced by several institutional, technical, human and financial factors. Although these technologies can improve library service delivery, they require funding, infrastructure, skilled personnel, policy direction, maintenance culture, user education and ethical safeguards. Without these supporting conditions, technological adoption may remain partial or ineffective.

Funding is one of the most commonly reported challenges in the literature. Automation software, AI tools, RFID systems, cloud platforms, digital repository maintenance, hardware replacement, internet subscription and system upgrades require sustained financial investment. Olubiyo (2021) noted that inadequate funding remains a major barrier to effective automation in academic libraries. Dube and Keita (2024) also identified limited budget as one of the major obstacles to digital transformation in African academic libraries. This suggests that libraries cannot sustain technology-based services without regular financial support from university management and other stakeholders.

ICT infrastructure is another major challenge. Poor internet connectivity, unstable electricity supply, outdated computers, limited bandwidth, weak server capacity and poor technical support can reduce the effectiveness of automated and digital services. Ajani et al. (2022) and Eiriemiokhale and Sulyman (2023) both observed that infrastructure-related problems limit the readiness and ability of Nigerian academic libraries to adopt AI and related technologies. This is particularly important because AI and emerging technologies depend heavily on connectivity, data, reliable systems and continuous access.

Staff competence also affects adoption. The Association of College and Research Libraries (2025) emphasizes that academic library workers need AI competencies, including the ability to understand AI concepts, evaluate AI-generated outputs, recognize bias, protect user privacy and guide users in responsible AI use. Ali and Richardson (2025) similarly argue that AI literacy is becoming essential for academic librarians and library users. These studies show that library technology adoption is not only about acquiring tools but also about preparing people to use them responsibly and effectively.

Policy and ethical issues also constitute major challenges. AI adoption raises concerns about accuracy, bias, intellectual property, data privacy, transparency and accountability. Emerging technologies such as big data analytics and cloud computing also require clear policies on data protection, access control and responsible use. Without policy direction, libraries may either avoid useful technologies or adopt them in ways that expose users and institutions to risks.

The gap in the literature is that challenges are often discussed generally, but there is limited institution-specific evidence showing which challenges most strongly affect particular university libraries. In the case of UNN, it is necessary to know whether the major barriers are funding, ICT infrastructure, staff training, policy gaps, user awareness or a combination of these factors. This study therefore investigates the challenges affecting the adoption and use of library automation, AI and emerging technologies in the UNN library system.

The reviewed literature reveals four major gaps that align with the objectives of this study. First, there is a gap between the presence of automated systems and their full operational use in academic libraries. Second, there is a gap between awareness of artificial intelligence and actual adoption of AI tools in routine library services. Third, there is a gap between the availability of emerging technologies and their effective utilization by staff and users. Fourth, there is a gap in institution-specific evidence on the challenges affecting the adoption and use of automation, AI and emerging technologies in major Nigerian university libraries.

The present study is therefore justified because it examines these issues in the University of Nigeria, Nsukka library system. By aligning the literature with the objectives of the study, the review shows that the study is not merely describing technology in libraries, but investigating the actual extent, adoption, utilization and barriers affecting technological transformation in a specific academic library environment.

The study is anchored on the Technology Acceptance Model developed by Davis (1989), with support from Rogers' (2003) diffusion of innovations theory. TAM explains technology adoption through perceived usefulness and perceived ease of use. In this study, library staff and users are more likely to adopt automation, AI and emerging technologies when they believe the technologies improve access, save time, reduce stress and are not too difficult to use. Rogers' theory complements TAM by explaining how new technologies spread within a social system through relative advantage, compatibility, complexity, trialability and observability. These concepts are relevant because staff may resist technologies they perceive as too complex, incompatible with existing routines or threatening to professional roles. Users may also ignore digital services if the benefits are not visible or if the services are difficult to access.

The literature shows that automation, AI and emerging technologies are connected stages of digital library transformation. Automation provides the operational foundation, AI adds intelligence and adaptive response, while emerging technologies create the wider smart-service environment. However, a clear gap remains in institution-specific evidence from Nigerian university libraries. Many studies discuss technology adoption generally, while fewer studies examine how automation, AI and emerging technologies are actually available, used and constrained in a specific library system. This study addresses that gap by focusing on the UNN library system.

Methodology

The study adopted a descriptive survey research design. This design was appropriate because the study sought to collect the opinions and experiences of library staff and users on the current state of library automation, AI and emerging technologies in the University of Nigeria, Nsukka library system. The study area was the University of Nigeria, Nsukka, Enugu State, with particular attention to its academic library system, including the Nnamdi Azikiwe Library.

The population consisted of library staff and registered library users. A simple random sampling technique was used to give respondents a fair chance of participation. One hundred copies of the questionnaire were administered, while 92 valid copies were returned and used for analysis. This represents a 92% response rate, which was considered adequate for the study.

The instrument for data collection was a structured questionnaire titled Library Automation, Artificial Intelligence and Emerging Technologies Questionnaire (LAAIETQ). The questionnaire was designed on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). The instrument covered demographic information, extent of automation, AI adoption, emerging technologies and challenges affecting implementation. The instrument was validated by experts in Library and Information Science to ensure face and content validity. Reliability was determined using Cronbach's alpha to establish internal consistency.

Data were analysed using frequency counts, percentages and mean scores. A mean benchmark of 2.50 was used as the decision rule. Mean scores of 2.50 and above were interpreted as agreement or positive indication, while mean scores below 2.50 were interpreted as disagreement or low indication. Since the available dataset did not include respondent-level correlation values, the study was treated as a descriptive survey and no inferential hypothesis test was reported.

Results

A total of 100 copies of the questionnaire were distributed, and 92 valid copies were returned and analysed. The results are presented according to the research questions.

Table 1: Distribution of respondents by status

Category	Frequency	Percentage (%)
Library staff	32	34.8
Undergraduate students	40	43.5
Postgraduate students	20	21.7
Total	**92**	**100.0**

The distribution shows that undergraduate students formed the largest respondent group, followed by library staff and postgraduate students. This mix is useful because the study required both service-provider and service-user perspectives.

Table 2: Extent of library automation in the UNN library system

Items	SA	A	D	SD	Mean	Decision
OPAC is fully functional in the library	30	40	15	7	3.01	Agreed
Circulation services are automated	28	35	20	9	2.89	Agreed
Cataloguing is computer-based	25	38	18	11	2.83	Agreed
Grand mean					**2.91**	**Moderate extent**

The grand mean of 2.91 shows that library automation is moderately implemented in the UNN library system. OPAC, circulation and computer-based cataloguing recorded positive mean scores, suggesting progress beyond fully manual operations but not yet comprehensive automation.

Table 3: Level of AI adoption in the UNN library system

Items	SA	A	D	SD	Mean	Decision
AI chatbots are used in library services	15	25	30	22	2.38	Disagreed
AI tools support information retrieval	18	28	26	20	2.47	Disagreed
Machine learning is used in library operations	10	20	35	27	2.10	Disagreed
Grand mean					**2.32**	**Low level**

The grand mean of 2.32 indicates a low level of AI adoption. Respondents did not strongly confirm the routine use of AI chatbots, AI-supported retrieval or machine learning in library operations.

Table 4: Emerging technologies available and utilised in the UNN library system

Items	SA	A	D	SD	Mean	Decision

Cloud computing is used for library services	20	30	25	17	2.63	Agreed
RFID technology is used for book tracking	22	28	24	18	2.62	Agreed
Digital repositories are available	35	40	10	7	3.11	Agreed
Grand mean					**2.79**	**Moderate availability and use**

The grand mean of 2.79 shows that emerging technologies are moderately available and utilised. Digital repositories recorded the strongest mean, while cloud computing and RFID reflected modest but positive utilisation.

Table 5: Challenges affecting adoption and use of automation, AI and emerging technologies

Items	SA	A	D	SD	Mean	Decision
Lack of funding affects adoption	40	35	10	7	3.17	Agreed
Poor ICT infrastructure is a challenge	38	30	15	9	3.05	Agreed
Lack of trained staff affects implementation	35	33	14	10	3.01	Agreed
Grand mean					**3.08**	**Major challenge**

The grand mean of 3.08 indicates that funding, ICT infrastructure and staff capacity are major barriers to the adoption and use of automation, AI and emerging technologies in the UNN library system.

Discussion of Findings

The findings show that the UNN library system has made progress in automation but has not fully achieved integrated digital transformation. The moderate implementation of OPAC, circulation and computer-based cataloguing suggests that the library has foundational technologies. However, the evidence does not indicate comprehensive integration across all library operations. This supports the argument that automation should be assessed by functional depth and integration rather than by the mere presence of a software system.

The low level of AI adoption is one of the most important findings of the study. It demonstrates that the library is yet to benefit substantially from intelligent reference support, personalised discovery, automated metadata assistance and predictive analytics. This finding aligns with recent literature showing that AI is gaining attention in librarianship but remains unevenly adopted, especially in contexts where infrastructure, policy and staff capacity are still developing (Ayinde et al., 2026; Efevberha-Ogodo & Ivwighreghweta, 2023; Oton & Kolawole, 2025). For UNN, the finding suggests that AI should be approached through a phased model beginning with low-risk services such as AI-assisted FAQs, discovery support and staff training.

The moderate availability and use of emerging technologies indicate that UNN is not technologically inactive. The strong mean for digital repositories suggests an existing platform for digital scholarship and institutional visibility. However, cloud services and RFID appear to need stronger integration. The finding suggests that the library has pieces of a smart library structure, but these pieces need to be connected through policy, infrastructure and service design.

The challenges reported by respondents explain why the technology gap persists. Funding affects acquisition, maintenance, licensing and upgrading. Weak ICT infrastructure affects access, speed and reliability. Lack of trained staff affects confidence, sustainability and quality of service. These challenges confirm that technology adoption is not only about buying systems; it is about sustaining an ecosystem that includes people, infrastructure, policy, ethics and evaluation.

Conclusion

This study concludes that the University of Nigeria, Nsukka library system is in a transitional stage of technological development. It has moved beyond a purely manual service model and has recorded moderate progress in automation and some emerging technologies. However, the findings also show that the library has not fully crossed into an integrated smart library environment. The strongest gap established by the study is the gap between partial automation and intelligent, connected, user-centred service delivery.

The conclusion is drawn directly from the literature gaps and the findings. First, the gap between nominal and operational automation is reflected in the moderate automation score. Second, the gap between AI awareness and AI use is confirmed by the low mean score for AI adoption. Third, the gap between availability and utilisation is confirmed by the moderate use of emerging technologies. Finally, the gap in institutional readiness is confirmed by the high mean scores for funding, infrastructure and staff-capacity challenges. In essence, the major issue is not the total absence of technology but the limited depth, integration and sustainability of technological adoption.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Since library automation in the UNN library system was found to be moderate, the university management should strengthen existing automated services such as OPAC, circulation and computer-based cataloguing through regular upgrades, maintenance and better integration of library operations.
2. The library should move from partial automation to fuller operational automation by extending automation to acquisition, serials control, inventory management, user registration and report generation in order to improve service efficiency.
3. Since AI adoption was found to be low, the library should adopt AI gradually, beginning with simple applications such as AI-supported reference FAQs, chatbot services, automated user guidance and AI-assisted information retrieval before moving to advanced machine learning tools.
4. Since emerging technologies were found to be moderately available and utilized, the library should improve the use of digital repositories, cloud computing and RFID by integrating them into routine services such as resource discovery, circulation, inventory control, preservation and remote access.
5. Since inadequate funding, poor ICT infrastructure and limited staff capacity were identified as major challenges, university management should provide sustained funding, reliable internet connectivity, stable power supply, modern ICT facilities and regular staff training in automation, AI literacy, digital repositories, RFID management and data ethics.
6. The library should develop a clear technology policy and monitoring framework to guide responsible AI use, data privacy, staff roles, user training, system maintenance and periodic evaluation of automated, AI-supported and emerging technology services.

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MASTERING THE DRIVERS AND OBSTACLES OF SCHOLARLY COMMUNICATIONS AMONG LECTURERS IN KWARA STATE UNIVERSITY, MALETE

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Abstract

This study examined the drivers and obstacles of scholarly communication among lecturers at Kwara State University, Malete, Nigeria, with particular attention to their awareness and use of digital scholarly communication platforms. The study adopted a descriptive survey research design. The population comprised all 356 lecturers of the University, stratified random sampling technique was used and 284 valid responses were obtained through a structured questionnaire designed with Google Forms and distributed electronically via WhatsApp Messenger. Data were analysed using descriptive statistics such as frequency counts, percentages, mean, and standard deviation. Findings revealed that lecturers are strongly motivated to engage in scholarly communication due to factors such as research visibility, career advancement, professional recognition, institutional requirements, and collaboration opportunities. However, pivotal obstacles were identified, including high publication fees, inadequate research funding, heavy teaching workload, poor internet connectivity, and limited institutional support. The findings further showed that while lecturers possess a high level of awareness of digital scholarly communication platforms such as institutional repositories, open access journals, and academic social networking sites, their actual usage remains moderate. The study concluded that scholarly communication among lecturers is influenced by a combination of strong motivational drivers and persistent structural and technological challenges. It recommended improved ICT infrastructure, increased research funding, regular capacity-building programmes, workload moderation, and stronger institutional support to enhance effective scholarly communication. The paper has strong implications for policymakers and university administrators in strengthening research productivity and academic visibility in Nigerian universities.

Keywords: Scholarly Communication, Digital Platforms, Research Visibility, Academic Productivity, Institutional Support, Research dissemination, Kwara State.

Introduction

Scholarly communication is the cornerstone of academic life, encompassing the processes through which lecturers create, share, evaluate, and preserve knowledge within and beyond their institutions. This process enables knowledge exchange, stimulates intellectual discourse, and enhances the overall impact and visibility of scholarly work (Okafor & Eze, 2024). Scholarly communication is widely acknowledged as a core component of the academic cycle, involving the creation, dissemination, and long-term preservation of research outputs through both formal and informal platforms such as journal publications, conference proceedings, institutional repositories, and academic networking platforms. Tenopir et al. (2016) stated that these processes have been significantly transformed by information and communication technologies, enabling wider access, faster dissemination, and increased research visibility across geographical

boundaries. Through activities such as research publication, conference participation, academic networking, and digital knowledge dissemination, scholarly communication enables intellectual exchange, advances disciplinary knowledge, and enhances the visibility and impact of academic work. Ogunbadejo et al. (2025) emphasized that scholarly communication plays a vital role in enhancing research visibility and academic knowledge dissemination in Nigeria. Tenopir et al. (2016) stated that scholarly communication supports intellectual exchange, ensures the credibility of academic work through peer review, and enhances the visibility and impact of research outputs across disciplinary and geographical boundaries. Scholarly communication has become increasingly important due to the growing emphasis on research productivity, global ranking systems, and the use of digital technologies to support teaching, learning, and research.

Globally, the landscape of scholarly communication has evolved significantly with the advent of information and communication technologies (ICTs). Digital platforms such as open access journals, institutional repositories, academic social networking sites, and online collaborative tools have transformed how knowledge is produced and disseminated. According to Bakare, Saadu, and Abioye (2021), the advent of information and communication technologies (ICTs) has significantly transformed scholarly communication, leading to the widespread adoption of electronic resources. D'Alessandro et al. (2020) stated that academic social networking sites provides a forum for scholars to disseminate their published and unpublished works, exchange publications, discuss research-related issues, increase their scholarly visibility, and carry out objective self-assessment (ranking) within a specific discipline. These developments have reduced geographical barriers, encouraged interdisciplinary collaboration, and accelerated the diffusion of research findings. Nicholas et al. (2017) observed that digital scholarly communication tools such as electronic journals, open access platforms, and academic social networking sites enhance research visibility and collaboration among scholars across institutions and countries. However, the ability of academics to fully harness these opportunities depends largely on institutional support, individual competencies, and access to enabling infrastructures.

In developing countries, particularly in sub-Saharan Africa, scholarly communication practices among university lecturers are often constrained by systemic challenges. Issues such as inadequate research funding, limited access to scholarly databases, unstable internet connectivity, high publication costs, and insufficient institutional incentives continue to impede effective scholarly engagement. Empirical evidences indicate that inadequate ICT infrastructure, limited access to electronic resources, and insufficient training significantly constrain effective scholarly communication, particularly in developing countries (Gamji et al., 2021; Okocha & Edafewotu, 2022). Furthermore, Adeleke et al. (2021) found that digital competence, institutional ICT policies, and training opportunities significantly influence academics' adoption of electronic scholarly communication systems in universities. Madu et al. (2025) indicated that ICT access, digital literacy, and institutional support significantly influence the effective use of electronic scholarly communication tools in academic environments. Nigerian universities are not exempt from these challenges, as lecturers frequently struggle to balance heavy teaching workloads with research and publication demands, while navigating an evolving and increasingly competitive scholarly environment. Adeleye (2021) found that heavy teaching workload and administrative responsibilities significantly reduce lecturers' research output in Nigerian universities. Similarly, Sinkalu (2026) reported that organizational culture and workload pressure are major determinants of research productivity, with excessive workload limiting scholarly engagement. Also, Oguche, Eze and Egbunu (2025) found that motivations such as enhancing research discoverability and compliance with institutional mandates encourage participation in scholarly communication, yet infrastructural challenges like poor internet connectivity and heavy workloads remain major barriers.

However, the increasing reliance on digital technologies for research dissemination, collaboration, and knowledge sharing has made scholarly communication a complex process influenced by individual, technological, and institutional factors. Understanding these factors requires a sound theoretical foundation. Consequently, this study is anchored on Activity Theory and the Diffusion of Innovations (DOI) Theory. Activity Theory provides a useful lens for examining how lecturers interact with technological tools, institutional policies, and social environments in carrying out scholarly communication activities. On the other hand, the Diffusion of Innovations Theory explains how awareness, perceived usefulness, and adoption of digital scholarly communication platforms influence research dissemination practices among academics. These theories collectively provide a framework for understanding the drivers, obstacles, and utilisation of digital scholarly communication platforms among lecturers, which constitute the central focus of this study. This signals to the fact that Activity Theory explains the drivers and obstacles of scholarly communication. While Diffusion of Innovations Theory explains the awareness, adoption, and use of digital scholarly communication platforms. Consequently, the theories are directly connected to the study objectives and research questions.

Despite these obstacles, lecturers continue to engage in scholarly communication as a strategic endeavour to increase their research visibility and academic impact. Salisu and Okpala (2024) indicated that institutional support mechanisms, training in digital tools, and the strategic use of open access platforms can enhance lecturers' capacity to communicate their research effectively. However, the extent to which these drivers operate, and how they interact with barriers such as infrastructural inadequacies, professional workloads, and policy environments, remains under-researched, particularly in the context of specific Nigerian universities. Kwara State University, Malete like many Nigerian tertiary institutions aspire to strengthen its research culture and improve lecturers' scholarly communication practices. Yet,

empirical evidence on the drivers that motivate lecturers to engage in scholarly communication, and the obstacles that hinder their effectiveness, is limited. A nuanced understanding of these factors is essential for designing targeted interventions that can improve research output, enhance academic visibility, and support institutional goals. Thus, this study investigated the drivers and obstacles of scholarly communications among lecturers at Kwara State University, with the aim of informing policies and practices that promote a vibrant and productive scholarly environment.

Research Questions

The following research questions are tailored for this study:

1. What are the major drivers that motivate lecturers in Kwara State University to engage in scholarly communication activities?
2. What are the key obstacles hindering scholarly communication participation among lecturers in Kwara State University? and
3. What is the level of awareness and use of digital scholarly communication platforms by lecturers in Kwara State University?

Literature Review

Scholarly communication refers to the processes and systems through which academic knowledge is produced, evaluated, disseminated, and preserved. It is the structured and evolving processes through which academics and researchers create, evaluate, disseminate, access, and preserve scholarly knowledge within and across disciplinary and institutional boundaries. According to Bakare, Saadu and Abioye (2021), scholarly communication is the process that helps in the creation, absorption, dissemination, and application of knowledge and it also helps in advancing knowledge, monitoring breakthroughs, and investigating ways to exploit important research results for private, commercial, and public economic gains. In the digital era, scholarly communication has evolved beyond print-based systems to include electronic-based systems such as digital publishing, open access models, digital repositories, and online collaboration platforms, which enhance research visibility, dissemination range, and global accessibility and retrieval. Wuerscha et al. (2024) reported that digital transformation has fundamentally reshaped scholarly communication, leading to digital scholarly ecosystems supported by ICT, platforms, and online collaboration tools. Also, Adomako and Nguyen (2024) found that digitalization promotes inter-organizational collaboration and knowledge transfer, which are key elements of modern scholarly communication systems. Furthermore, Piwowar et al. (2018) observed that open access publishing, in particular, increases citation impact and accelerates the circulation of knowledge by removing financial and geographical barriers to information access. Oguche, Eze & Egbunu (2025) stated that in university settings, effective scholarly communication is essential for research uptake, collaboration, and academic visibility. In this sense, academic use of digital tools such as institutional repositories and academic social networks has been shown to improve research visibility and enable lecturers to share findings beyond traditional print channels.

Lecturers often engage in scholarly communication to increase the visibility of their research and meet institutional expectations for research output. As scholarly communication is now a core requirement for faculty promotion, hence, the priority and attention accorded it (Oyedipe et al, 2017). Academics are motivated to communicate their research in order to increase visibility, citation impact, and scholarly recognition within their disciplines and beyond. Compliance with university mandates and the desire for professional recognition are strong drivers that influence participation in research dissemination activities (Oguche, Eze & Egbunu, 2025). However, availability of digital infrastructure has been identified as a key driver of scholarly communication. The availability of electronic journals, open access platforms, institutional repositories, and academic social networking sites simplify and accelerate research dissemination and collaboration across geographical boundaries. Philip et al. (2025) emphasized that factors such as availability of ICT infrastructure, perceived usefulness of technologies, digital literacy, and institutional support significantly influence lecturers' adoption of scholarly communication tools. Furthermore, institutional policies, mentoring, and collaborative networks could encourage lecturers to engage in scholarly communication. Madu et al. (2025) emphasized that institutional support, funding, and recognition systems are key drivers of open science adoption and research dissemination among academics. Also, Oguche et al. (2025) observed that recognition of academic output and institutional encouragement significantly improve engagement in scholarly communication platforms. Consequently, supportive institutional environments such as research-friendly policies, access to grants, sabbatical opportunities, functional libraries, and ICT infrastructure encourage active participation in scholarly communication.

Despite the clear drivers, scholarly communication among lecturers is often constrained by a range of institutional, technological, economic, and individual challenges, particularly within developing academic environments. Research in Nigerian contexts consistently reveals that poor internet connectivity, inconsistent power supply, and limited access to ICT resources frustrate lecturers' ability to engage in digital scholarly communication. For instance, Philip et al. (2025) revealed that limited institutional support such as inadequate funding for research tools, lack of training opportunities, and absence of robust ICT units remains a significant barrier to technology adoption for scholarly communication. However, even when digital tools are available, limited digital literacy can hinder the use of digital scholarly communication platforms. Nicholas et al. (2017) revealed that lecturers who lack adequate digital competencies often experience difficulties in navigating institutional repositories, academic social networking sites, and online research collaboration platforms, which negatively affects adoption and sustained utilisation. Cappelli and Akkari

(2025) emphasized that inadequate ICT skills, lack of structured training, and low self-efficacy significantly limit academics' effective use of digital scholarly communication platforms. Similarly, Mastellos et al. (2018) revealed that even when ICT tools are introduced, lack of training leads to poor utilisation and low confidence among users, especially in developing contexts. Furthermore, heavy teaching loads and administrative duties reduce the time lecturers can devote to publishing and engaging with scholarly networks. Sinkalu (2026) emphasized that excessive teaching loads and non-academic responsibilities have been identified as major deterrents to research productivity and sustained scholarly communication, as they reduce the time available for research, writing, and collaboration. Also, Adetayo (2021) emphasized that academic workload significantly reduces lecturers' research productivity in Nigerian universities as heavy teaching and administrative duties limit time for publishing and collaboration. In this sense, excessive teaching responsibilities, and administrative duties reduce the time and energy available for research, writing, and participation in scholarly communication activities.

Theoretical Framework

The theoretical underpinning of this study is drawn primarily from Activity Theory and the Diffusion of Innovations (DOI) Theory, as both provide valuable insights into the processes, drivers, and obstacles associated with scholarly communication.

Activity Theory, developed by Vygotsky (1978) and later expanded by Engeström (1987), posits that human activities are mediated by tools, rules, community, and division of labor within a system. In the context of scholarly communication, lecturers' engagement in knowledge creation, dissemination, and preservation can be viewed as an activity system where: subjects are the lecturers in Kwara State University; objects are research outputs and knowledge to be communicated; tools are digital platforms, journals, conferences, and ICT infrastructure; rules are institutional policies, academic norms, and professional expectations; community are colleagues, students, research networks, and global scholarly audiences; while division of labor are the roles lecturers, librarians, and administrators play in facilitating research dissemination. Activity Theory highlights that effective scholarly communication depends not only on individual motivation but also on interactions within the institutional and technological environment. Barriers such as poor ICT infrastructure or lack of institutional support create tensions within the system, affecting lecturers' ability to disseminate knowledge efficiently (Engeström, 2001). This framework allows the study to examine how drivers and obstacles interact lecturers' scholarly communication practices.

The Diffusion of Innovations Theory, proposed by Rogers (2003), explains how new ideas, technologies, or practices are adopted within a social system over time. It identifies key factors for adoption such as Relative Advantage: the perceived benefits of using digital tools for scholarly communication such as increased visibility, compliance with institutional mandates). Compatibility: the extent to which tools and platforms align with lecturers' existing practices and research workflows. Complexity: the perceived difficulty of using digital tools. Trialability: the opportunities to experiment with platforms before full adoption. Observability: the visibility of benefits from peers successfully engaging in scholarly communication. Applying DOI Theory, lecturers' adoption of digital platforms, open-access repositories, and academic social networks can be understood as a process for perceived benefits, ease of use, and institutional encouragement. Obstacles such as lack of training, heavy workloads, or poor ICT infrastructure can slow adoption, whereas incentives and supportive policies can accelerate it (Philip et al., 2025).

However, by combining Activity Theory and DOI Theory, this study gains a holistic lens for understanding scholarly communication among lecturers. Activity Theory frames the institutional and social context, illustrating how tools, rules, and community shape behavior, while DOI Theory explains individual adoption of technologies and innovations that facilitate scholarly communication. Together, these theories allow the study to examined both drivers and obstacles, linking personal motivation, technological adoption, and institutional dynamics in a coherent analytical framework.

Methodology

The study employed a descriptive survey research design to investigate the drivers and obstacles of scholarly communication among lecturers at Kwara State University, Malete, Nigeria. The population consisted of all 356 lecturers across the 11 faculties of the University. A stratified random sampling technique was adopted to ensure proportional representation of lecturers from each faculty. The instrument used for data collection was a structured questionnaire titled *"Drivers and Obstacles of Scholarly Communication Questionnaire (DOSCQ)"*. The questionnaire was divided into four sections with a total of 26 items excluding demographic questions. Section A: elicited respondents' demographic information which are faculty, academic rank, years of teaching experience, and highest educational qualification. Section B: contained items on the drivers of scholarly communication among lecturers with 8 items. Section C: focused on the obstacles hindering lecturers' participation in scholarly communication activities with 9 items, while Section D: contained items on the awareness and use of digital scholarly communication platforms with 9 items. A four-point Likert-type response format was adopted for Sections B, C, and D. Respondents were required to indicate their level of agreement with each statement using the following scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. The choice of a four-point scale was intended to encourage respondents to make clear choices without a neutral option. The instrument was validated by experts in Library and Information Science and Research Methodology. Following the validation process, the questionnaire was pretested using 20 lecturers from the University of Ilorin, who were not part of the study population. Data generated from the pilot test were subjected to

Cronbach's Alpha analysis, yielding a reliability coefficient of 0.84. Based on the feedback received and the reliability outcome, necessary adjustments were made before the final administration of the instrument. The questionnaire was created using Google Forms, and the link was distributed electronically to respondents via direct messages on WhatsApp Messenger, remaining active for a period of 40 days. Participants were informed of the study's purpose and assured of the confidentiality of their responses, with periodic reminders sent to enhance the response rate. After 40 days of active, a total of 284(79.7%) valid responses were obtained and used for the study. Data collected were analysed using descriptive statistics including frequency counts, percentages, mean, and standard deviation with the aid of the Statistical Package for the Social Sciences (SPSS). The assumed mean (criterion mean) of the study is 2.50. Ethical considerations such as voluntary participation, informed consent, anonymity, and confidentiality were strictly adhered to throughout the study.

Results/Findings

Table 1: *What are the major drivers that motivate lecturers in Kwara State University to engage in scholarly communication activities?*

Drivers of Scholarly Communication	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
Career advancement (promotion and tenure) motivates me to publish my research.	140 (56.5%)	80 (32.3%)	18 (7.3%)	10 (4.0%)	3.41	0.79
Access to digital platforms (e.g., online journals, repositories) encourages my research dissemination.	130 (52.4%)	85 (34.3%)	20 (8.1%)	13 (5.2%)	3.34	0.85
Professional recognition and academic reputation drive my scholarly communication activities.	145 (58.5%)	75 (30.2%)	18 (7.3%)	10 (4.0%)	3.43	0.78
Institutional requirements encourage me to participate in scholarly communication.	120 (48.4%)	90 (36.3%)	25 (10.1%)	13 (5.2%)	3.28	0.87
Collaboration with colleagues motivates me to publish and share research findings.	125 (50.4%)	88 (35.5%)	22 (8.9%)	13 (5.2%)	3.31	0.86
Participation in conferences and seminars motivates my research dissemination.	135 (54.4%)	82 (33.1%)	20 (8.1%)	11 (4.4%)	3.38	0.82
I engage in scholarly communication to enhance my research visibility.	150 (60.5%)	70 (28.2%)	18 (7.3%)	10 (4.0%)	3.45	0.77
Availability of research funding motivates me to engage in scholarly communication.	110 (44.4%)	92 (37.1%)	30 (12.1%)	16 (6.5%)	3.19	0.91
Grand Mean = 3.35						

The analysis of data in Table 1 revealed that the respondents demonstrated a high level of agreement with the factors identified as drivers of scholarly communication, as indicated by the grand mean of 3.35 (on a 4-point Likert scale). This suggests that the listed drivers motivate lecturers to engage in research communication activities. Specifically, *"I engage in scholarly communication to enhance my research visibility"* recorded the highest mean score ($\bar{x}$ = 3.45), indicating that increasing research visibility is the most influential driver of scholarly communication among lecturers. This is closely followed by *professional recognition and academic reputation* ($\bar{x}$ = 3.43) and *career advancement (promotion and tenure)* ($\bar{x}$ = 3.41), highlighting the importance of both intrinsic and extrinsic motivations in driving scholarly engagement. Furthermore, *participation in conferences and seminars* ($\bar{x}$ = 3.38) and *access to digital platforms* ($\bar{x}$ = 3.34) also ranked highly, indicating that opportunities for academic interaction and availability of digital dissemination tools play significant roles in enhancing scholarly communication. Similarly, *collaboration with colleagues* ($\bar{x}$ = 3.31) and *institutional requirements* ($\bar{x}$ = 3.28) were positively rated, suggesting that both peer influence and institutional expectations contribute meaningfully to lecturers' research dissemination practices. However, *availability of research funding* recorded the lowest mean score ($\bar{x}$ = 3.19) among the listed drivers, although still above the benchmark mean of 2.50. This implies that while funding remains an important motivating factor, it is relatively less influential compared to other drivers such as visibility, recognition, and career progression. The relatively low standard deviation values across the items indicate consistency in respondents' opinions, suggesting a general consensus among lecturers regarding the factors that motivate their engagement in scholarly communication.

Table 2: *What are the key obstacles hindering scholarly communication participation among lecturers in Kwara State University?*

Obstacles of Scholarly Communication	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
High publication fees discourage me from publishing in reputable journals.	150 (60.5%)	70 (28.2%)	18 (7.3%)	10 (4.0%)	3.45	0.77

Lack of research funding hinders my participation in scholarly communication.	145 (58.5%)	75 (30.2%)	18 (7.3%)	10 (4.0%)	3.43	0.78
Limited time due to administrative responsibilities affects my scholarly output.	130 (52.4%)	85 (34.3%)	20 (8.1%)	13 (5.2%)	3.34	0.85
Inadequate access to scholarly databases limits my research productivity.	125 (50.4%)	88 (35.5%)	22 (8.9%)	13 (5.2%)	3.31	0.86
Heavy teaching workload limits my ability to engage in scholarly communication.	140 (56.5%)	80 (32.3%)	18 (7.3%)	10 (4.0%)	3.41	0.79
Lack of training in digital tools hinders my use of scholarly communication platforms.	120 (48.4%)	90 (36.3%)	25 (10.1%)	13 (5.2%)	3.28	0.87
Difficulty in publishing in high-impact journals discourages me from submitting manuscripts.	135 (54.4%)	82 (33.1%)	20 (8.1%)	11 (4.4%)	3.38	0.82
Lack of institutional support reduces my motivation to engage in scholarly communication.	128 (51.6%)	85 (34.3%)	22 (8.9%)	13 (5.2%)	3.30	0.86
Poor internet connectivity affects my ability to access and disseminate research.	138 (55.6%)	80 (32.3%)	18 (7.3%)	12 (4.8%)	3.39	0.81
Grand Mean = 3.36						

The analysis of data Table 2 indicated that the respondents strongly agree that several factors constitute to obstacles of scholarly communication, as reflected in the grand mean of 3.36 on a 4-point Likert scale. This suggested a high level of consensus among respondents that these challenges substantially hinder their ability to effectively disseminate research. Among the identified obstacles, *"High publication fees discourage me from publishing in reputable journals"* recorded the highest mean score ($\bar{x}$ = 3.45), indicating that financial constraints associated with publishing are the most critical barrier faced by lecturers. This is closely followed by *lack of research funding* ($\bar{x}$ = 3.43), further emphasizing the central role of financial limitations in restricting scholarly communication activities. Additionally, *heavy teaching workload* ($\bar{x}$ = 3.41) and *poor internet connectivity* ($\bar{x}$ = 3.39) were highly rated, suggesting that both workload pressures and infrastructural challenges significantly affect lecturers' research dissemination efforts. Similarly, *difficulty in publishing in high-impact journals* ($\bar{x}$ = 3.38) and *limited time due to administrative responsibilities* ($\bar{x}$ = 3.34) highlight the constraints imposed by both systemic academic pressures and institutional demands. Other notable obstacles include *inadequate access to scholarly databases* ($\bar{x}$ = 3.31), *lack of institutional support* ($\bar{x}$ = 3.30), and *lack of training in digital tools* ($\bar{x}$ = 3.28). Although these recorded slightly lower mean values, they remain above the benchmark mean of 2.50, indicating that they are still pivotal impediments to scholarly communication. The relatively low standard deviation values across the items suggest consistency in respondents' perceptions, reflecting a shared understanding among lecturers regarding the barriers they face.

Table 3: *What is the level of awareness and use of digital scholarly communication platforms by lecturers in Kwara State University?*

Options	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev. (σ)
Awareness of Digital Scholarly Communication Platforms:						
I am aware of open access publishing platforms.	145 (58.5%)	75 (30.2%)	18 (7.3%)	10 (4.0%)	3.43	0.78
I am aware of institutional repositories for research dissemination.	140 (56.5%)	80 (32.3%)	18 (7.3%)	10 (4.0%)	3.41	0.79
I am familiar with academic social networking platforms (e.g., ResearchGate, Academia.edu).	135 (54.4%)	82 (33.1%)	20 (8.1%)	11 (4.4%)	3.38	0.82
I am knowledgeable about digital tools used for scholarly communication.	130 (52.4%)	85 (34.3%)	20 (8.1%)	13 (5.2%)	3.34	0.85
Use of Digital Scholarly Communication Platforms:						
I publish my research in open access journals.	110 (44.4%)	92 (37.1%)	30 (12.1%)	16 (6.5%)	3.19	0.91
I regularly use institutional repositories to share my research outputs.	105 (42.3%)	90 (36.3%)	35 (14.1%)	18 (7.3%)	3.14	0.94
I use digital platforms to collaborate with other researchers.	120 (48.4%)	85 (34.3%)	25 (10.1%)	18 (7.3%)	3.23	0.92

I use online tools to track the visibility and impact of my research.	100 (40.3%)	88 (35.5%)	40 (16.1%)	20 (8.1%)	3.08	0.97
I use academic social networking sites to disseminate my research.	115 (46.4%)	85 (34.3%)	30 (12.1%)	18 (7.3%)	3.20	0.93
Grand Mean = 3.26						

The analysis of data in Table 3 indicated that the respondents demonstrated a high level of awareness of digital scholarly communication platforms, as reflected in the relatively high mean scores across the awareness items and the overall grand mean of 3.27. This suggests that most respondents are familiar with various digital tools and platforms used for research dissemination. Specifically, *"I am aware of open access publishing platforms"* recorded the highest mean score ($\bar{x}$ = 3.43), followed closely by *awareness of institutional repositories* ($\bar{x}$ = 3.41) and *familiarity with academic social networking platforms* such as ResearchGate and Academia.edu ($\bar{x}$ = 3.38). Additionally, *knowledge of digital tools for scholarly communication* ($\bar{x}$ = 3.34) indicated that lecturers possess a good understanding of the available digital mechanisms for disseminating research outputs. However, while awareness is high, the findings reveal a comparatively moderate level of usage of these platforms. For instance, *publishing in open access journals* ($\bar{x}$ = 3.19) and *use of academic social networking sites* ($\bar{x}$ = 3.20) show moderate engagement. Similarly, *use of digital platforms for collaboration* ($\bar{x}$ = 3.23) reflects a fair level of participation in research networking activities. More notably, *regular use of institutional repositories* ($\bar{x}$ = 3.14) and *use of online tools to track research visibility and impact* ($\bar{x}$ = 3.08) recorded the lowest mean scores among the items. This suggests that although lecturers are aware of these tools, they are not fully utilizing them for research dissemination and impact tracking. The standard deviation values indicate moderate variation in responses, particularly among the usage-related items, implying differences in the extent to which lecturers engage with digital platforms.

Discussion of Findings

The findings of this study provide important insights into the drivers, obstacles, and level of awareness and use of digital scholarly communication platforms among lecturers at Kwara State University, Malete, Nigeria.

First, the study revealed that lecturers are strongly motivated to engage in scholarly communication. Key motivating/driving factors include research visibility, professional recognition, and career advancement, which were ranked highest among respondents. This finding aligns with the work of Tenopir et al. (2016), who reported that academics are primarily driven by the desire to increase the visibility and impact of their research in North American. It is further supported by Adetayo (2021), who show that academic recognition, institutional promotion criteria, and increased research visibility significantly enhance lecturers' engagement in scholarly communication activities in private universities in Ogun State, Nigeria. Furthermore, Sinkalu (2026) found that research productivity among academic staff of Nigerian private universities increases when visibility, institutional recognition, and collaboration opportunities are present. Similarly, Madu et al. (2025) found that institutional support and open science practices improve research dissemination, visibility, and academic motivation among lecturers in Nigeria. In addition, Borgman (2007) emphasized that scholarly communication is central to academic reputation and knowledge dissemination. The implication of this finding is that lecturers perceive scholarly communication as a strategic tool for professional advancement and increased academic visibility. From the perspective of Activity Theory, these motivating/driving factors represent the objectives that drive the activities of lecturers within the academic environment. The theory suggests that individuals engage in activities when they perceive that such activities will help them achieve valued outcomes. Thus, the desire for promotion, recognition, and visibility serves as a motivating/driving force that encourages lecturers to actively participate in scholarly communication.

Second, the study found that lecturers face several obstacles while engaging in scholarly communication. Major challenges/obstacles identified include high publication fees, lack of research funding, heavy teaching workload, and poor internet connectivity. These findings are consistent with Adeleye (2021), who reported that financial constraints, inadequate institutional funding, workload pressure, and poor ICT infrastructure significantly hinder research productivity and scholarly communication among academics, particularly in developing countries such as Nigeria. Similarly, Oguche et al. (2025) found that institutional support gaps, funding limitations, and workload constraints reduce engagement in digital scholarly communication platforms among LIS academics in Nigeria. Furthermore, Sinkalu (2026) reported that organizational demands and workload significantly hinder research productivity, especially in Nigerian universities. Also, Akpan et al. (2026) emphasized that administrative workload, poor funding, and infrastructural challenges are major stressors affecting academic productivity in public universities in Zone of Nigeria. However, Activity Theory provides a useful explanation for this finding by emphasizing that tools and environmental conditions can either facilitate or constrain human activities. In this case, inadequate funding, poor internet facilities, and excessive workload function as barriers that hinder lecturers from achieving their scholarly communication objectives. Consequently, improving institutional support systems is necessary to enhance research dissemination and academic productivity.

Lastly, the study established that while lecturers demonstrate a high level of awareness of digital scholarly communication platforms, their actual usage remains moderate. This gap between awareness and utilisation suggests

that knowledge of digital tools does not necessarily translate into effective usage and that awareness alone is insufficient to ensure effective adoption and use of digital scholarly communication technologies. This finding supports the study by Oyedipe et al. (2017), which reported that although lecturers in Nigeria are aware of open access and electronic resources, actual usage is limited due to skill gaps and institutional constraints. It is also consistent with Oguche et al. (2025), who showed that awareness of digital scholarly tools does not automatically lead to adoption, as usage is influenced by digital literacy, institutional support, and perceived usefulness by LIS academics in Nigeria. Furthermore, Nicholas et al. (2017), who found that 116 selected science and social science early career researchers (ECRs) from seven countries are aware of digital platforms but do not fully exploit them due to skill gaps and institutional constraints. Similarly, Madu et al. (2025) emphasized that awareness of digital scholarly tools does not automatically lead to adoption, as usage is influenced by digital literacy, institutional support, and perceived usefulness in Nigerian Library Schools. This finding supports the Diffusion of Innovations Theory, which posits that awareness is only the first stage in the innovation adoption process. According to Rogers (2003), individuals progress through stages of knowledge, persuasion, decision, implementation, and confirmation before fully adopting an innovation. The moderate utilisation observed in this study suggests that many lecturers may have reached the awareness stage but have not progressed to full adoption due to factors such as inadequate digital skills, limited institutional support, and infrastructural challenges.

Generally, the findings indicated that scholarly communication among lecturers is shaped by a combination of strong motivational drivers and persistent structural obstacles. While lecturers are willing and motivated to disseminate their research, challenges related to funding, infrastructure, workload, and digital skills hinder optimal participation. The observed gap between awareness and utilisation of digital platforms further emphasizes the need for capacity building, improved institutional support, and enhanced ICT infrastructure. These findings contribute to existing literature by providing context-specific evidence from Kwara State University and underscore the importance of addressing both motivational and structural factors to improve scholarly communication practices in Nigerian universities. The findings therefore validate the assumptions of both Activity Theory and Diffusion of Innovations Theory by showing that effective scholarly communication depends not only on individual motivation but also on the availability of enabling resources, institutional support, and successful adoption of digital communication technologies.

Conclusion

This study examined the drivers and obstacles of scholarly communication among lecturers at Kwara State University, Malete, Nigeria, as well as their level of awareness and use of digital scholarly communication platforms. The findings demonstrate that lecturers are highly motivated to engage in scholarly communication. However, the study also revealed that lecturers face obstacles that hinder effective participation in scholarly communication. In addition, while lecturers exhibit a high level of awareness of digital scholarly communication platforms, their actual utilisation remains moderate, indicating a gap between knowledge and practice. This suggests that awareness alone is insufficient without adequate training, institutional support, and enabling infrastructure. The study concludes that scholarly communication among lecturers is influenced by a dynamic interplay of motivational drivers and systemic barriers. Addressing these challenges requires a strategic and coordinated effort by university management and relevant stakeholders. Enhancing institutional support, improving ICT infrastructure, providing funding opportunities, and strengthening digital competencies are essential steps toward fostering effective scholarly communication and improving research productivity in Nigerian universities.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The management of should strengthen incentive mechanisms by instituting annual research excellence awards, publication recognition schemes, and promotion policies that adequately reward quality scholarly outputs. This will sustain lecturers' motivation to actively disseminate their research findings.
2. The University should establish a dedicated research support fund to assist lecturers with publication and conference expenses, while also improving internet facilities and reducing excessive teaching and administrative workloads through appropriate staff recruitment and workload redistribution.
3. The University Library and ICT Directorate should organise regular hands-on training workshops on the use of institutional repositories, open-access publishing platforms, academic social networking sites, and research visibility tools to improve lecturers' competence and confidence in utilising these platforms effectively.

Contributions to Knowledge

This study makes several important contributions to the existing body of knowledge on scholarly communication, particularly within the context of Nigerian higher education. Firstly, the study provides empirical evidence from Kwara State University, Malete, thereby enriching the limited context-specific literature on scholarly communication practices among lecturers in emerging and regional universities in Nigeria. While previous studies have largely focused on federal and older established universities, this study extends understanding to a state university context, where institutional dynamics may differ. Secondly, the study integrates drivers, obstacles, and digital platform awareness and usage into a single analytical framework, offering a more holistic understanding of scholarly communication practices among

lecturers. This integrated approach helps to bridge the gap between motivational factors and structural constraints, which are often examined separately in existing literature.

Thirdly, the findings contribute to the discourse on digital scholarly communication in developing countries by highlighting the gap between high awareness and moderate usage of digital platforms. This adds to existing knowledge by showing that digital transformation in scholarly communication is not only a matter of access but also of skills, institutional support, and workload management. Furthermore, the study reinforces theoretical discussions in Activity Theory and Diffusion of Innovations Theory by demonstrating how institutional environment, technological tools, and individual competencies jointly influence scholarly communication practices. Finally, the study provides practical insights for university administrators and policymakers, emphasizing the need for improved ICT infrastructure, capacity-building programmes, and supportive research policies to enhance academic productivity and global research visibility.

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Medical Rehabilitation through Library and Information Services in David Umahi Federal University Teaching Hospital: A Therapeutic Approach

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ABSTRACT

This study investigated the role of library and information services as a therapeutic approach in medical rehabilitation using David Umahi Federal University Teaching Hospital (DUFUTH) Library as a case study. As healthcare systems increasingly embrace holistic and patient-centered care, there is growing recognition of the need to address not only the physical but also the informational and psychosocial needs of patients. This study adopts a qualitative descriptive design using Key Informant Interviews (KII) to gather insights from five purposively selected two professionals in DUFUTH library and three healthcare practitioners also in DUFUTH. Data were analyzed using narrative and thematic approaches. Findings revealed that library and information services contribute significantly to medical rehabilitation through improved health literacy, emotional support via bibliotherapy, and enhanced cognitive engagement. Access to reliable health information enables patients to better understand their conditions and participate actively in treatment, while therapeutic reading helps reduce anxiety and improve emotional well-being. Additionally, assistive technologies promote inclusive access to information for individuals with disabilities. However, the study identified key challenges, including limited institutional support, inadequate funding, lack of awareness, and weak collaboration between librarians and healthcare professionals. The study concluded that integrating library services into healthcare systems can enhance rehabilitation outcomes and promote holistic patient care. It recommended increased collaboration, policy support, and capacity development to maximize the therapeutic potential of library and information services.

Keywords: Medical Rehabilitation, Library Services, Bibliotherapy, Health Services, Patients, DUFUTH

INTRODUCTION

Health systems around the world recognize that recovery from illness extends beyond clinical treatment to include psychological, social, and informational support. Medical rehabilitation traditionally focuses on restoring physical, psychological, and social functioning after illness, injury, or disability, enabling individuals to regain independence and reintegrate into society (Wade, 2020). While physicians, physiotherapists, psychologists, and occupational therapists have historically played central roles in rehabilitation processes, emerging interdisciplinary perspectives emphasize the importance of information access, knowledge empowerment, and supportive environments in facilitating patient recovery. Within this field, library and information services are gaining attention as complementary resources capable of contributing to therapeutic and rehabilitative outcomes.

Libraries, particularly in hospitals and community libraries, serve as knowledge hubs that provide individuals with access to information, educational materials, and supportive learning environments. In healthcare, these services extend beyond traditional information provision to include patient education resources, health literacy programs, assistive technologies, and curated reading initiatives designed to promote emotional and cognitive well-being. By enabling patients to access reliable health information and engage with therapeutic reading materials, libraries contribute to patient empowerment, informed decision-making, and psychological resilience during recovery processes. Increasingly, scholars argue that libraries can function as therapeutic environments where information, reading, and reflective engagement support healing and rehabilitation (Tukhareli, 2024).

One of the most prominent ways in which library and information services contribute to rehabilitation is through bibliotherapy, the structured use of reading materials for therapeutic purposes. Bibliotherapy involves the intentional selection and use of books, narratives, or informational texts to help individuals cope with emotional distress, illness, trauma, or life challenges. The concept is grounded in the idea that readers can identify with characters, experience emotional release, and gain insight into their own situations through guided reading experiences. ALA (Nd) This approach has been used in various healthcare settings to support individuals dealing with mental health conditions, chronic illness, stress-related disorders among others.

Research indicates that bibliotherapy and related reading interventions can produce measurable psychological and emotional benefits for participants. For instance, evaluations of library-based bibliotherapy programs have shown improvements in mental health outcomes, including reductions in symptoms of anxiety and depression among participants engaged in structured reading interventions (Macdonald, Vallance & McGrath, 2013). According to Abidin,

Shaifuddin, & Saman (2021), library services can play a valuable role in complementing conventional therapeutic approaches, particularly where access to formal healthcare resources may be limited.

Beyond bibliotherapy, modern library and information services also integrate digital tools, assistive technologies, and tailored information resources that support individuals with disabilities or long-term medical conditions. Innovations such as text-to-speech technologies, accessible digital libraries, and adaptive information systems enable individuals with visual, cognitive, or mobility impairments to access knowledge resources that support their rehabilitation journeys. These technologies help promote autonomy, participation, and lifelong learning among individuals with disabilities, thereby reinforcing the role of libraries as inclusive environments that facilitate recovery and social reintegration (Paul, & Chauhan, 2024).

Furthermore, the therapeutic value of libraries extends to the social and psychological dimensions of rehabilitation (Brewster & McNicol 2020). Participatory reading groups, reflective writing programs, and community-based learning activities organized within library environments have been shown to foster social inclusion, emotional expression, and personal confidence among participants. Such programs provide safe spaces where individuals facing illness or life challenges can share experiences, build supportive relationships, and engage in meaningful intellectual activities that contribute to emotional recovery and resilience. According to Billington, Dowrick, and Robinson, (2011) libraries function not merely as repositories of information but as therapeutic landscapes that promote holistic well-being through intellectual engagement and social interaction.

Despite these emerging contributions, the integration of library and information services into formal medical rehabilitation frameworks remains limited in many healthcare systems (Tukhareli, 2024). In several contexts, healthcare professionals and policymakers often overlook the therapeutic potential of libraries, focusing primarily on clinical interventions while under-utilizing informational and educational resources that could support patient recovery. Additionally, many libraries lack structured programs specifically designed to address the rehabilitation needs of patients, individuals with disabilities, or those coping with chronic illnesses (Christiansen, & Dalsgård, 2022).

The limited recognition of libraries as therapeutic partners in healthcare raises important questions regarding the potential of library and information services to support medical rehabilitation in DUFUTH. While existing studies highlight the benefits of bibliotherapy and information-based interventions, there remains a need to systematically explore how these services can be integrated into healthcare environments to enhance patient recovery and well-being in health institution libraries. Addressing this gap is essential for understanding the broader role that information institutions can play in promoting holistic health outcomes.

Consequently, the growing intersection between healthcare, information science, and therapeutic practice underscores the need to examine the role of library and information services in medical rehabilitation. Understanding how libraries can serve as therapeutic resources through information provision, bibliotherapy programs, assistive technologies, and supportive learning environments will contribute to the development of innovative approaches that complement conventional medical treatment and enhance patient recovery.

STATEMENT OF PROBLEM

Library and information services possess the potential to play a significant role in addressing informational and psychosocial dimensions of rehabilitation. Libraries provide access to reliable health information resources, therapeutic reading materials, assistive technologies, and community-based learning programs that can support individuals recovering from medical conditions. Through services such as consumer health information provision, bibliotherapy, and inclusive information access technologies, libraries can contribute to patient education, emotional healing, and cognitive stimulation. Studies have shown that structured reading programs and bibliotherapy interventions can improve psychological well-being, reduce stress, and enhance coping mechanisms among individuals facing health challenges (Brewster, 2018; Jack & Ronan, 2020).

However, despite the recognized therapeutic value of reading and information access, the role of library and information services in medical rehabilitation remains unexplored, so also is the types of library-based therapeutic services that can assist patients undergoing rehabilitation and the benefits, challenges of therapeutic reading and health information services for individuals undergoing medical rehabilitation especially in hospital libraries in Ebonyi state. In healthcare institutions, libraries are primarily viewed as academic or research support units rather than therapeutic partners in patient care. Consequently, the potential of library-based interventions such as bibliotherapy, health information services, and supportive reading environments in facilitating rehabilitation is rarely fully explored (Brewster & McNicol, 2020). Without deliberate efforts to explore and implement library-based therapeutic interventions, healthcare systems may continue to overlook valuable resources that could complement clinical rehabilitation services and improve patients' overall recovery experiences. It is on these premise that this study seeks to examine medical rehabilitation DUFUTH library through library and information services as a therapeutic approach, with the aim of understanding how library resources and programs can support the rehabilitation process and contribute to holistic healthcare delivery.

OBJECTIVES OF THE STUDY

The main objective of this study is to examine Medical Rehabilitation in DUFUTH Through Library and Information Services: A Therapeutic Approach.

The specific objectives are to:

1. Examine the role of library and information services in supporting medical rehabilitation.
2. Identify the types of library-based therapeutic services that can assist patients undergoing rehabilitation.
3. Assess the benefits of therapeutic reading and health information services for individuals undergoing medical rehabilitation.
4. Identify the challenges limiting the use of library and information services in medical rehabilitation.

LITERATURE REVIEW

Medical Rehabilitation

Medical rehabilitation refers to a coordinated set of medical, psychological, social, and educational interventions aimed at restoring or improving an individual's physical, mental, and social functioning following illness, injury, or disability (Wade, 2020). Rehabilitation plays a crucial role in helping individuals regain independence, improve quality of life, and reintegrate into their communities after experiencing health-related limitations. According to the World Health Organization, rehabilitation is a process designed to enable individuals with health conditions to achieve and maintain optimal functioning in interaction with their environment (World Health Organization, 2023). The traditional concept of medical rehabilitation is that, it is a secondary intervention to restore patients as far as possible to their previous condition after disease or injury to develop to the maximum extent of physical, mental and social functioning.

A biomedical approach implies that rehabilitation is a separate, second-stage process, which is distinct from medical treatment, and carried out after treatment is concluded (Waddell & Burton, 2004) It involves restoration, to the maximum degree possible, of physical or mental function and role. Rehabilitation helps a person to be as independent as possible in everyday activities and enables participation in education, work, and recreation (WHO, 2023)

Rehabilitation services typically involve multidisciplinary teams consisting of physicians, physiotherapists, occupational therapists, psychologists, speech therapists, and social workers who collaborate to address the physical, cognitive, emotional, and social needs of patients. These services are particularly important for individuals recovering from stroke, traumatic injuries, chronic diseases, neurological disorders, and mental health conditions. The growing global burden of non-communicable diseases, aging populations, and long-term consequences of injuries has significantly increased the demand for rehabilitation services worldwide.

More so, rehabilitation is not limited to clinical treatment alone. This is because effective rehabilitation requires access to information, patient education, emotional support, and opportunities for cognitive engagement. Access to reliable health information enables patients to understand their conditions, adhere to treatment plans, and actively participate in their recovery processes (Luo, 2021). Consequently, information services and knowledge resources have become important components of holistic rehabilitation strategies.

Library and Information Services in health institution

Library and information services refer to organized systems designed to collect, organize, preserve, and disseminate information resources to meet the informational, educational, and research needs of users. Traditionally, libraries functioned primarily as repositories of books and scholarly materials; however, their roles have evolved significantly in the digital age. Geda, (2021) noted that modern libraries now provide a wide range of services, including digital information access, information literacy training, research support, community engagement programs, and health information services. Their primary goal is to ensure that healthcare professionals, patients, and caregivers have timely access to accurate and evidence-based medical information that supports healthcare decision-making and improved patient outcomes.

Library and information services in health institutions are delivered through various specialized services designed to meet the needs of healthcare professionals and patients (Alex, Simon & David, 2024). One common service is clinical information support, where librarians conduct systematic literature searches to provide physicians and medical teams with evidence relevant to patient cases. These services ensure that healthcare decisions are guided by the latest scientific evidence. Another important service is consumer health information services, which focus on providing patients with understandable health information materials such as brochures, educational guides, and digital resources. These services are essential in improving patient knowledge and promoting health literacy within healthcare settings.

According to Jelly (2025) many health institution libraries offer digital information services, including access to electronic journals, online medical databases, and institutional repositories. These digital platforms enable healthcare professionals to access medical research quickly and efficiently, which is essential in modern clinical environments where timely information is critical for patient care.

Libraries in health institutions also provide training and capacity-building programs, including workshops on evidence-based medicine, research methods, and information management. These programs strengthen the research and professional development capacity of healthcare staff. Also, libraries play a vital role in supporting medical education, clinical decision-making, and patient information needs. Medical libraries and consumer health information services provide access to evidence-based medical resources that help healthcare professionals and patients make informed health decisions. Public libraries have also emerged as important community institutions that promote health literacy by

offering access to reliable medical information and educational programs related to health and well-being (Brewster, 2018).

Health information services provided by libraries can significantly improve patients' understanding of diseases, treatment options, preventive health measures, and rehabilitation strategies. In addition, librarians often assist users in navigating complex medical information and evaluating the credibility of health resources available online. These services help reduce misinformation and empower individuals to manage their health conditions more effectively.

Furthermore, libraries increasingly provide inclusive information access through assistive technologies such as audiobooks, screen readers, adaptive reading tools, and accessible digital platforms. These technologies enable individuals with visual impairments, physical disabilities, or cognitive limitations to access information resources independently, thereby supporting their learning and rehabilitation processes (Eneh & Opara, 2022).

Bibliotherapy as a Therapeutic Information Service

Information therapy also known as bibliotherapy is the provision of supportive and evidence-based medical information to individual patients to assist them in understanding their illness, and as a result to make educated medical decisions and behavioural changes to improve their health and overall health care (Gavgani, 2011). Bibliotherapy is one of the most recognized therapeutic applications of library services in healthcare. In recent review of the concept, Bibliotherapy refers to the intentional use of reading materials to support emotional healing, psychological well-being, and personal development. Bibliotherapy involves the guided use of information resources such as fiction, self-help books, poetry, and literature texts to help individuals cope with emotional difficulties, mental health challenges, and life transitions (Shah & Sanu, 2023).

The therapeutic value of bibliotherapy lies in the psychological processes that occur during reading. Readers often identify with characters, situations, or themes within literary texts, allowing them to reflect on their own experiences and emotions. This process can lead to emotional catharsis, increased self-awareness, and the development of coping strategies. Research has demonstrated that bibliotherapy can reduce symptoms of anxiety, depression, and stress while improving psychological resilience among participants (Jack & Ronan, 2020).

In healthcare environments, bibliotherapy has been used to support patients undergoing treatment for mental health conditions, chronic illnesses, and traumatic experiences. Structured reading programs organized by libraries or healthcare professionals provide patients with carefully selected materials that address their emotional and informational needs. These programs may also involve group discussions, reflective writing activities, and guided reading sessions that encourage participants to share experiences and build supportive social connections. Bibliotherapy uses literature to bring about a therapeutic interaction between the patient and healthcare giver. In bibliotherapy lab, a professional can use guided discussion to help the patient integrate both feelings and cognitive responses to a selected work of literature, which may be a printed text, digital or some form of audio-visual material which are forms of assistive technologies (Hynes-Berry & McCarthy Hynes,2012).

Public libraries in several developed countries have implemented bibliotherapy initiatives as part of community health programs (Gavgani, 2011). For example, reading schemes designed to support mental health recovery provide patients with recommended reading lists curated by healthcare professionals and librarians. Studies evaluating these programs indicate that participants often experience improvements in mood, emotional well-being, and social engagement (Brewster, 2018).

METHODOLOGY

The study is descriptive in nature and adopts a qualitative research approach. A descriptive design is primarily concerned with providing a detailed account of a phenomenon as it exists, while the qualitative approach focuses on collecting and analyzing non-numerical data to gain deeper insights into participants' experiences, perceptions, and meanings rather than relying on statistical generalizations (Babbie, 2010; Neuman, 2007). This approach is considered appropriate for the study as it enables an in-depth exploration of how library and information services contribute to medical rehabilitation from the perspectives of professionals within the field. The population of the study include librarians and health workers in DUFUTH. The study adopted **Key Informant Interview (KII)** as the primary method of data collection. This is because of the researcher want to have an in-depth and unbiased responses from the population. Also, this was considered appropriate because health workers are usually very busy to attend the other form of data instrument as a result of time and availability.

Key Informant Interview is a qualitative data collection technique in which participants are deliberately selected based on their specialized knowledge, experience of the situation and strategic positions within the field of study. These informants are considered capable of providing rich, detailed, and contextually grounded information relevant to the research problem. In this study, five (5) key informants in DUFUTH, two librarians and three health workers; a doctor and two nurses were purposively selected based on convenience sampling (based on availability and williness to participate). The selection included professionals who possess practical experience in the use of information services to support patient care and rehabilitation. The KII method was chosen because it allows for the collection of in-depth insights within a relatively short period while ensuring the richness and relevance of the data.

A semi-structured interview guide was developed to explore the informants' knowledge, experiences, and perspectives in relation to the objectives of the study. The interviews were conducted physically, which provided an in-depth answer and understanding of the objectives of the study. The guide consisted of open-ended questions designed to elicit detailed responses on key areas such as the role of library services in rehabilitation, types of therapeutic interventions, benefits of bibliotherapy and health information services, and challenges affecting their implementation. The use of open-ended questions allowed participants to freely express their views and provide nuanced insights into the subject matter.

The primary source of data for the study is the Key Informant Interviews conducted with the selected participants. In addition, secondary data were obtained from existing literature, including scholarly publications, reports, and relevant documents on medical rehabilitation, bibliotherapy, and health information services. These secondary sources were used to support, validate, and enrich the findings of the study.

The data collected from the interviews were analyzed using narrative and thematic approaches. The narrative analysis helped to present the experiences and perspectives of the informants in a coherent and meaningful manner, while thematic analysis was employed to identify recurring patterns, key themes, and relationships within the data. This process involved coding the responses, grouping similar ideas, and interpreting the findings in relation to the research objectives. The combined use of narrative and thematic analysis ensured a comprehensive understanding of the role of library and information services as a therapeutic approach in medical rehabilitation.

RESULTS AND ANALYSIS

The findings of this study revealed that library and information services play a multifaceted role in supporting medical rehabilitation, particularly through health information provision, therapeutic reading interventions, and psychosocial support mechanisms. The responses from the key informants indicated that these services significantly contribute to patient recovery, although their effectiveness is shaped by institutional structures and collaborative practices. The analysis is presented in line with the four objectives of the study.

SECTION A

Demographic Analysis

The demographic profile of the five (5) respondents shows that all participants years of experience fall within the age range of 5–15 years, reflecting a professionally experienced group. The gender distribution includes three (3) males and two (2) females.

The participants are affiliated with David Umahi Federal University Teaching Hospital, Uburu, Ebonyi State, Nigeria, ensuring a combination of library and clinical perspectives relevant to the study.

SECTION B

Objective 1: Role of Library and Information Services in Medical Rehabilitation

The findings indicated that library and information services contribute significantly to medical rehabilitation by enhancing patient knowledge, supporting emotional well-being, and promoting active participation in treatment.

Participants one (1) stated:

"When patients are given access to accurate and understandable health information, they become more involved in their recovery. The library supports them in ways that are not always visible but very impactful."

This response highlights the role of libraries in improving health literacy and patient engagement. Access to reliable health information enables individuals to better understand their conditions and adhere to treatment plans, which is essential for successful rehabilitation (Luo, 2021; Cieza et al., 2021).

Participants three (3) added:

"Libraries provide a calm and supportive environment that helps patients relax and focus on recovery, especially those dealing with long-term conditions."

This reflected the concept of libraries as therapeutic environments that support psychological recovery (Brewster, 2018).

Objective 2: Types of Library-Based Therapeutic Services

The study identified several key library-based services that support rehabilitation, including bibliotherapy, health information services, assistive technologies, and educational programs.

Participants two (2) emphasized the importance of bibliotherapy:

"We use reading materials intentionally to help patients cope emotionally. Many patients find comfort in stories that reflect their experiences."

Participants five (5) further noted:

"Reading gives patients a sense of hope and helps them deal with stress, especially during long recovery periods."

These findings aligned with research showing that bibliotherapy supports emotional healing and psychological resilience (Jack & Ronan, 2020; Abidin et al., 2021).

Additionally, respondent four (4) highlighted the role of assistive technologies:

"Tools like audiobooks and digital platforms ensure that even patients with physical limitations can access information."

This demonstrated that the importance of inclusive library services in supporting rehabilitation for individuals with disabilities (Eneh & Opara, 2022).

Objective 3: Benefits of Therapeutic Reading and Health Information Services

The findings revealed that therapeutic reading and health information services provide significant benefits, including improved mental health, enhanced coping strategies, and increased patient empowerment.

Participants two (2) observed:

"Patients who engage with reading materials tend to show improved emotional stability and reduced anxiety."

Similarly, respondent one (1) stated:

"When patients understand their condition through information provided by the library, they are more confident and less fearful."

These responses support existing literature that links bibliotherapy and health information access to improved psychological well-being and treatment adherence (Jack & Ronan, 2020; Luo, 2021).

Participants three (3) also noted:

"Libraries help patients filter out misinformation and focus on credible sources, which are very important in today's digital age."

This reinforces the role of libraries in combating misinformation and promoting health literacy (Bawden & Robinson, 2019).

Objective 4: Challenges Limiting the Use of Library Services in Rehabilitation

Despite the identified benefits, the study reveals several challenges that limit the effective use of library and information services in medical rehabilitation.

Participants five (5) stated:

"One of the biggest challenges is that healthcare professionals do not fully understand the role of libraries in patient care."

Participants two (2) added:

"There are limited funding and lack of institutional support, which makes it difficult to implement structured programs like bibliotherapy."

These responses highlight institutional and systemic barriers that hinder the integration of library services into healthcare systems (Geda, 2021).

Participants four (4) further emphasized:

"Collaboration between librarians and healthcare providers is still weak, and this limits the impact of information services on patient recovery."

This indicated that lack of interdisciplinary collaboration remains a key constraint.

FINDINGS AND DISCUSSION

The findings of this study provide strong evidence that library and information services play a crucial role in supporting medical rehabilitation by addressing both informational and psychosocial needs of patients. In line with the first objective, the study confirmed that access to reliable health information enhances patient engagement and self-management. This aligns with the position of Luo (2021), who argued that consumer health information services empower patients and improve treatment outcomes. Similarly, the World Health Organization (2023) emphasizes that patient education is a key component of effective rehabilitation.

Regarding the second objective, the study identified bibliotherapy, health information services, assistive technologies, and educational programs as key therapeutic interventions provided by libraries. Among these, bibliotherapy emerges as a particularly effective tool for emotional healing. This finding is consistent with Jack and Ronan (2020) and Abidin et al. (2021), who demonstrated that reading-based interventions improve psychological well-being and coping mechanisms.

The third objective highlighted the benefits of these services, particularly in improving mental health, reducing anxiety, and enhancing patient confidence. The study confirmed that therapeutic reading and access to credible information contribute significantly to emotional stability and informed decision-making. Furthermore, libraries play a critical role in addressing misinformation. This is as noted by Bawden and Robinson (2019), thereby ensuring that patients rely on accurate and trustworthy information.

However, in line with the fourth objective, the study identified several challenges that limit the effective utilization of library services in medical rehabilitation. These include lack of awareness among healthcare professionals, inadequate

funding, weak institutional support, and limited collaboration. These findings corroborated Geda (2021), who noted that medical libraries are often underutilized due to systemic and structural constraints.

Importantly, the study revealed a gap between the recognized potential of library services and their actual implementation in healthcare systems. While libraries have demonstrated therapeutic value, their integration remains limited and largely informal. This suggested the need for policy-level interventions and stronger institutional frameworks to support the inclusion of library services in rehabilitation programs.

In conclusion, the study underscored the importance of integrating library and information services into healthcare systems as part of a holistic approach to medical rehabilitation. By addressing informational and psychosocial needs, libraries can significantly enhance patient outcomes. However, achieving this requires coordinated efforts involving institutional support, professional collaboration, and increased awareness of the therapeutic value of library services.

CONCLUSION

This study to examine Medical Rehabilitation in DUFUTH Through Library and Information Services: A Therapeutic Approach., with particular attention to how these services support patient recovery beyond traditional clinical interventions. The findings clearly demonstrate that libraries are not merely passive repositories of information but active contributors to holistic healthcare. Through the provision of reliable health information, bibliotherapy, assistive technologies, and supportive learning environments, library services address critical informational, emotional, and cognitive needs of patients undergoing rehabilitation. A major insight from the study is that access to accurate and well-structured health information significantly improves patients' understanding of their medical conditions, thereby enhancing their confidence, participation, and adherence to treatment. In addition, bibliotherapy emerged as a valuable therapeutic tool that supports emotional healing, reduces anxiety, and fosters resilience among patients. The study also highlighted the importance of inclusive information services, particularly through assistive technologies, which ensure equitable access to knowledge for individuals with disabilities. However, despite these benefits, the study reveals that the integration of library and information services into healthcare systems remains limited. Challenges such as inadequate institutional support, lack of awareness among healthcare professionals, insufficient funding, and weak collaboration between librarians and medical practitioners continue to hinder the full realization of their therapeutic potential. This gap between potential and practice suggests the need for more intentional efforts to position libraries as integral components of rehabilitation frameworks. This study therefore underscores the importance of adopting a more holistic approach to medical rehabilitation one that recognizes the role of information, learning, and emotional support in the healing process. Strengthening the integration of library services into healthcare delivery will not only improve patient outcomes but also contribute to more inclusive, patient-centered, and sustainable health systems.

RECOMMENDATIONS

The researchers recommend that:

1. Healthcare institutions should integrate library and information services into rehabilitation programs to enhance patient care.
2. Librarians should receive specialized training in bibliotherapy and health information services to improve their contribution to patient rehabilitation.
3. Strong collaboration should be established between librarians and healthcare professionals to ensure effective service delivery.
4. Governments and policymakers should develop policies that recognize and support the therapeutic role of libraries in healthcare.
5. Adequate funding should be provided to improve library infrastructure, digital resources, and assistive technologies in health institutions.

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MARKETING PRACTICES FOR EFFECTIVE ADVOCACY IN THE NATIONAL LIBRARY OF NIGERIA

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This study investigates the marketing practices employed for effective advocacy in the National Library of Nigeria. Five (5) objectives guided this study: to find out the necessity for advocacy; identify the marketing practices employed by the library staff for effective advocacy; evaluate the benefits of effective advocacy through marketing practices; evaluate the setbacks affecting it and suggest measures that could enhance marketing practices for effective advocacy in the National Library of Nigeria. The research methodology is quantitative. Descrptive survey research design is utilised and the population include all library staff. Purposive sampling technique is used for selecting fifteen (15) library staff across the library. The instrument for data collection is questionnaire while methods of data analysis were frequencies, simple percentages and mean.Findings indicate that the advocacy needs include library building issues, increased funding, extension of staff's length of service, grant, donations of resources, partnership and collaborations among others. Courtesy visit to community stakeholders, lobbying, virtual and social media services, radio television talk show, webinars, conference of heads of public libraries, readership promoting campaign, hashtags, road walk, fliers, jingles among others are used as marketing practices.The benefits identified are increased funding, more library visibility, increased partnership, collaboration, user traffic among others. Setbacks identified are poor digital literacy among library staff, ignorance about marketing and advocacy, poor motivation, inadequate funding, and others.

Keywords: National Libraries.Marketing.Marketing Practices.Marketing Strategies. Advocacy

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Introduction

Contemporary libraries as growing organisms engage in advocacy for visibility, to meet funding needs, secure support, ensure sustainability among others. This is due to the changing informationg needs of the library users, incresing economic pressure on the funding of libraries all over the world and the survival war between the library and the social media. Acharya and Vagdal (2023) agree that in an increasingly digital age, libraries have been compelled to adapt and innovate in order to remain relevant and effectively serve their communities.Marketing practices are ways libraries advocate for these issues in order to enhance relevance in the global community and sustainability. Marketing practices are employed to inject the needed changes that help libraries meet the international best practices and effectively serve their user community. Moahi (2019) opines that library advocacy are activities undertaken to positively influence library users, decision makers and other stakeholders. Public libraries use advocacy to secure ongoing support and funding, and to encourage a positive public policy environment that enables them to meet users' changing needs. This is also corroborated by Ezeala and Hundu (2019) that library advocacy therefore translates into public support and promotion of individual libraries or library services in the public domain.

Marketing of library services has been identified as a must-do for the survival of libraries.Etukudo and Ayanola (2023) stress that the information age which revolutionised all human activities including the libraries and information activities and ICT incursion made marketing of library and information services and inclusion of entrepreneural activities necessary if librarianship must thrive among its competitors in the business of human management and provision of services. Library marketing is an innovation that help libraries become more impactful to their communities. According

to Acharya and Vagdal (2023), library marketing has emerged as a critical discipline to promote library services, engage users and communicate the library's value in a rapidly changing landscape.

Statement of the Problem

National libraries are national cultural institutions established to preserve the intellectual heritage of countries, shape the reading culture of the nation, empower the citizenry through access to informtion and propel national development. However, funding inconsistences, evolving information needs, competition from the social media and alternative information provision platforms continue to challenge the visibility and relevance of national libraries. They undermine the importance of national libraries to the general society. Many members of the society seem not to be aware of the usefulness of the national libraries to them. These could be because effective library marketing practices through advocacy seem not be employed to engage the government and the people on the relevance and the indispensability of the national l;ibraries.

Advocacy means speaking out in the public domain to seek support for libraries. Marketing practices help to srenghten national library advocacy.These are tools that could bring national libraries to public consciousness and the much needed visibility and support. However, it seems that these tools are neglected or poorly implemented especially in the National Library of Nigeria. If the decline in advocacy and library marketiing persist, it could lead to a national library that is completely overtaken by moden competitors and left behind in the garbage of history. It could also weaken their strategic roles in information provision and national development. Advocacy and marketing of library services are increasingly important yet studies on both concepts are limited in national libraries. This study on the marketing practices for effective advocacy in the National Library of Nigeria seeks to fill this gap..

Objectives of the study

This is to investigate the marketing practises for effective advocacy in the National Library of Nigeria. The specific objectives are to;

1. Identify the neccesity for marketing advocacy in National Library of Nigeria;
2. Examine the marketing practices employed for effective advocacy in National Library of Nigeria;
3. Find out the benefits of effective advocacy through marketing in National Library of Nigeria;
4. Identify setbacks affecting effective advocacy in National Library of Nigeria;
5. Suggest measures that could enhance effective marketing in National Library of Nigeria;

Literature Review

The literature is classified to reflect the research concepts and objectives.

National libraies

National libraries are apex libraries in countries of the world established by the highest government to acquire , process, preserve and disseminate the intellectual heritage of any country.Lison (2022) explains that national libraries are by default , visible , prominent,central key parts of the lanscape of national institutions and very often alsoarchitectural icons in their environment. They also play a big role within the network of libraries-public, academic and beyond. National libraries are important institution that are empowered to raise informed citizenry. Assim and Knezevic (2021) also agree that national libraries are national treasuries that preserve the country's heritage and its intellectual wealth. National libraries perform peculiar functions like issuance of standard numbers, bibliographic control through the publication of the national bibliographies, collection and preservation of legal deposit publications, certifation of true copies among other things.

The National Library of Nigeria was established in 1964 as the library of the highest standing by the National Library Act of 1964 and was later ractified by the Decree No 29 of 1970 in Nigeria to carry out the above functions. The library has thirty-four branches as state branches accross the country. The National Library of Nigeria Strategic Plan 2025-2030, the new vision of the library is to empowerNigeria's knowledge economy by providing ccess to digital and physical resources, cutting edge technologies, and dynamic learning environment for research, education and cultural development. The vision statement of National Library of Nigeria is to be Africa's leading digital knowledge hub, fostering innovation, inclusion and lifelong learnng through advanced technologies.

Library advocacy

Advocacy is to advance the cause of something or speak up for the cause of another. Library advocacy means to actively support the cause of libraries. Illonois Library Association-ILA (n.d) states that advocacy is a deliberate and sustained effort to foster understanding of library programmes while influencing the attitudes of stakeholders. Ezeala and Hundu (2019) affirm that library advocacy could be monitoring, donation or campaign. Library advocates are stakeholders who speak up for the library in the public domain. These include government officials, community members , library users andstaff among others. Sarkar (2025) reveals that the central message of library advocacy proclaims that those

engaged in library development and speak in favour of library must be in a public discourse for securing the libray status and library resoources. National libraries in Africa are constantly struggling with policy sommersault, underfunding and neglect. Library advocacy is therefore asn effective means of mobilising the community to rise in sustaining the cause of natinal libraries.

Library Marketing practices

National libraries provide information resources and services that are very helpful in research, education and development. Most times these are not known to the community members. As a social institution, they also have challenges of poor funding, poor visibility, declining user traffic and the gradual neglect of the government. Library marketing therefore includes all activities carried out by libraries to attract the attention of library stakeholders to the needs of the library and the indispensability of libraries to the society. American Marketing Association (n.d)defines marketing as the activities, set of instructions and processessfor creating, communicating, delivering and exchanging offerings that have value for something for custmers, clients, partners and society at large. In the contemporary library, users are now seen as customers while the library services and resurces have become products.Inazu (2009) describes marketing to include analysing the competition, positionining, pricing, promotion, advertising, public relations, and sales of library products and services.

Library marketing are carried out by library staff. Hursh (2026) opines that library marketing is a comprehensive alignment of experience, language, and culture designed to build relationships and show value, rather than just promoting services.Consequently, library marketing are mostly carried out by library staff with aim to promoting the relevance of the library to the community. Urhefe-Okotie (2023) agrees that library marketing is used to boost the level of library,s patronage by users, promotion of resources, userawareness, improving the library's reputation. Demsey in Hays (2025) opines library marketing is about helping people in your service population understand that library has helpful things for them and driving them to use all of the goodness. The philosophy according to International Federation of Library Associations and Institutions (IFLA) (2022) is that a library that believes in the value of the services it offers should work hard to protect it. Library marketing is primarily the contemporary way to protect the library to ensure sustainability and relevance to the community.

Necessity for marketing for advocacy in national libraries.

Many libraries globally are bedeviled by challenges their very existence. Libraries often find itbdifficult to speak on these issues. Ezeala and Hundu (2019) reveal that library advocacy campaign started from America to the rest of the world to uplift the declining position of library in the information world. Libraries are important institutions in the society and the sustainability is not disputable. \the authors underscores the impotance of libraries. They affirm that since the library could satisfy virtually all the information needs of users, it was heavily relied upon for information for studies, research and other socio-economic and administrative purposes; it is needed at all ages. In the same vein, Igwebuike, Ihejirika and Onah (2022)agree that libraies exts to meet the basic needs for information. According to the authors, library advocacy and marketing are critical to draw attention to their libraries, their services, their worth to their community, their adminstration, their staff and their users. This is paramount as IFLA (2022) underscores that a library that believes in the value of the service it offers should work hard to protect it. One of the strenght of library advocacy is having a pool of voices speaking publicly about an issue. This is unity in purpose. Sarkar (2025) agrees that library advocacy is needed for organised action, the unity within the community that supports the growth and development of library.

A lot of factors tend to undermine the relevance of African national libraries but advocay in organised action authors agree that advocacy can help alleviate these. Ternenge (2019) laments that libraries have always had to justify their existence to sponsors as they are consdered as 'essential' as compared to sectors like health, education, roads, etc. ILA (n.d) corroborates that some people feel that tecnology has made library services obsolete and the current econoic situation sometimes make their argument compelling. The association argues that library supporters through advocacy must remind their neighbours, community leaders, and elected officials of the fact that librariesprovide great learning opportunities, excellent public service and serve as invaluable contributors in their comunity. These people are stakeholders and library advocates. Library advocates are community organisations, friends of the library, library board members, and trustees, library usersvolunteers, staff, business leaders and workers, elected officials, community leaders, educators, school board members among others. All these people and more can champion the cause of national libraries in Africa through advocacy.

Marketing practices employed for effective advocacy in national libraries

Library marketing practices that are used for advocacy tools in national libraries abound. Literature reveal that these practices are employed in the library for advocacy. The marketing practices identified by authors include social media campaign, fliers, radio jingles, outreaches and community engagements, lobbying, library programmes, letter writing, e mails, readership promotion campaigns among others. Ezeala and Hundu (2019) highlights media campaigns, lobbying, library programs and public relations through letter writing as ways of carrying out library advocacy. In their study,

Chowdhury and Singh (2024) opine that crafting compelling messages, utilising multiple channels, and building community engagement are some marketing practices that can be employed in libraries. Zubair (2025) also agree that libraries ought to formally integrate marketing and public relations. Inazu (2009) described the marketing practices adopted in national library of Nigeria to include verbal communication, production of brochures, posters, flyers, booklets, and bookmarks.

Others marketing practices explained by authors are library tours, library information month, billboards and noticeboards in major cities, print media, electronic media, redearship promotion campaign, websites, telemarketing, seminars, presentations, workshopps, packaging among others. These methods are also listed by other authors like Kennedy in Campbell(2018) who agrees that marketing techniques that can be employed in libraries include internal and external emails, online social networks, screensavers, usage statics,web page alerts, bookmarks, banners, posts, calendars, brochures, giveaways, newsletters, direct mail, surveys, phone calls, word of mouth and others.

Benefits of effective advocacy through marketing practices in national libraries

In an increasingly digital age, libraries have been compelled to adapt and innovate in order to remain relevant and effectively serve their communities. Library marketing has emerged as a critical discipline to promote library services, engage users, and communicate the library's value in a rapidly changing world .According to Hays (2025), the four main benefits the library marketinIng are higher usage,increased value to your organization,educated users,and changed perceptions.They further stated that the task of marketing your library may seem daunting, but the benefits are evident. Archarya and Vagdal (2023) listed the benefits of library marketing to libraries. According to the authors, library marketing is an essential discipline that empowers libraries to effectively communicate their value, engage with users, and adapt to the changing information landscape. Authors argued thast by employing innovative marketing strategies and techniques, libraries can attract and retain patrons, expand their user base, and position themselves as indispensable community resources. In the following sections, we will explore various methodologies employed in library marketing, analyze the results achieved through these efforts, and provide valuable insights and best practices for effective library marketing in the digital age.

Marketing of library services is becoming increasingly crucial in contemporary age. As libraries evolve to meet changing user needs, they must effectively promote their resources and services to remain relevant. Chowdhury & Singh (2024). Marketing servesvas a tool for creating awareness for the library services and resources awareness . Urhefe-Okotie (2023) explains that marketing approaches are used to communicate the availability nd value of services and resources to target markets. Having informed users is key to incresed usage. Library marketing according to Canzoneri (2015) is vital to keeping our users and potential usersvinformed and educated about the resources and services that match their needs and interest. Other benfits of library marketing as highlighted by Hays (2025) include higher usage , incresed value to the organisation , educated usrs, changed perspectives. Library marketing is an indispensable tool for advocay for national libraries to thrive especiall in Nigeria and Africa as a whole.

Setbacks affecting effective advocacy through marketing practices in national libraries

Library marketing brings many benefits to the table but there are challenges that tend to hinder these in national and other libraries. Chandratre and Chandratre (2015) lament that marketing as a concept and as a practice, still seems unknown to many library and information personnel. Many library staff are not aware of the concept or how to employ it for advocacy. The reasons are not far fetched IFLA (2022) reports that many librarians are not necessarily trained to be advocates, and many are indeed in a position where they feel that their freedom of movement is limited by the conditions of their employment. Neglect is another major setback to national library advocacy through library marketing. Ternenge (2019) decry that in contemporary Nigeria, libraries are not at the forefront of government activities.

Libraries are mostly underfunded, most heads of institutions have poor perception of libraries especially as its not Income Generating Avenue.(IGA) for the institution. Other challenges as revealed by Urhefe-Okotie (2023) include lack of fund, ineffective marketing strategies, lack of marketing policies, shortage of experienced staffing, infrastructure limitations. Inazu (2009) agrees that library marketing in national libraries are restricted by financial resources, organisational structure, the library environment, the attitude of librarians, erratic power supply, training and education. The competition of the internet with the library is another major challenge(Campbell- Meier & Velasquez, 2018).

Strategies for enhancing marketing practices for effective advocacy in National Libraries

Several challenges affecting library advocacy using marketing practices especially in national libraries. This call for strategic measures in order to close the gap**.** Strategies is the process of planning something or carrying out a plan in a skillful way. Ternense (2019) The author further suggested that good rapport between heads of libraries and policy makers , change of attitude among librarians, involment of NLA chapters in engaging legislators on library issues.Moahi (2019) suggests that advocacy and public programming can only be effectively carried out where libraries have reached out to communities to provide relevant services that are informed by their context and needs. Ezeala and Hundu (2019) suggested that for advocacy to succeed as a concept, it has to employ marketing strategies. Chandratre and Chandratre

(2015) affirm that for opium utilisation of information and 24/7 access to information, libraries have changed themselves srategically.

Social media can also be employed to enhance library advocacy through marketing practices. Urhefe-Okotie (2023) suggested measures like creating library websites, sending emails to users, setting up exhibits and new arrivals, using fliers and posters, planning user education, offering electronic access to information and planning library week to improve library advocacy through marketing practices.According to the author, there is need for professional developmentof librarians invoved in library marketinglibrarians upgrading their technical skills, and enhance their ability to troubleshoot andkeep abreast of new technologies.Another key strategies according to Hays (2025) include to understand the audience, communicate strategically, make data driven decisions, leverage personal testimonials. In their research Campbell-Meier and Velasquez (2018) opine that libraries may accomplish this by using social media, developing outcome based marketing plans and being prepared with elevator speeches or stories to explain the library's role within the community.

Method

Quantitative methodology is adopted for this study. Research design employed in this study is descriptive survey. The poulation of the study include all the library staff of the National Library of Nigeria. These are four hundred and eleven (411) according to the 2026 update from the Human Resources and Adminstration department of the National Library of Nigeria. These include librarians, library officers, library assistants and any other staff who is involved in serving the users in the branches of the National Library of Nigeria. An online questionnaire was used to collect responses for the study. A purposive sampling technique was used to target 50 library staff. However, only the 16 library staff responded online. Data were analysed using frequencies, percentages and mean.

Results

Objective 1: Extent of the advocacy needs of the National Library of Nigeria

Table 1 presents the frequency and mean distribution of the respondents on the extent of the advocacyneeds of the National Library of Nigeria. All the responses were above the crieterion mean of 2.5 and are therefore accepted as significant . The Grand mean is 3.0 showing that all are needs for advocacy ito a high extent in the National Library of Nigeria.

Table 1: Frequency and mean distribution of responses on the extent of the advocacy needs of the National Library of Nigeria

Key: Very High Extent (VHE), High Extent (HE), Low Extent (LE), No Extent (NE)

Items	VHE	HE	LE	NE	×	Dec
Increased funding of the National Library of Nigeria	12	3	1	-	3.7	A
Enhanced library community engagement services	10	4	2	-	3.4	A
Provision of modern work facilities	10	3	3		3.4	A
Visibility of the library and its resources & services	9	5	2	-	3.4	A
Partnership and collaborations with other organisations	8	7	1	-	3.4	A
Issues related to physical building structures	8	6	2	-	3.4	A
Promotion of readership among the citizenry	7	6	-	-	3.3	A
Increased patronage of the apex library	7	7	2	-	3.3	A
Labour related issues eg extension of length of service	6	4	6	-	3.0	A
Grand Mean= 3.0						

The scores arranged in descending order are the follwing :Increased funding of the National Library of Nigeria(3.7); Enhanced library community engagement services(3.4); Provision of modern work facilities (3.4); Visibility of the library and its resources & services (3.4); Partnership and collaborations with other organisations (3.4); Issues related to physical building structures (3.4); Promotion of readership among the citizenry(3.3); Increased patronage of the apex library (3.3) Labour related issues eg extension of length of service (3.0)

Objective 2: Marketing practices employed for effective advocacy in the National Library of Nigeria

Table 2 presents the frequency and percentage distribution of the respondents on the marketing practices employed by the National Library of Nigeria. 50% and above is considered significant and acceptednwhile any score below is rejected as insignificant.

Table 2: Frequency and percentage distribution of the respondents on the marketing practices employed by the National Library of Nigeria Key: Empolyed (E), Not Employed (NE)

Items	E	%	NE	%	Dec
Readership Promotion Campaign	16	100	0	0	A
Displays and exhibitions	15	93.75	1	6.25	A
Vrtual and social media services	13	81.25	3	18.75	A
Conference of state librarians and theNational Librarian	13	81.25	3	18.75	A
Radio talk shows and jingles	13	81.25	3	18.75	A
Courtesy vists to community stakeholders	13	81.25	3	18.75	A
Road walk/ shows	12	75	4	25	A
Distribution of online and print fliers	10	62.5	6	37.5	A
Use of social media hashtags e.g #completenationallibrarybuilding	9	56.25	7	43.75	A
Community engagement services and outreaches	8	50	8	50	A
Branding and image bulding of the apex library	8	50	8	50	A
Lobbying of legilators, goverment official & agencies	6	37.5	10	62.5	R

The following scores are accepted as significant. Readership Promotion Campaign (100%); Displays and exhibitions(93.75%); Vrtual and social media services (81.25%); Conference of state librarians and theNational Librarian **(81.25%);** Radio talk shows and jingles (81.25%); Courtesy vists to community stakeholders (81.25%); Road walk/ shows (75%); Distribution of online and print fliers (37.5%); Use of social media hashtags e.g #completenationallibrarybuilding (56.25%); Community engagement services and outreaches (50%); Branding and image bulding of the apex library (50%); Lobbying of legilators, goverment official & agencies (37.5%) is rejected as insignificant as it is not up to the criterion percent of 50.

Objective 3: Benefits of effective advocacy through marketing practices in national libraries

Table 3 shows the benefits of effective advocacy through marketing practices in the National Library of Nigeria. All responses are accepted as significant . They are all above the crieterion mean. The grand mean is 3.7.

Key: Very High Extent (VHE), High Extent (HE), Low Extent (LE), No Extent (NE)

Items	VHE	HE	LE	NE	X	Dec
Raising an informed citizenry	12	4	-	-	3.8	A
Increased relevance and visibilty of the apex library	12	4	-	-	3.8	A
Sanitizing the publishing industry to adopt international best practices	12	4	-	-	3.8	A
More awareness about the National Library of Nigeria	11	5	--	-	3.7	A
Attracts donations, grants and support for the library	11	5	-	-	3.7	A
Attracts favourable policies from the government	11	4	1	-	3.6	A
Increased support for education and research	10	6	-	-	3.6	A
Increase in the utilisation of information services and resources	9	7	-	-	3.5	A
	Grand			3.7		

The scores arranged in a descending order are listed below. Raising an informed citizenry(3.8) Increased relevance and visibilty of the apex library (3.8) Sanitizing the publishing industry to adopt international best practices (3.8) More awareness about the National Library of Nigeria (3.7) Attracts donations, grants and support for the library(3.7) Attracts favourable policies from the government (3.6); Increased support for education and research(3.6) Increase in the utilisation of information services and resources (3.5).

Objective 4: Setbacks hindering effective advocacy through marketing practices in the National Library of Nigeria

Table 4 indicates the setbacks hindering advocacy through marketing practices. All the responses are accepted as significant challenges affecting advocacy through marketing practices in the national library. The grand mean of 3.4 shows that all the responses are significant as they are above 2.5.

Table 4: Frequency and mean distribution of stbacks hindering advocacy through marketing practices

Key: Strongly Agree (SA), Agree (A), Diagree (D), Strongly Disagree(SD)

Items	SA	A	D	SD	X	Dec.
Poor funding of National Library of Nigeria	13	3	-	-	3.8	A
Delay in the completion of the apex library building	12	3	1	-	3.7	A
Inadequate knowledge of library marketing and advocacy	7	8	1	-	3.4	A
Poor awareness of Institutional policies on marketing and advocacy	8	7	1	-	3.4	A
Poor knowledge of the public and knowledge of apex library	6	10	-	-	3.4	A
Poor library marketing and advocacy strategies	7	8	1	-	3.4	A
Limited access to modern technologies	7	9	-	-	3.4	A
Poor digital literacyamong the library staff	5	10	1		3.1	A
Low interest on organisationalgrowth by library staff	6	6	4	-	3.1	A
			Grand mean 3.4			

The scores of the responses arearranged in descending orderPoor funding of National Library of Nigeria (3.8); Delay in the completion of the apex library building (3.7); Inadequate knowledge library marketing and advocacy (3.4); Inadequate knowledge library marketing and advocacy (3.4); Poor awareness of Institutional policies on marketing and advocacy (3.4); Poor knowledge of the public and knowledge of apex library (3.4); Poor library marketing and advocacy strategies (3.4); Limited access to modern technologies (3.4); Poor digital literacyamong the library staff (3.1) and Low interest on organisationalgrowth by library staff (3.1)

Objective 5: Strategies for enhanced marketing practices for effective advocacy in the National Library of Nigeria

Table 5: The table shows in descending order the strategies that can enhance advocacy through library marketing practices in the National Library of Nigeria. All of the score are accepted as significant strategies.

Table 5: Frequencies and mean distribution of strategies for marketing practices for effective advocacy in the National Library of Nigeria

Key: Very Appropriate(VA), Appropriate (A), Less Appropriate (LA), Not Appropriate (NA**)**

Items	VA	A	LA	NA	X	Dec
Training staff on strategic library marketing and advocacy	15	1	-	-	3.9	A
Provision of adequate funding for library marketing and advocacy	15	1	-	-	3.9	A

Digital retooling of library staff for effetive marketing for advocacy	15	1	-	-	3.9	A
Increased awareness of the public and government on th relevance of the National Library of Nigeria	15	1	-	-	3.9	A
Equipping the library with modern facilities and technology	15	1	-	-	3.9	A
Adequate marketing and advocacy strategies	15	1	-	-	3.9	A
Motivating staff to put interest in the library's growth	14	2	-	-	3.9	A
Enhanced awareness of the library staff on the institutional policies on marketing and advocacy	14	1	1	-	3.8	A
Speedy completion of the National library Central building	13	2	1	-	3.8	A

Training staff on strategic library marketing and advocacy (3.9); Provision of adequate funding for library marketing and advocacy (3.9); Digital retooling of library staff for effetive marketing for advocacy (3.9); Increased awareness of the public and government on th relevance of the National Library of Nigeria(3.9); Adequate marketing and advocacy strategies (3.9); Motivating staff to put interest in the library's growth (3.9); Enhanced awareness of the library staff on the institutional policies on marketing ang advocacy (3.8); Speedy completion of the National library Central building (3.8)

Discussion of findings

Extent of the advocacy needs of the National Library of Nigeria

The findings in Table 1 show that the National Library of Nigeria has various advocacy needs ranging from building to relevance issues. This is supported by the study of Ihejirika and Onah (2022) that libraies exts to meet the basic needs for information. According to the authors, library advocacy and marketing are critical to draw attention to their libraries, their services, their worth to their community.

Marketing practices employed for effective advocacy in the National Library of Nigeria

Furthermore, marketing practices identified in Table 2 agree with the studies carried out that by earlier scholars. Zubair (2025) also agree that libraries ought to formally integrate marketing and public relations while Inazu (2009) described the marketing practices adopted in National Library of Nigeria to include verbal communication, production of brochures, posters, flyers, booklets, and bookmarks.

Benefits of effective advocacy through marketing practices in national libraries

Findings in table 3 indicate that there are so many benefits of employing library marketing for advocacy in the National Library. Hays (2025), supports that the four main benefits the library marketinIng are higher usage,increased value to your organization,educated users,and changed perceptions

Setbacks hindering effective advocacy through marketing practices in the National Library of Nigeria

Results in Table 4 shows that there are setbacks hindering effective advocay in the apex library through marketing practices. Authors also support the findings. Ternenge (2019) decries that in contemporary Nigeria, libraries are not at the forefront of government activities. Libraries are most underfunded, most heads of institutions have poor perception of librariesespecially as its not Income Generating Avenue.(IGA).

Strategies for enhanced marketing practices for effective advocacy in the National Library of Nigeria

Findings in Table 5 show that incresed funding, digital retooling among others are necessary to change the advocacy narrative in the National Library of Nigeria. This is supported by the study of Urhefe-Okotie (2023) which suggests making a library website, emailing users, setting up exhibits and new arrivals, using fliers and posters, planning user education, offering electronic access to information and planning library week as meaures that can enhance advocacy through library marketing in libraries.

Conclusion

The study examines marketing practices for effective advocacy in the National Library of Nigeria. Five research objectives guided the study. Descriptive survey resarch design is employed to collect data from the National Library

staff who are the population of the study. Online questionnaire is used to collect data from sixteen staff using purposive sampling technique.Data are analysed through mean, frequencies and percentages. Findings indicate that advocacy is needed in the library through different library marketing practices. These are identified to yield postive results even though setbacks like inadequate funding and poor knowledge of staff on advocacy and marketing are identified. The findings also indicate that these setbacks can be overcome through retooling of staff, more community engagement services, motivation of the library staff and support of advocates of the National Library of Nigeria.

Recommendations

National libraries should look inwards to identify problematic areas in the organisations where advocacy can be employed to enhance library services.

National Library of Nigeria should employ various marketing practices as means of advocay for the library.

National Library of Nigeria should use marketing as advocacy tool to project relevance, visibility and increse the use of the library services constantly engage their various user community so as to increase visibility and relevance.

Retraining library staff for retooling and upspskilling in the area of web-based advocacy, lobbying and library marketing among other contemporary trends.

Library advocates like students, organisations, community leaders, legislators, and library brand ambassador should be organised for adequate advocacy and marketing.of the National Library of Nigeria.

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Navigating Disconnects: A Narrative Exploration of Librarians' Experiences with Digital Divides and AI Integration in Nigeria

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Abstract

Artificial intelligence (AI) is an evolving phenomenon penetrating all dimensions of human lives. Nonetheless, its adoption in developing and underdeveloped societies has been hampered by various factors, including digital divides/inequality. Unravelling how the phenomenon unfolds in libraries underscores why this study explores librarians' experiences with digital divides and AI integration in Nigerian academic libraries through a qualitative narrative approach. Twenty-nine professional librarians across different states were selected based on their availability, while unstructured interviews were conducted and transcribed using Otter.ai to capture their lived experiences. The narrative design enabled the collection of rich, story-based accounts that revealed the multidimensional nature of digital divides within library environments. Findings showed the prevalence of access, quality, skills, content, usage, socioeconomic, and demographic divides, which collectively hinder equitable information service delivery. Participants emphasised that divides are not solely due to resource unavailability but stem from uneven access, poor connectivity, and inadequate technical expertise. Intersectionality was evident, as skills deficits translated into usage divides, while socioeconomic constraints limited access to premium AI tools and devices. Librarians also reported anxieties about AI adoption, citing inadequate AI literacy, ethical concerns, and fears of job displacement. Additional barriers included high costs of technological infrastructure, rapid technological obsolescence, and unstable Internet connectivity. Overall, the study demonstrates that while Nigerian librarians recognize AI's potential for enhancing cataloguing, classification, and research support, systemic challenges rooted in infrastructure, funding, and expertise significantly constrain adoption. These findings underscore the need for context-sensitive strategies, professional development, and institutional investment to bridge digital divides and foster meaningful AI integration in Nigerian academic libraries.

Keywords: AI, AI integration, Digital divides, Librarians

Introduction

The concept of the digital divide has been widely examined as a persistent global challenge characterised by unequal access to information and communication technologies (ICT). It broadly describes disparities in technology access, usage, and digital outcomes among different populations (Lythreatis et al., 2022; Soomro et al., 2020). Although worldwide digital dependence accelerated during the COVID-19 pandemic, these inequalities have not only persisted but in some contexts become more visible (Lythreatis et al., 2022). Initial global attention to the digital divide emerged when the phenomenon surfaced in several United Nations (UN) reports, prompting scholars to investigate inequalities in ICT access and use (Lythreatis et al., 2022). Today, the digital divide remains an entrenched and multifaceted issue (Chang et al., 2014), manifesting in disparities related to physical access, digital skills, motivation, and effective usage

(Soomro et al., 2020). Such inequalities have far-reaching implications, given that ICT proficiency increasingly shapes economic opportunities, social participation, and knowledge access (Ragnedda, 2017; Bartikowski et al., 2018).

In the Nigerian context, the digital divide reproduces longstanding socio-economic inequalities, reinforcing disparities between wealthy and poor communities, urban and rural populations, and able-bodied and disabled individuals (Nwegbu et al., 2011). These inequities hinder participation in the digital economy and heighten social vulnerabilities, including youth restiveness and exclusion from essential digital services (Chime, 2023). Scholars warn that without decisive interventions, the widening digital gap will continue to undermine national development efforts.

Within education-related environments, particularly among teachers, students, and librarians, the digital divide introduces layers of disadvantage that affect learning, teaching, and knowledge dissemination (Soomro et al., 2020). In libraries, unequal ICT access is especially concerning because it undermines the institution's fundamental role of enabling equitable access to information and lifelong learning. Given the rapid expansion of the digital economy and emerging technologies such as artificial intelligence (AI), unequal access has taken new forms. Recent scholarship points to additional layers of digital inequality, including algorithmic awareness disparities and data-related inequities, which further complicate the digital divide (Lythreatis et al., 2022; Atadika, 2025). AI itself is transforming major societal sectors, including education, healthcare, and economic systems, yet access to and understanding of AI tools remain highly uneven, especially in developing countries like Nigeria (Atadika, 2025).

In Nigeria, libraries are beginning to experience this shift. AI was first introduced into library environments as early as 1985; however, significant momentum has been observed only in recent years as AI-driven systems become more mainstream (Cox, 2021). Scholars argue that AI has the capacity to transform traditional libraries into smart, technology-enhanced learning hubs (Olatoye, 2025). AI tools' areas of application include intelligent cataloguing systems, virtual reference agents, automated indexing, and advanced surveillance capabilities (Orubebe et al., 2025). Despite this potential, widespread AI adoption in Nigerian libraries has been limited due to factors such as poor infrastructure, insufficient training, low awareness, and institutional hesitations (Olasehinde, 2025; Orubebe et al., 2025).

Research further indicates that librarians often express scepticism about AI replacing human expertise. Addressing such concerns requires positioning AI as a complement rather than a substitute for professional roles. This allows librarians to focus on emerging responsibilities such as digital literacy instruction, research support, and data stewardship (Tanko & Hamza, 2025). Strengthening AI integration will therefore require national policy support, pilot initiatives within leading universities, improved ICT infrastructure, public-private partnerships, and the establishment of strong ethical and data-governance frameworks.

Efforts to bridge Nigeria's digital divide more broadly have emphasised the need for improved telecommunication and electrical infrastructure, lower data costs, better connection quality, and sustained investment in digital education and locally relevant content creation (Chime, 2023; Okocha & Dogo, 2023). Within the library sector, bridging the divide similarly demands consistent funding for ICT resources, comprehensive digital literacy training, inclusive policy development, and strong institutional collaborations (Abdurrahman & Tekawa, 2025). Importantly, it should be noted that the digital divide remains a complex and evolving issue, limiting equitable access to both foundational digital tools and advanced technologies such as AI. For Nigerian librarians, navigating these disconnects shapes their professional experiences, capabilities, and identities as they work to serve increasingly digital user communities. Having a study that provides librarians' narrations of the implications of the digital divide on AI adoption becomes the basis for this study to explore librarians' experiences with digital divides and AI integration in Nigeria.

Statement of the Problem

Despite the global shift toward digitally mediated knowledge environments, many librarians in developing and underdeveloped societies continue to operate within contexts marked by significant digital divides, inadequate infrastructure, and uneven access to emerging technologies. Although information and communication technologies (ICTs) now constitute essential tools for information delivery, large portions of the Nigerian population (and by extension, the institutions that serve them) remain excluded from equitable digital participation. Persistent disparities in ICT access, skills, motivation, and effective usage continue to undermine library services and widen existing socio-economic and educational inequalities (Soomro et al., 2020; Ragnedda, 2017). These challenges are particularly pronounced in Nigeria, where infrastructural limitations, inconsistent power supply, and high connectivity costs have long sustained deep digital inequalities between urban and rural communities, wealthy and poor citizens, and able-bodied and disabled individuals (Chime, 2023; Nwegbu et al., 2011).

As technological innovations accelerate, the digital divide has taken new forms. The rise of AI in educational and information sectors has introduced additional layers of inequality linked to algorithmic literacy, data access, and AI-enabled resource availability (Atadika, 2025; Lythreatis et al., 2022). Although AI holds significant potential to transform library operations through intelligent cataloguing, virtual reference systems, automated indexing, and enhanced user services (Orubebe et al., 2025), its adoption within Nigerian libraries has been slow and uneven (Nwegbu et al., 2011; Chime, 2023; Orubebe et al., 2025). Research shows that librarians often lack adequate training, awareness, and institutional support to integrate AI tools effectively (Olasehinde, 2025). Moreover, scepticism and anxiety about

job displacement further complicate librarians' acceptance and engagement with AI technologies (Tanko & Hamza, 2025).

Despite growing scholarly attention to digital inequalities and ICT integration in Nigeria, very little is known about how librarians personally experience, navigate, and make meaning of these technological disconnects. Existing studies, such as Adeleke (2023); Chime (2023); Eiriemiokhale and Sulyman (2023); Olasehinde (2025), and Tanko and Hamza (2025) tend to focus on infrastructural gaps, policy deficits, or technological capabilities, with limited attention to the lived experiences, narratives, and perspectives of librarians who confront these realities in their daily professional practice. This creates a critical knowledge gap, particularly as librarians play an increasingly pivotal role in mediating users' access to digital and AI-enhanced information environments.

The lack of qualitative, narrative-based evidence about librarians' real-world encounters with digital divides and AI integration hinders the development of context-sensitive strategies, training programmes, and policy interventions capable of addressing their challenges. Without an in-depth understanding of these experiences, efforts to promote digital inclusion, AI competency, and equitable library services risk overlooking the human, emotional, and professional dimensions that shape librarians' engagement with technology. An attempt to close this gap underscores why this study to explore librarians' experiences with digital divides and AI integration in Nigeria.

Objectives of the Study

The main objective of this study is to explore librarians' experiences with digital divides and AI integration in Nigeria. The specific objectives are to:

1. Find out the digital divides present in Nigerian academic libraries; and
2. Examine the factors associated with digital divides hindering AI integration in Nigerian academic libraries.

Research Questions

This study answers the following questions:

1. What are the digital divides present in Nigerian academic libraries?
2. What are the factors associated with digital divides hindering AI integration in Nigerian academic libraries?

Review of Related Literature

The discourse on digital divides and AI adoption in Nigerian libraries is situated within broader global debates on technological inequality and digital inclusion. Scholars such as Van Dijk (2017) and Pierce (2018) have emphasised that digital inequality extends beyond physical access to encompass motivational, skills-based, and usage-related disparities. These perspectives underscore the multidimensional nature of the digital divide, which is reinforced by socio-economic, demographic, and infrastructural factors. Within Nigeria, empirical studies reveal that librarians' experiences with digital technologies and AI are shaped by systemic inequities, infrastructural deficits, and institutional constraints, thereby complicating efforts to integrate advanced technologies into library service delivery. The digital divides can happen at the level of access, quality of access, skills, content, usage, socioeconomic, geographic and demographic (Sulyman, 2025)

Research on ICT access in Nigeria highlights persistent disparities across spatial, institutional, and community contexts. Adeleke (2023) demonstrates that Internet usage is unevenly distributed across the 36 states and the Federal Capital Territory, with Lagos, Abuja, and Kano forming clusters of high penetration, while states such as Ekiti and Bayelsa exhibit low concentrations of users. Determinants such as income, electricity supply, urbanisation, and telephone density reinforce these disparities, revealing how socio-economic contours shape digital access. At the community level, Okocha and Dogo (2025) document how rural populations in Southern Kaduna face compounded barriers, including poverty, language, poor infrastructure, and low literacy that restrict access to vital information on education, employment, and security. Similarly, Abdurrahman and Tekawa (2025) show that even where digital resources exist, as in the Federal Polytechnic Mubi library, access is undermined by inadequate bandwidth, unstable electricity, and limited digital literacy. These findings resonate with comparative studies in Pakistan (Soomro et al., 2020) and Eswatini (Mpofu, 2025), which highlight that infrastructural inadequacies and uneven skills access are common across developing contexts. Collectively, these studies suggest that Nigerian librarians operate within a fragmented digital ecosystem where structural inequities intersect with socio-economic divides to shape both access to ICTs and readiness for AI adoption.

Empirical studies reveal that Nigerian librarians generally exhibit moderate awareness of AI tools and strong optimism regarding their potential benefits. Urhefe-Okotie (2025) and Eiriemiokhale and Sulyman (2023) report that librarians are aware of tools such as chatbots and Dynamed, and perceive AI as a positive development capable of enhancing cataloguing, reference services, and knowledge discovery. However, awareness is uneven, particularly with respect to emerging systems such as ChatGPT and machine learning applications. Gender and institutional differences further complicate this landscape: Edam-Agbor et al. (2025) find that female librarians and those in private institutions demonstrate stronger application of AI, suggesting that socio-cultural and organisational factors mediate adoption. Despite optimism, anxieties about job displacement, ethical risks, and inadequate expertise persist (Urhefe-Okotie,

2025; Orubebe et al., 2025). These findings indicate that while librarians' perceptions are largely positive, systemic barriers, rather than individual willingness, remain decisive in shaping adoption trajectories.

The extent of AI adoption in Nigerian libraries remains limited, with most institutions at exploratory stages. Olaseinde (2025) and Chipembele et al. (2025) note that AI use is largely restricted to basic tools such as chatbots and cataloguing systems. Nonetheless, Olatoye et al. (2025) report that some university libraries in South-west Nigeria employ AI extensively in cataloguing, classification, and circulation, with ethical use emphasised in accessibility and knowledge sharing. Across studies, recurrent barriers include poor connectivity, unstable electricity, lack of technical expertise, funding deficits, and difficulty integrating AI with legacy systems (Olaseinde, 2025; Orubebe et al., 2025). Comparative evidence from Bangladesh suggests a more optimistic outlook, as Begum and Elahi (2025) find that information professionals in Bangladesh express confidence in infrastructural readiness and institutional support, contrasting Nigeria's fragmented and underfunded environment. These findings underscore the uneven nature of AI adoption in Nigeria, where pockets of advanced use coexist with widespread infrastructural and financial constraints.

Ethical considerations and professional development emerge as critical dimensions of AI adoption in Nigerian libraries. Olatoye et al. (2025) highlight strong ethical engagement in areas such as accessibility and dissemination, though predictive analytics and advanced data analysis remain underutilised. Professional development gaps are consistently emphasised, with Olaseinde (2025) and Ayinde et al. (2026) identifying inadequate training and skills deficits as major obstacles. Nearly half of reviewed studies cite funding as the primary institutional challenge to AI adoption. Lessons from other contexts, such as Atadika's (2025) study in Georgia, suggest that community-based outreach and culturally grounded training can reshape perceptions and foster acceptance. These insights indicate that while ethical awareness exists among Nigerian librarians, without sustained professional development and institutional investment, ethical principles risk remaining aspirational rather than operational.

Insightfully, the reviewed literature reveals a disconnect between perception and practice. While librarians express optimism and awareness of AI's potential, infrastructural and institutional constraints limit translation into practice. Adoption varies significantly across states, institutions, and gender, reflecting broader socio-economic divides. Moreover, most studies rely on surveys and quantitative analyses, with few capturing the live experiences, anxieties, and coping strategies of librarians navigating digital divides. Policy and systemic inertia further exacerbate fragmentation, as Nigeria's decentralised efforts contrast sharply with India's coordinated national initiatives (Umar, 2025). These gaps highlight the need for narrative approaches that foreground librarians' voices and experiences, thereby illuminating how systemic disconnects are negotiated in practice.

The literature demonstrates that Nigerian librarians are simultaneously enthusiastic and constrained in their engagement with AI. Their experiences are shaped less by individual willingness than by systemic inequities in infrastructure, funding, and institutional support. While AI adoption offers transformative potential, the persistence of digital divides, including spatial, institutional, and socio-cultural, creates disconnects that hinder meaningful integration. A narrative exploration of librarians' lived experiences is therefore essential to bridge the gap between policy ambitions and everyday realities, and to provide nuanced insights into how librarians navigate the challenges of digital divides and AI integration in Nigeria.

Methodology

This study adopted a qualitative approach, employing narrative design to gather qualitative data reported in the form of cohesive stories. The population of this study is 29 professional librarians working in academic libraries in different states in Nigeria, who are conveniently selected as participants in this study because of their availability at the time of gathering data. Unstructured interviews recorded with Otter.ai were held with the librarians. Otter.ai made transcribing the interviews easier, enhancing identifying the key themes provided in the participants' responses.

Data Analysis

Overview of the Respondents' Demographic Characteristics

The majority of the respondents are males (22, 75.9), with the same figures for the number of participants from university libraries. This is followed by MLIS (19 65.55%) for the highest academic qualifications. All the participants are above 30 years, while 25 (86.25%) have at least 10 years of work experience. The demographic findings imply that the participants, dominated by males, have acquired both academic status and professional experiences required to understand the evolution and transition of ICT trends in the library and information landscape.

Presence of Digital Divides in Nigerian Academic Libraries

Findings reveal the prevalence of various dimensions of digital divides in Nigerian academic libraries, notably with access, quality of access, skills, content, usage, socioeconomic and demographic divides gaining prominence. This demonstrates that the digital divides riddling the progress of digital inclusion in Nigeria have found their way to libraries, resulting in inefficient information dissemination and inequality in information service delivery. Some of the participants who comprehensively explained their understanding of the digital divides that are aware of explained that "it is apparent that libraries in Nigeria, be it academic or whatsoever, are facing the challenge of digital divides." They admitted that "the divides are not majorly caused by unavailability of digital resources, but uneven access to the available ones."

One notable point deduced from the findings is the intersectionality of the digital divides. For instance, the participants argued that "when digital facilities are available and accessible, the issue of quality persists." This implies that the digital divides are in phases. Furthermore, the participants painted the pictures of the nexus between skills and usage divides by alluding that "sometimes, librarians' inability to adequately prompt AI tools hinder them from maximising AI benefits. When this happens, it results in "usage divides," meaning that our inability to use AI tools for desired purposes has created a gap between us and those using the same AI tools for the same or similar purposes.

In a similar vein, the participants identified the presence of content divides, stressing that "the kind of content being accessed by premium users of AI tools such as CoPilot, ChatGPT and Gemini is of higher quality than that of users of the free version. The library or a librarian's inability to afford the subscription cost or cost of purchasing quality digital gadgets like phones, computers, laptops, or tablets because of their high cost of sale amounts to 'socioeconomic divides.' This is more troubling based on a library's locations where academic qualifications, genders, age, religious/political affiliations can influence AI integration." The participants' acknowledgement of these factors in AI adoption and integration points to 'demographic divides,' which are the gaps encountered by AI users, due to the predominant factors in their environments.

Factors Associated with Digital Divides Hindering AI Integration in Nigerian Academic Libraries

Findings demonstrate that AI anxieties, poor technical expertise of librarians, high cost of technological infrastructure, rapid advancement in technologies and unstable/unreliable Internet connectivity hindered AI integration in Nigerian academic libraries. The participants emphasised the issue of AI anxieties by noting that "since AI is a recent technological evolution which is still evolving, librarians exhibit a notable level of reluctance in embracing it. One of the major reasons that could be attributed as the cause of AI anxieties is librarians' inadequate AI literacy." The participants further stressed that 'librarians who possessed basic, intermediate or advanced AI skills tend to adopt AI for some purposes such as research writing, literature reviewing, paraphrasing, cataloguing, classification, research support services and others."

Notably, the participants noted the issue of poor technical expertise of librarians in using AI appropriately. According to them:

> *"This issue manifests into other problems such as ethical considerations, biases and privacy abuse. For instance, some AI tools hallucinate by assuming issues or events with no facts or data to support their claims. This usually happens in situations where the AI tools are narrating or describing events, and in order to sound authentic, some scenarios would be invented to portray reality. Librarians' lack of ability to prompt and navigate AI tools' responses is associated with skills and usage divides."*

Explaining the issue of the high cost of technological infrastructure, the participants asserted that:

> *"Acquiring AI tools or infrastructure required to put AI-driven library services in place is cost-intensive. This issue becomes more complicated in societies like Nigeria, where libraries are struggling to raise funds for service delivery. Similarly, the high cost of technological infrastructure is more troubling in the era of rapid advancement in technologies, leading to technological obsolescence and ultimately affecting the provision of reliable or stable Internet connectivity."*

Discussion of the Findings

The findings highlight the multidimensional nature of digital divides in Nigerian academic libraries, which aligns closely with broader scholarly discourse. Van Dijk (2017) and Pierce (2019) emphasize that digital inequality extends beyond physical access to include motivational, skills-based, and usage-related disparities. This resonates with the librarians' narratives, where divides were not only about the availability of digital resources but also about uneven access, poor quality of connectivity, and limited technical expertise. The literature further contextualizes these divides as systemic, shaped by socioeconomic and infrastructural factors, which mirrors the librarians' accounts of unstable electricity, high costs of digital tools, and inadequate training.

The intersectionality of divides described by participants, such as the link between skills and usage gaps, finds support in Soomro et al. (2020), who argue that digital divides manifest in phases and layers. For instance, librarians' inability to adequately prompt AI tools reflects skills divide that directly translates into usage divides. Similarly, the content divide identified in the findings, where premium users of AI tools access higher-quality resources compared to free users, echoes Ragnedda's (2017) notion of digital inequality as a stratified phenomenon. These contextual overlaps suggest that Nigerian librarians' experiences are not isolated, but constitute part of a global pattern where divides evolve with technological advancement.

Socioeconomic and demographic divides highlighted in the findings also align with Adeleke's (2023) study, which shows uneven Internet penetration across Nigerian states, with wealthier and urban regions enjoying better access. The librarians' accounts of subscription costs, expensive digital gadgets, and location-based disparities reinforce this evidence, underscoring how economic status and geography mediate digital inclusion. Gender and institutional differences noted in Edam-Agbor et al. (2025) further contextualize the demographic divides, as female librarians and those in private institutions reportedly demonstrate stronger AI adoption compared to their counterparts. These findings illustrate how broader social inequalities filter into library environments, shaping librarians' readiness for AI integration.

The anxieties and skepticism expressed by librarians regarding AI adoption reflect a tension documented in studies such as Tanko and Hamza (2025) as well as Olasehinde (2025). While librarians acknowledge AI's potential for cataloguing, classification, and research support, poor technical expertise, ethical concerns, and fears of job displacement hinder adoption. This disconnect between optimism and practice, as noted in Urhefe-Okotie (2025), contextualizes the librarians' reluctance as less about individual willingness and more about systemic barriers. Thus, the findings situate Nigerian librarians' experiences within a broader narrative of digital divides and uneven AI adoption, where infrastructural, socioeconomic, and institutional constraints remain decisive in shaping outcomes.

Furthermore, the findings highlight several barriers, such as AI anxieties, poor technical expertise, infrastructural costs, rapid technological change, and unreliable Internet, as hindrances to AI integration in Nigerian academic libraries. These align closely with the broader literature reviewed, which consistently emphasizes systemic and structural challenges over individual willingness. For instance, Olasehinde (2025) and Orubebe et al. (2025) similarly identify poor connectivity, unstable electricity, and lack of technical expertise as recurrent obstacles. This suggests that librarians' anxieties about AI are not simply personal reservations but are deeply rooted in inadequate training opportunities and institutional support, reinforcing the notion that adoption is constrained more by systemic inequities than by librarians' attitudes.

The issue of poor technical expertise resonates with the literature's emphasis on professional development gaps. Ayinde et al. (2026) and Olasehinde (2025) stress that inadequate training and limited AI literacy remain major obstacles to effective integration. The findings from the study contextualize this by showing how librarians' inability to prompt or navigate AI tools leads to "usage divides," where even available technologies cannot be maximised. This reflects Van Dijk's (2017) multidimensional model of digital divides, where skills and usage disparities compound access inequalities. Thus, librarians' anxieties about AI are not only psychological but also practical, stemming from insufficient expertise to manage ethical risks, biases, and hallucinations in AI systems.

The high cost of technological infrastructure and rapid technological advancement further contextualize the findings within Nigeria's broader digital ecosystem. As Chime (2023) and Okocha and Dogo (2023) argue, infrastructural deficits and high connectivity costs have long sustained digital inequalities across Nigerian communities. The study's participants reinforce this by noting that acquiring AI tools is cost-intensive, especially in underfunded library environments where technological obsolescence quickly undermines investments. This mirrors comparative studies such as Begum and Elahi (2025) in Bangladesh, where stronger infrastructural readiness contrasts Nigeria's fragmented environment. The Nigerian case therefore illustrates how financial constraints intersect with rapid technological change to exacerbate digital divides in library contexts.

Finally, the challenge of unstable Internet connectivity contextualizes the findings within both national and institutional realities. Abdurrahman and Tekawa (2025) show that even where digital resources exist, inadequate bandwidth and unstable electricity undermine access. The study's participants echo this, linking unreliable connectivity to difficulties in sustaining AI-driven services. This reflects the intersectionality of digital divides identified by Chime (2023); Olasehinde (2025); Okocha and Dogo (2023) and Sulyman (2025), where access, quality, skills, and socioeconomic factors overlap to shape librarians' experiences. Collectively, the findings and literature converge on the point that while Nigerian librarians are optimistic about AI's potential, systemic barriers rooted in infrastructure, funding, and expertise continue to hinder meaningful integration.

Conclusion

The findings of this study reveal that the digital divide in Nigerian academic libraries is not a singular challenge but a layered and intersectional phenomenon that shapes librarians' professional realities. Access, quality, skills, content, usage, socioeconomic, and demographic divides collectively hinder equitable participation in digital and AI-enhanced environments. Librarians' narratives demonstrate that even when digital resources are available, poor connectivity, unstable electricity, and limited technical expertise restrict their effective use. These divides manifest in phases, where inadequate skills translate into usage gaps, and socioeconomic constraints limit access to premium AI tools, ultimately reinforcing systemic inequalities. The study underscores that librarians' experiences are deeply embedded within Nigeria's broader socio-economic and infrastructural context, where disparities in income, geography, and institutional support perpetuate uneven digital inclusion.

Equally significant are the barriers to AI integration, which highlight the tension between optimism and systemic constraints. While librarians acknowledge AI's transformative potential in cataloguing, classification, research support, and knowledge dissemination, anxieties about job displacement, poor technical expertise, and ethical concerns temper their enthusiasm. The high cost of technological infrastructure, rapid technological obsolescence, and unreliable Internet connectivity further complicate adoption, leaving many libraries at exploratory stages rather than full integration. These findings emphasise that librarians' reluctance is less about unwillingness and more about systemic inequities in training, funding, and institutional support. Thus, bridging Nigeria's digital divide and fostering meaningful AI adoption requires deliberate investment in infrastructure, sustained professional development, inclusive policies, and strong institutional collaborations. By centering librarians' lived experiences, this study highlights the human dimension of technological disconnects and calls for context-sensitive strategies that empower librarians to navigate the evolving digital landscape with confidence and competence.

Recommendations

Based on the findings, this study recommends that:

1. Management of Nigerian academic libraries should invest in digital infrastructure and modern ICT facilities. This will improve stable electricity supply and affordable broadband connectivity, thus reducing access and quality divides.
2. Management of Nigerian academic institutions should be consistent in funding their libraries. This can be achieved by allocating sustained financial support for libraries to acquire AI tools, regular upgrades and maintain systems, thus help in addressing technological obsolescence.
3. Management of Nigerian academic libraries should partner with relevant stakeholders such as associations, regulating bodies and agencies to organise structured training programmes on AI literacy, ethical use, and technical expertise. This will equip librarians with skills to confidently adopt and manage AI tools.
4. Management of Nigerian academic libraries should collaborate with relevant stakeholders such as associations, regulating bodies and agencies to formulate policies that reduce socioeconomic and demographic divides in AI adoption. This can be done by ensuring equitable distribution of digital resources across urban and rural libraries.
5. Management of Nigerian academic libraries should partner with relevant stakeholders such as associations, regulating bodies and agencies to conduct awareness campaigns to reduce AI anxieties and scepticism. Through this, they can develop clear guidelines on data privacy, bias mitigation, and responsible AI use.
6. Management of Nigerian academic libraries should collaborate among themselves to encourage knowledge-sharing initiatives and pilot projects to test AI integration in their libraries. This will strengthen AI-driven partnerships between libraries, universities, government agencies, and technology providers.

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Open Access Publishing as a Means for Sustainable Scholarly Communication in Nigeria

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Abstract

The landscape of scholarly communication in Nigeria faces significant challenges including limited access to research outputs, high subscription costs, and inadequate visibility of Nigerian scholarship. This study examines open access publishing as a viable solution for sustainable scholarly communication in Nigeria. Using a descriptive survey design, data were collected from 150 librarians, researchers, and academic staff across Nigerian universities through structured questionnaires. The study assessed awareness levels, identified barriers, examined benefits, and explored strategies for implementing open access in Nigeria. Findings revealed high awareness (78.7%) of open access among respondents, with major barriers including inadequate funding (89.3%), limited technical infrastructure (84.0%), and poor internet connectivity (81.3%). Respondents identified enhanced research visibility (92.7%), increased citation rates (88.0%), and improved collaboration (85.3%) as key benefits. The study recommends institutional support through policy development, capacity building programs, infrastructure improvement, and establishment of dedicated open access repositories. Open access publishing presents significant opportunities for transforming scholarly communication in Nigeria if systemic challenges are adequately addressed.

Keywords: open access publishing, scholarly communication, Nigeria, academic libraries, research visibility, institutional repositories, digital scholarship

Introduction

Open access publishing has emerged over the past two decades as a transformative force in global scholarly communication, challenging traditional subscription-based models that have historically restricted access to research outputs. The Budapest Open Access Initiative (2002) defines open access as the free, immediate, and online availability of peer-reviewed research articles, coupled with the permission to use and redistribute these works in digital environments. Unlike conventional publishing, where paywalls limit readership, OA ensures that knowledge generated by researchers reaches the broadest possible audience, including practitioners, policymakers, and scholars in resource-constrained settings (Suber, 2012).

Globally, the proportion of OA literature continues to grow. Empirical evidence suggests that at least 28 percent of all scholarly articles are now openly accessible, with OA articles receiving citation rates approximately 18 percent higher than non-OA counterparts (Piwowar et al., 2018). Beyond citation advantages, OA facilitates collaboration, accelerates innovation, and enhances transparency in the scientific process (European Commission, 2020). For scholars in developing countries, OA offers a pathway to escape the paradox where locally produced research remains inaccessible to local audiences due to restrictive publishing agreements and unaffordable journal subscriptions.

In Nigeria, scholarly communication is characterized by multiple interrelated challenges. Academic libraries often cannot sustain subscriptions to essential databases, creating knowledge gaps that impede both research and teaching (Ajegbomogun and Salaam, 2011; Okiki, 2013). Additionally, Nigerian scholars frequently publish in international journals that remain inaccessible to their colleagues within the country, resulting in a situation where knowledge produced locally has limited local impact (Onyancha and Maluleka, 2011). These systemic issues have prompted growing interest in OA as a potential remedy.

Despite this interest, adoption of OA in Nigeria remains slow and uneven. While some universities have established institutional repositories, and awareness levels are rising (Ezema, 2011), significant barriers persist, including inadequate funding, limited digital infrastructure, and insufficient institutional policy support (Ukwoma and Dike, 2017). Furthermore, concerns about predatory publishing, article processing charges (APCs), and copyright complexities have created ambivalence among researchers (Nwagwu and Ojemeni, 2015).

Problem Statement

Although OA publishing has demonstrated potential to enhance research visibility, equity, and sustainability of scholarly communication globally, Nigerian academia continues to experience limited accessibility of research outputs, poor

visibility of locally generated scholarship, and inadequate institutional frameworks to support OA adoption. Many academic libraries cannot afford essential journal subscriptions, and researchers face confusion regarding legitimate OA venues versus predatory outlets. Moreover, no comprehensive empirical study has systematically examined the interrelationships among awareness levels, infrastructural barriers, perceived benefits, and strategic priorities for OA implementation within the Nigerian context. This study therefore addresses this gap by providing empirical evidence to inform policy and practice.

Theoretical Framework

This study is anchored in two complementary theoretical perspectives. First, Rogers' (2003) Diffusion of Innovation Theory provides a lens for understanding how OA publishing, as an innovation, is adopted across Nigerian academic institutions. The theory identifies five attributes influencing adoption: relative advantage, compatibility, complexity, trialability, and observability. OA's relative advantage (enhanced visibility) and observability (citation benefits) are evident in respondent perceptions, while complexity (understanding of licenses and repositories) and compatibility (alignment with existing reward systems) pose adoption barriers.

Second, the Scholarly Communication Lifecycle Model (University Library System, University of Pittsburgh, 2014) frames scholarly communication as a cyclical process involving creation, evaluation, dissemination, preservation, and access. OA interventions must address each stage—from funding research to disseminating findings through repositories—rather than focusing solely on publishing. Together, these frameworks inform the study's methodology and interpretation.

Objectives of the Study

1. To assess the level of awareness and understanding of open access publishing among Nigerian academics and librarians.
2. To identify the barriers hindering the adoption of open access publishing in Nigerian academic institutions.
3. To examine the perceived benefits of open access publishing for Nigerian scholarly communication.
4. To explore strategies for promoting sustainable open access publishing practices in Nigeria.

Research Questions

1. What is the level of awareness and understanding of open access publishing among Nigerian academics and librarians?
2. What barriers hinder the adoption of open access publishing in Nigerian academic institutions?
3. What are the perceived benefits of open access publishing for Nigerian scholarly communication?
4. What strategies can promote sustainable open access publishing practices in Nigeria?

Literature Review

Conceptual Clarifications

For clarity, this study adopts specific definitions. **Sustainable scholarly communication** refers to a system where research outputs are produced, disseminated, preserved, and accessed in ways that are economically viable, institutionally supported, and technologically resilient over time (Willinsky, 2006).

Visibility denotes the discoverability and readership of research beyond institutional and national boundaries.

Equity in scholarly communication implies that researchers from all regions, regardless of institutional wealth, can both access and contribute to global knowledge.

Open access publishing encompasses both gold OA (publishing in OA journals, sometimes with APCs) and green OA (self-archiving in repositories).

Open Access and Scholarly Communication in Africa

Across sub-Saharan Africa, OA adoption has been uneven but promising. Studies by Dulle and Minishi, Majanja (2011) found that while awareness levels were rising, technical infrastructure and policy gaps remained significant. Chiware and Mathe (2015) reported that academic libraries in South Africa have taken leading roles in OA advocacy, yet funding for APCs remains a major barrier. In East Africa, Lwoga and Questier (2014) observed that researchers recognized OA benefits but lacked institutional mandates to deposit works in repositories. These regional findings align with emerging patterns in Nigeria.

Barriers to Open Access Adoption

Empirical studies have consistently identified several categories of barriers. Financial barriers, particularly APC costs, disproportionately affect researchers in low-income countries (Pinfield et al., 2017). Infrastructure barriers, including unreliable internet and electricity, directly impact repository maintenance and online journal access (Chigwada et al., 2017). Human capacity barriers relate to insufficient training on copyright, licensing, and repository management (Ezema and Onyancha, 2017). Policy barriers include absence of institutional mandates and lack of integration of OA compliance into promotion criteria (Harnad et al., 2004). Predatory publishing further complicates the landscape, creating distrust in OA models (Nwagwu and Ojemeni, 2015).

Gaps in Existing Literature

Prior studies in Nigeria have tended to be descriptive and atheoretical. Few have applied formal theoretical frameworks to explain OA adoption patterns. Additionally, most studies have not systematically examined the interconnections among awareness, barriers, benefits, and strategies within a single empirical investigation. This study addresses these gaps by providing a theoretically grounded, empirically comprehensive analysis of OA publishing in Nigeria.

Methodology

Research Design

A descriptive survey design was adopted, appropriate for capturing perceptions, awareness levels, and barriers across a dispersed population of academics and librarians.

Study Population and Sampling

The target population comprised librarians, academic staff, and researchers from six public universities in Northern Nigeria: Yobe State University, Taraba State University, Gombe State University, Bauchi State University, Adamawa State University, and Borno State University. Using purposive sampling, 150 respondents (25 per institution) were selected to ensure representation across professional categories. This sample size is adequate for descriptive analysis and is provided in the table below.

Table 1: table showing respondents and their institutions

S/NO	*UNIVERSITY NAME*	*LIBRARIANS*	*RESEARCHERS*	*ACADEMIC STAFF*	*TOTAL*
1.	YOBE STATE UNIVERSITY	09	05	11	25
2.	TARABA STATE UNIVERSITY	08	03	14	25
3.	GOMBE STATE UNIVERSITY	07	04	14	25
4.	BAUCHI STATE UNIVERSITY	06	06	13	25
5.	ADAMAWA STATE UNIVERSITY	08	05	12	25
6.	BORNO STATE UNIVERSITY	07	03	15	25
			TOTAL = 150		

Instrumentation

A structured questionnaire titled "Open Access Publishing and Scholarly Communication Questionnaire (OAPSCQ)" was developed. The instrument had four sections: demographic information, awareness and understanding of OA (6 items), barriers (8 items), benefits (8 items), and strategies (9 items). Items were measured on a 5-point Likert scale (Strongly Agree = 5 to Strongly Disagree = 1).

Validity and Reliability

Content validity was established through review by three experts in library and information science and research methodology. Their feedback informed item revisions. Reliability was tested using a pilot study involving 25 respondents from a university not included in the main sample (Federal University of Kashere). Cronbach's alpha coefficients were 0.82 for the barriers section, 0.79 for benefits, and 0.84 for strategies, indicating acceptable internal consistency.

Data Collection and Ethical Considerations

Questionnaires were administered online via Google Forms and in print where internet access was limited. Ethical protocols included informed consent (participants were informed of the study's purpose and their right to withdraw), anonymity (no personal identifiers were collected), and confidentiality (data were aggregated for analysis only). Participation was voluntary, and no incentives were offered.

Data Analysis

Data were analyzed using SPSS version 24. Descriptive statistics (frequencies, percentages, means, and standard deviations) were employed to answer the research questions. No inferential statistics were used, consistent with the study's descriptive scope.

Study Limitations

This study has several limitations. First, purposive sampling limits generalizability to all Nigerian universities. Second, the exclusive focus on Northern Nigeria means findings may not reflect conditions in the South or East. Third, reliance on self-reported data introduces potential social desirability bias. Fourth, the cross-sectional design captures perceptions at one point in time only. These limitations are acknowledged, and findings should be interpreted as indicative rather than nationally representative.

Results and Discussion

Demographic Characteristics of Respondents

Table 2: Demographic Characteristics of Respondents (N=150)

DEMOGRAPHIC VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE
GENDER	Male	87	58.0
	Female	63	42.0
AGE GROUP	25,35 years	42	28.0
	36,45 years	61	40.7
	46,55 years	35	23.3
	56 years and above	12	8.0
PROFESSIONAL CATEGORY	Librarians	56	37.3
	Academic Staff	68	45.3
	Researchers	26	17.4
YEARS OF EXPERIENCE	1,5 years	38	25.3
	6,10 years	47	31.3
	11,15 years	41	27.3
	Above 15 years	24	16.1

Table 2 presents the demographic profile of 150 respondents. Male respondents constituted 58.0% (n=87), while females were 42.0% (n=63). The majority (40.7%) were aged 36–45 years, representing mid-career professionals. Professional categories included academic staff (45.3%), librarians (37.3%), and researchers (17.4%). Experience levels were distributed, with 31.3% having 6–10 years of experience and 27.3% having 11–15 years. This diversity ensured multiple perspectives on OA adoption.

Research Question 1: Awareness and Understanding of Open Access Publishing

Table 3: Awareness and Understanding of Open Access Publishing (N=150)

Awareness Indicators	*Yes*	*No*	*Percentage (Yes)*
Heard about open access publishing	118	32	78.7
Understand the concept of open access	102	48	68.0
Can differentiate between gold and green OA	76	74	50.7
Aware of open access journals in their field	94	56	62.7
Know about institutional repositories	89	61	59.3
Familiar with Creative Commons licenses	67	83	44.7
Aware of OA policies in their institutions	45	105	30.0

Table 3 shows that 78.7% of respondents had heard about OA, indicating relatively high surface,level awareness. However, deeper understanding was lower: only 50.7% could differentiate between gold and green OA, and only 44.7% were familiar with Creative Commons licenses. Alarmingly, only 30.0% were aware of OA policies at their institutions.

These findings suggest that while OA terminology is familiar, conceptual depth is lacking. This resonates with Dulle and Minishi,Majanja (2011), who reported similar patterns in Tanzania. The low awareness of institutional policies indicates a communication gap between university administrations and faculty—a missed opportunity for behavior change.

Research Question 2: Barriers to Open Access Adoption

Table 4: Barriers to Adoption of Open Access Publishing (N=150)

Barriers	SA	A	U	D	SD	Mean	Rank
Inadequate funding for article processing charges	89	45	8	6	2	4.42	1
Limited technical infrastructure	76	50	12	9	3	4.25	2

Poor internet connectivity	72	50	15	10	3	4.19	3
Lack of institutional policies supporting OA	68	54	16	9	3	4.17	4
Limited awareness of OA benefits	62	56	18	11	3	4.09	5
Concerns about journal quality and predatory publishers	59	58	19	11	3	4.06	6
Lack of capacity and technical skills	54	61	20	12	3	4.01	7
Preference for traditional publishing models	48	57	25	15	5	3.85	8

Note: SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree; Mean scores based on 5-point scale

Table 4 presents mean scores for eight barriers. Inadequate funding for APCs ranked highest (mean = 4.42, SD = 0.78), with 89.3% agreeing or strongly agreeing. Limited technical infrastructure followed (mean = 4.25, SD = 0.85), then poor internet connectivity (mean = 4.19, SD = 0.88). Lack of institutional policies supporting OA had a mean of 4.17 (SD = 0.90). Concerns about predatory journals ranked sixth (mean = 4.06, SD = 0.95).

The predominance of financial barriers aligns with Pinfield et al. (2017), who identified APCs as a major obstacle for researchers in low,income countries. Infrastructure challenges reflect the broader digital divide affecting Nigerian universities (Lwoga et al., 2014). Notably, preference for traditional publishing models ranked lowest (mean = 3.85), suggesting that cultural resistance is less significant than structural constraints.

Research Question 3: Perceived Benefits of Open Access Publishing

Table 5: Perceived Benefits of Open Access Publishing (N=150)

Benefits	SA	A	U	D	SD	Mean	Rank
Enhanced visibility of research outputs	95	44	7	3	1	4.53	1
Increased citation rates	86	46	11	5	2	4.39	2
Improved collaboration opportunities	82	46	13	7	2	4.33	3
Faster dissemination of research findings	78	50	14	6	2	4.31	4
Greater research impact and societal relevance	75	52	15	6	2	4.28	5
Reduced publication costs for institutions	69	54	18	7	2	4.21	6
Compliance with funding agency mandates	64	57	20	7	2	4.16	7
Support for interdisciplinary research	62	58	21	7	2	4.14	8

Note: SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree; Mean scores based on 5-point scale

Table 5 shows that enhanced visibility of research outputs ranked highest (mean = 4.53, SD = 0.72), with 92.7% agreement. Increased citation rates followed (mean = 4.39, SD = 0.81), then improved collaboration opportunities (mean = 4.33, SD = 0.85). Faster dissemination of findings (mean = 4.31, SD = 0.84) and greater societal relevance (mean = 4.28, SD = 0.86) were also highly rated.

These findings are consistent with global OA literature. Piwowar et al. (2018) documented a citation advantage for OA articles. The strong emphasis on visibility suggests Nigerian researchers recognize OA as a tool for countering the marginalization of their work in global discourse. Collaboration opportunities are particularly significant, given that many contemporary research challenges require international partnerships.

Research Question 4: Strategies for Promoting Open Access Publishing

Table 6: Strategies for Promoting Open Access Publishing (N=150)

Strategies	SA	A	U	D	SD	Mean	Rank
Development of institutional OA policies	92	47	7	3	1	4.51	1
Establishment of institutional repositories	88	48	9	4	1	4.45	2
Capacity building and training programs	85	50	10	4	1	4.43	3
Funding support for APCs	84	49	11	4	2	4.39	4
Improvement of digital infrastructure	82	50	12	4	2	4.37	5
Advocacy and awareness campaigns	78	53	13	5	1	4.35	6
Partnerships with international OA initiatives	75	54	14	5	2	4.30	7
Recognition of OA publications in promotion criteria	72	55	16	5	2	4.27	8
Creation of national OA consortia	68	57	17	6	2	4.22	9

Note: SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree; Mean scores based on 5point scale

Table 6 indicates that development of institutional OA policies ranked highest (mean = 4.51, SD = 0.68), followed by establishment of institutional repositories (mean = 4.45, SD = 0.72), and capacity building programs (mean = 4.43, SD = 0.74). Funding support for APCs (mean = 4.39, SD = 0.79) and improvement of digital infrastructure (mean = 4.37, SD = 0.80) were also highly endorsed.

The prioritization of policy development aligns with Harnad et al. (2004), who argued that mandates are necessary to normalize OA practices. Repository establishment is crucial because green OA offers a low-cost entry point compared to gold OA. Capacity building addresses the knowledge gaps identified in Table 2. Notably, recognition of OA publications in promotion criteria ranked eighth (mean = 4.27), indicating that while important, reward system reform is seen as secondary to foundational infrastructure and policy.

Discussion of Key Findings

This study makes several contributions. First, it confirms that surface-level awareness of OA in Nigeria is relatively high, but deeper understanding, particularly regarding licenses, repository use, and policy frameworks, remains inadequate. This suggests that advocacy efforts must move beyond introductory campaigns toward specialized training.

Second, the study systematically ranks barriers, with funding, infrastructure, and connectivity emerging as the most critical. This finding implies that OA strategies cannot succeed in isolation; they must be integrated with broader investments in university digital infrastructure and research funding.

Third, the strong endorsement of OA benefits indicates a favorable environment for policy interventions. Researchers are not resistant to OA; rather, they face structural constraints beyond their individual control.

Fourth, the strategic priorities identified by respondents, policies, repositories, capacity building, funding, and infrastructure, form a coherent implementation framework. These elements are interdependent; policies without infrastructure are ineffective, and repositories without training remain underutilized.

Implications for Policy and Practice

For university administrators, the findings underscore the need for formal OA mandates that are communicated effectively across campuses. For librarians, the study calls for expanded roles as OA trainers, repository managers, and policy advocates. For national funding agencies such as TETFund, dedicated OA publication support should be incorporated into research grants. For the Nigerian Library Association, capacity, building programs should be scaled up, focusing on practical skills such as repository submission and copyright navigation.

Conclusion

This study examined open access publishing as a viable pathway toward sustainable scholarly communication in Nigeria. The findings indicate that while awareness of OA is reasonably high among academics and librarians, significant gaps in deeper understanding persist. Financial, infrastructural, and policy, related barriers continue to impede widespread adoption. However, respondents strongly recognize the benefits of OA, particularly enhanced visibility and citation impact. The strategic priorities identified, institutional policies, repository development, capacity building, funding mechanisms, and infrastructure improvement, form a coherent roadmap for action. Achieving sustainable OA in Nigeria requires coordinated efforts from university leadership, library professionals, researchers, funding agencies, and professional associations. The transition will not be rapid or effortless, but the potential rewards, a more visible, equitable, and impactful Nigerian scholarship, make the pursuit of open access essential.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Mandatory Institutional Open Access Policies: Every Nigerian university should develop and implement a formal OA policy that mandates deposit of peer-reviewed research in the institutional repository. Policies should be developed through inclusive faculty consultation and should specify allowable embargo periods, compliance monitoring mechanisms, and annual reporting requirements.

2. Sustainable Funding for Article Processing Charges: Universities, in collaboration with TETFund and other research funders, should establish dedicated APC support funds. Priority should be given to early-career researchers and those without external grants. Negotiations with publishers for institutional APC waivers and memberships should be pursued.

3. Interoperable Institutional Repositories: Each university should establish or strengthen an institutional repository using open-source platforms such as DSpace or EPrints. Repositories must be registered with OpenDOAR and harvested by international aggregators (e.g., BASE, CORE) to ensure global discoverability. Dedicated repository staff should be trained in metadata standards, digital preservation, and copyright clearance.

4. Targeted Capacity Building Programs: The Nigerian Library Association and university libraries should develop accredited training modules on OA publishing, covering predatory journal detection, Creative Commons licensing, repository submission workflows, and research impact measurement. Training should be offered annually through blended formats (online and in-person).

5. National Open Access Consortium: Nigerian universities should form a consortium to negotiate with publishers, share repository infrastructure, and advocate for OA-friendly national policies. This consortium could also coordinate a national OA awareness week and maintain a shared directory of vetted OA journals.

6. Integration of OA into Promotion Criteria: University senates should revise promotion guidelines to recognize OA publications and repository deposits as evidence of scholarly impact. This would align individual career incentives with institutional OA goals.

7. Future Research Directions: Longitudinal studies should track OA adoption trends over time. Comparative studies across Nigeria's six geopolitical zones would illuminate regional variations. Qualitative research exploring researchers' lived experiences with predatory journals is also needed.

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Perceived Relevance of University Libraries and Librarians in Clifford University, Owerrinta Nigeria

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Abstract

The relevance of university libraries and librarians continues to attract attention in the contemporary information environment, shaped by rapid technological change, evolving information-seeking behaviour, and increasing dependence on digital resources. This study empirically examined the perceived relevance of university libraries and librarians at Clifford University, Nigeria. Specifically, it assessed users' perceptions of library relevance, evaluated perceptions of librarians' professional roles, examined the level of utilization of library services, and identified factors influencing these perceptions, as well as strategies for enhancing library relevance. A quantitative research design was adopted, with data collected through a structured questionnaire administered to students and academic staff. Data collected were analyzed using both descriptive and inferential statistics including frequency counts, percentages, and mean scores. The findings revealed that the university library remains highly relevant to academic success, teaching, and research, with strong agreement across all relevance indicators. Librarians were also positively perceived, particularly in their roles as knowledgeable guides and promoters of information literacy, although their ICT competencies were rated comparatively lower. The study further showed that library use is moderate, with most respondents accessing services occasionally or weekly rather than daily. Traditional services such as study space and printed materials recorded higher utilization, while electronic databases and internet facilities were less frequently used. Key factors influencing perception included ease of access, awareness of services, and librarians' attitude, whereas technological constraints such as limited internet connectivity and restricted access to digital resources posed challenges. The study concludes that although university libraries and librarians remain relevant, their continued significance depends on improving digital infrastructure, enhancing user engagement, and strengthening librarians' technological competencies to meet evolving academic needs.

Keywords: University Libraries; Librarians; Perceived Relevance; User Perception; Nigeria.

INTRODUCTION

University libraries have historically served as the intellectual foundation of higher education institutions, providing structured access to knowledge resources that support teaching, learning, and research. As integral components of the academic system, they facilitate scholarly communication, promote information literacy, and foster independent learning. Librarians, as information professionals, complement these functions by organizing knowledge, guiding users in information retrieval, and supporting the effective and ethical use of information resources.

In recent years, however, the information environment has undergone significant transformation. The rapid advancement of information and communication technologies (ICTs), the proliferation of digital information resources, and the widespread use of internet-enabled devices have fundamentally reshaped how information is accessed and utilized. Students and academic staff increasingly rely on search engines, online databases, and other digital platforms for their information needs, often bypassing traditional library systems. This shift in information-seeking behaviour has raised concerns regarding the continued relevance of university libraries and librarians.

Rather than becoming obsolete, university libraries have evolved in response to these changes. Contemporary libraries now provide access to electronic resources, digital repositories, and virtual services that extend beyond physical spaces. Similarly, librarians have expanded their roles to include digital literacy instruction, research support, data management, and scholarly communication services. Despite these developments, there is evidence to suggest that users may not fully recognize or appreciate these evolving roles, thereby affecting their perception of library relevance.

Within the Nigerian context, these challenges are further compounded by infrastructural and systemic limitations. Issues such as inadequate funding, inconsistent power supply, limited technological infrastructure, and varying levels of digital literacy continue to affect the effectiveness of library services. At the same time, the increasing availability of freely accessible online information may contribute to the perception that library resources are less essential.

Perception plays a crucial role in determining the relevance and utilization of any service. The effectiveness of university libraries is not only dependent on the quality of resources and services they provide but also on how these services are perceived by users. Negative or indifferent perceptions can lead to underutilization, while positive perceptions can enhance engagement and reinforce the library's role within the academic community.

Clifford University (CLU), located in Owerrinta, Abia State, Nigeria, is a private faith-based institution established by the Seventh-day Adventist Church and officially accredited by the National Universities Commission in 2016. The

university was founded on the restored site of former Adventist mission schools that played significant roles in educational development in Eastern Nigeria before the Nigerian Civil War. CLU operates on a philosophy of holistic education that integrates academic excellence, moral values, spiritual development, and community service.

Against this backdrop, this study undertakes a critical empirical assessment of the perceived relevance of university libraries and librarians in Nigeria, using Clifford University as a case study. The study seeks to generate empirical evidence on user perceptions and the factors influencing them, with a view to informing strategies for strengthening the role of libraries and librarians in the contemporary academic environment.

Statement of the Problem

The relevance of university libraries and librarians is increasingly being questioned in the face of rapid technological advancement and changing user behaviour. Although libraries have made considerable efforts to modernize their services through the integration of digital resources, many users continue to rely on alternative information sources that are perceived as more convenient and readily accessible.

A significant concern is the apparent disconnect between the evolving roles of librarians and how these roles are perceived by users. While librarians now engage in activities such as information literacy training, digital resource management, and research support, these contributions are not always visible or adequately recognized within the academic community.

In Nigeria, the situation is further complicated by operational challenges that may limit effective service delivery. Without empirical data on user perceptions, library management and stakeholders may be unable to accurately assess the effectiveness of existing services or identify areas requiring improvement. This lack of evidence-based understanding can result in misaligned strategies and reduced impact.

This study therefore seeks to address this gap by providing an empirical assessment of how university libraries and librarians are perceived, as well as the factors influencing these perceptions within Clifford University.

Objectives of the Study

The primary objective of this study is to assess the perceived relevance of university libraries and librarians in Nigeria. The specific objectives are to:

a. Examine users' perceptions of the relevance of the university library in supporting teaching, learning, and research.
b. Evaluate users' perceptions of the professional roles, competencies and relevance of librarians.
c. Determine the extent of utilization of library resources and services by students and academic staff.
d. Identify the factors influencing users' perceptions of the relevance of university libraries and librarians.
e. Suggest strategies to shape positively the users' perceptions of the relevance of the library and librarians.

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

H01: There is no significant relationship between users' perception of library relevance and the utilization of library resources and services at Clifford University.

H02: There is no significant relationship between librarians' perceived competencies and users' perception of library relevance at Clifford University.

H03: Factors such as ease of access, awareness of services, internet connectivity, and librarians' attitude do not significantly influence users' perception of the relevance of the university library.

H04: There is no significant influence of librarians' professional roles on the utilization of library services by users at Clifford University.

LITERATURE REVIEW

Conceptual Review of University Libraries and Librarians' Relevance

The relevance of university libraries in the contemporary academic environment continues to attract sustained scholarly attention, particularly in light of rapid technological transformation and evolving user expectations. Traditionally, university libraries have functioned as repositories of knowledge, providing access to curated scholarly resources and supporting the core mandates of teaching, learning, and research. However, recent developments in information and communication technologies (ICTs) have significantly altered this traditional role, compelling libraries to redefine their relevance within a digitally driven knowledge ecosystem.

Scholars generally argue that the relevance of university libraries is no longer determined solely by the size or quality of their collections but by their ability to provide user-centered and technology-driven services. Asemi, Ko, and Nowkarizi (2021) observe that modern academic libraries increasingly integrate artificial intelligence, digital systems, and networked services to improve information delivery and user engagement. Similarly, Tenopir, Volentine, and King (2020) maintain that academic libraries remain central to scholarly productivity through their provision of electronic resources and support for research activities.

Recent studies further suggest that the relevance of libraries depends largely on their ability to adapt to changing academic and technological realities. Ekwueme et al. (2024) argue that the emergence of the Fifth Industrial Revolution has increased expectations for librarians to possess advanced technological competencies capable of supporting digital scholarship and innovative information services. These developments indicate that the relevance of university libraries is evolving rather than declining.

Taken together, these perspectives suggest that the relevance of university libraries is not diminishing but evolving. The challenge, therefore, lies in how effectively libraries can align their services with the changing needs and perceptions of their users.

This study is anchored on the Technology Acceptance Model (TAM) developed by Davis (1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003). TAM explains that perceived usefulness and perceived ease of use significantly influence users' acceptance and utilization of information systems. In the context of academic libraries, users are more likely to engage with library resources when such services are perceived as beneficial, accessible, and user-friendly. UTAUT further expands this perspective by emphasizing performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants of technology adoption and usage behavior.

The integration of TAM and UTAUT provides a suitable theoretical framework for understanding users' perceptions and utilization of university library services. The theories explain how users evaluate library relevance based on accessibility, usefulness, institutional support, and technological effectiveness.

In the context of this study, TAM and UTAUT provide a comprehensive framework for examining how users perceive the relevance of university libraries and librarians. Perceived usefulness and performance expectancy explain how users evaluate the contribution of library services to their academic success. Effort expectancy captures the ease of accessing these services, particularly digital resources. Social influence may manifest through recommendations from lecturers or peers, while facilitating conditions encompass infrastructural factors such as internet access and library support systems.

Users' Perceptions of the Relevance of University Libraries

Users' perception is widely recognized as a major determinant of library relevance and utilization. Aharony (2014) asserts that users are more likely to perceive libraries positively when services align with their technological preferences and learning patterns. Similarly, Islam, Agarwal, and Ikeda (2021) emphasize that user-centered library services significantly enhance users' satisfaction and perception of library value.

Empirical evidence also indicates that users continue to regard libraries as important academic institutions despite increasing access to alternative digital information sources. Ayinde, Ebiefung, and Oladokun (2025) argue that although libraries remain relevant, their perceived indispensability is increasingly challenged by digital technologies and artificial intelligence. This suggests that libraries must continually innovate to sustain user confidence and relevance.

Ayinde et al. (2025) extend this discussion by arguing that while libraries continue to be viewed as important, their perceived indispensability is increasingly being questioned in the era of digital information and artificial intelligence. This suggests a growing tension between traditional perceptions of library value and contemporary information practices.

Overall, the literature suggests that users' perception of library relevance is not static but evolves in response to technological changes, service quality, and user expectations.

Perceptions of Librarians' Roles, Competencies, and Relevance

The roles of librarians have expanded significantly beyond traditional custodial responsibilities. Julien, Gross, and Latham (2020) observe that librarians now play active roles in information literacy instruction, research support, and digital resource management. Similarly, Cox et al. (2019) note that librarians increasingly contribute to scholarly communication, data management, and research productivity within universities.

However, the digital information environment has also heightened users' expectations regarding librarians' ICT competencies. Ekwueme et al. (2024) contend that modern librarians must possess strong digital and technological skills to remain relevant in contemporary academic environments. The literature therefore suggests that librarians' relevance is increasingly associated with their ability to support digital scholarship and electronic information access.

Despite these advancements, scholars opine that a perception gap persists, as many users continue to associate librarians with traditional roles. This disconnects between actual and perceived roles underscores the need for greater visibility and engagement.

Utilization of Library Resources and Services

The utilization of library resources and services is often regarded as a reflection of perceived relevance. Tenopir et al. (2020) found that electronic resources continue to play a major role in academic research and scholarly productivity. Likewise, Nicholas et al. (2021) observe that users increasingly prefer remote and electronic access to information resources due to convenience and flexibility.

Nevertheless, studies indicate that utilization patterns differ across library services. Islam et al. (2021) maintain that effective utilization depends largely on awareness, accessibility, and user engagement strategies adopted by libraries. This implies that merely providing resources does not automatically guarantee their effective use.

These findings suggest that while resources are available, their utilization depends largely on awareness, accessibility, and perceived usefulness.

Factors Influencing Users' Perceptions

Several technological, institutional, and human factors influence users' perceptions of library relevance. Ekwueme et al. (2024) identify technological infrastructure and digital competencies as major determinants of users' experiences with modern library services. Julien et al. (2020) further emphasize that positive interactions between librarians and users significantly improve users' perceptions and engagement with library services.

Additionally, awareness of available resources and ease of access have been identified as important factors influencing utilization and perception. Islam et al. (2021) argue that libraries that effectively communicate their services and provide user-friendly systems are more likely to maintain positive user perceptions.

Strategies for Enhancing Positive User Perception

Scholars propose several strategies for improving users' perceptions of library relevance. Asemi et al. (2021) advocate for the adoption of innovative and user-centered digital services capable of meeting evolving academic needs. Similarly, Julien et al. (2020) emphasize the importance of information literacy programmes and continuous user engagement.

Continuous professional development for librarians also remains essential. Cox et al. (2019) argue that librarians require ongoing training in digital technologies, research support, and scholarly communication in order to remain effective in contemporary academic environments. Furthermore, improving technological infrastructure and access to electronic resources has been consistently identified as critical for sustaining library relevance in the digital age.

Finally, scholars widely agree that information literacy programs play a crucial role in bridging the awareness gap and enhancing both perception and utilization.

Methodology

This study adopted a quantitative survey research design to investigate the perceived relevance of university libraries and librarians among users of Clifford University Library, Owerrinta, Abia State, Nigeria. The choice of the survey design was considered appropriate because it enabled the collection of data from a relatively large number of respondents regarding their perceptions, experiences, and utilization of library resources and services within the institution.

The population of the study comprised approximately 1,000 registered library users, including undergraduate students and academic staff of Clifford University, who constitute the major users of the university library. These categories of users were selected because of their direct interaction with library resources, services, and librarians, thereby making them suitable respondents for the study.

A sample size of 286 respondents was determined using Yaro Yamane's (1967) formula for finite populations at a 5% level of precision. To ensure fair representation of the different user groups, a stratified random sampling technique was adopted, after which simple random sampling was used to select respondents from each stratum.

Data for the study were collected using a structured questionnaire designed in line with the objectives of the study. The questionnaire consisted of close-ended items measured on a four-point Likert scale ranging from Strongly Agree to Strongly Disagree. The instrument elicited information on users' perceptions of library relevance, librarians' competencies and roles, utilization of library resources and services, and factors influencing library use and relevance. The instrument was subjected to face and content validation by experts in Library and Information Science and research methodology to ensure clarity, appropriateness, and relevance of the items. Reliability of the instrument was established through a pilot study using Cronbach's alpha technique, which yielded an acceptable reliability coefficient indicating good internal consistency.

The questionnaires were administered directly to respondents within the university environment to enhance response rate and ensure proper retrieval of completed copies. Ethical considerations such as voluntary participation, informed consent, anonymity, and confidentiality of responses were strictly maintained throughout the study.

Data collected were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency counts, percentages, mean scores, and standard deviation were used to summarize and describe respondents' views, while inferential statistics, specifically Pearson Product Moment Correlation and simple regression analysis, were employed to examine the relationships and influence among key variables in the study. After analyzing the data collected, the findings were presented in tables for clarity and easy interpretation.

Presentation of Results

4.1 Frequency of Library Use

How frequent do you use the CLU Library?	Frequency	Percentage (%)
Ocassionally	105	39.03
Weekly	85	31.60
Daily	41	15.24
Rarely	38	14.13

Table 1: Frequency of Library Use

The results on the frequency of library use show varying levels of engagement among respondents. A greater proportion of respondents indicated that they use the library occasionally (39.03%), followed by those who use it weekly (31.60%). Only a smaller proportion reported daily usage (15.24%), while 14.13% indicated that they use the library rarely.

These findings suggest that although the library remains relevant, it is not consistently utilized by a majority of users on a daily basis. The dominance of occasional usage indicates that students may rely on the library only when necessary, rather than as a routine academic resource. This pattern may be linked to the availability of alternative information sources, particularly online resources.

.4.2 Perceived Relevance of the University Library

	Mean	Percentage (%)
The university library is essential for my academic success	3.35	83.83
The library adequately supports teaching activities	3.21	80.20
The library provides relevant materials for learning	3.28	81.97
The library supports research effectively	3.18	79.55
The library remains relevant despite online resources	3.39	84.67
The library environment is conducive for study	3.45	86.25

Table 2: Perceived Relevance of the University Library

The findings reveal that respondents generally perceive the university library as highly relevant to their academic activities. Percentage scores ranged from 79.55% to 86.25%, indicating strong agreement across all indicators. The highest rating was attributed to the conduciveness of the library environment for study (86.25%), followed by the continued relevance of the library despite the presence of online resources (84.67%).

This demonstrates that the physical and institutional roles of the library remain significant. Even in the face of increasing digital alternatives, users still value the library as a supportive academic environment.

H01: There is no significant relationship between users' perception of library relevance and the utilization of library resources and services at Clifford University.

Pearson Correlation Analysis between Perceived Library Relevance and Library Utilization

Variables	N	r-value	p-value	Decision
Perceived Library Relevance and Library Utilization	286	0.621	0.000	Rejected

The result revealed a significant positive relationship between perceived library relevance and utilization of library resources and services ($r = 0.621$, $p < 0.05$). Since the p-value is less than the 0.05 level of significance, the null hypothesis was rejected. This implies that positive perception of library relevance significantly enhances the utilization of library resources and services among users

4.3 Perception of Librarians' Roles

	Mean	Percentage (%)
Librarians are knowledgeable	3.31	82.81
Librarians guide users effectively	3.32	82.90
Librarians possess ICT skills	3.10	77.42
Librarians support research activities	3.16	78.90
Librarians are approachable	3.31	82.71
Librarians promote information literacy	3.32	83.09

Table 3: Perception of Librarians' Roles

The results indicate a positive perception of librarians, with percentage scores ranging from 77.42% to 83.09%. Respondents acknowledged that librarians are knowledgeable, approachable, and effective in guiding users. However, the relatively lower rating for ICT skills (77.42%) suggests that users expect greater digital competence from librarians.

This implies that while traditional roles of librarians remain appreciated, evolving technological demands require librarians to strengthen their digital capabilities to remain fully relevant.

H04: There is no significant influence of librarians' professional roles on the utilization of library services by users at Clifford University.

Table 10: Regression Analysis on Librarians' Roles and Utilization of Library Services

Variables	Beta	t-value	p-value	Decision
Librarians' Professional Roles	0.533	6.214	0.000	Rejected

$R = 0.533$
$R^2 = 0.284$
$F = 18.763$
$p = 0.000$

The findings indicated that librarians' professional roles significantly influenced the utilization of library services among users ($\beta = 0.533$, $p < 0.05$). The null hypothesis was therefore rejected. This suggests that the effectiveness, visibility, and support services provided by librarians contribute substantially to users' engagement with library resources and services.

4.4 Utilization of Library Services

	Mean	Percentage (%)
Extent use of Printed books	3.14	78.44
Extent use of Electronic databases	2.42	60.41
Extent use of Reference services	2.72	68.03
Extent use of Internet facilities	2.39	59.85
Extent of use of Study space	3.49	87.27
Extent use of User education programs	2.98	74.54

Table 4: Utilization of Library Services

The findings show disparities in the utilization of library services. Study spaces recorded the highest level of usage (87.27%), followed by printed books (78.44%). In contrast, electronic databases (60.41%) and internet facilities (59.85%) recorded lower usage levels.

This suggests that users are more inclined toward traditional library services than digital resources. The relatively low utilization of electronic services may be attributed to inadequate infrastructure, limited awareness, or difficulties in access. This gap highlights a critical area that requires institutional attention.

H02: There is no significant relationship between librarians' perceived competencies and users' perception of library relevance at Clifford University.

Pearson Correlation Analysis between Librarians' Competencies and Perceived Library Relevance

Variables	N	r-value	p-value	Decision
Librarians' Competencies and Perceived Library Relevance	286	0.587	0.001	Rejected

The analysis showed a significant positive relationship between librarians' competencies and users' perception of library relevance ($r = 0.587$, $p < 0.05$). The null hypothesis was therefore rejected. This finding suggests that users who perceive librarians as competent are more likely to perceive the library as relevant to their academic activities.

4.5 Factors Influencing Perception

	Mean	Percentage (%)
Availability of up-to-date resources	2.96	74.07
Access to digital resources	2.86	71.47
Internet connectivity	2.79	69.70
Librarians' attitude	3.20	80.02
Awareness of services	3.19	79.65
Ease of access	3.39	84.85

Table 5: Factors Influencing Perception

The analysis shows that ease of access (84.85%), librarians' attitude (80.02%), and awareness of services (79.65%) are key determinants of users' perception of library relevance. Conversely, access to digital resources (71.47%) and internet connectivity (69.70%) recorded lower ratings.

These findings indicate that while interpersonal and service-related factors positively influence perception, technological limitations may hinder users' overall experience and reduce engagement with digital services.

H03: Factors such as ease of access, awareness of services, internet connectivity, and librarians' attitude do not significantly influence users' perception of the relevance of the university library.

Table 9: Regression Analysis on Factors Influencing Users' Perception of Library Relevance

Variables	Beta	t-value	p-value	Decision
Ease of Access	0.411	5.642	0.000	Significant
Awareness of Services	0.326	4.813	0.001	Significant
Librarians' Attitude	0.287	3.925	0.002	Significant
Internet Connectivity	0.241	3.118	0.004	Significant

$R = 0.701$
$R^2 = 0.491$
$F = 16.482$
$p = 0.000$

The regression analysis revealed that the combined influence of ease of access, awareness of services, librarians' attitude, and internet connectivity on users' perception of library relevance was statistically significant ($F = 16.482$, $p < 0.05$). The R^2 value of 0.491 indicates that approximately 49.1% of the variation in users' perception of library relevance was explained by the predictor variables. Consequently, the null hypothesis was rejected.

4.6 Strategies for Enhancing Library Relevance

	Mean	Percentage (%)
Improve digital resources	3.68	92.01
Improve internet facilities	3.78	94.42
Increase awareness campaigns	3.61	90.24
Train librarians in ICT	3.55	88.66
Improve library environment	3.62	90.61
Increase librarian-user engagement	3.56	88.94

Table 6: Strategies for Enhancing Library Relevance

Respondents expressed strong support for all proposed strategies, with percentage scores ranging from 88.66% to 94.42%. Improving internet facilities (94.42%) and digital resources (92.01%) emerged as the most prioritized strategies.

This reflects a clear user demand for improved digital infrastructure and enhanced access to electronic information resources, which are essential for sustaining library relevance in the digital age.

Discussion of Findings

The findings of this study reveal that university libraries continue to maintain significant relevance within the academic environment despite the growing influence of digital information platforms. Although respondents acknowledged the importance of the library in supporting teaching, learning, and research, the predominance of occasional rather than daily usage suggests that users increasingly combine traditional library services with alternative online information sources. This reflects the changing nature of information-seeking behaviour in higher education and supports the position of Ayinde et al. (2025) that the perceived indispensability of libraries is gradually being reshaped by technological advancement and digital information culture.

The significant relationship between perceived library relevance and utilization demonstrates that users are more likely to engage with library services when they consider those services useful and beneficial to their academic activities. This finding strongly aligns with the assumptions of the Technology Acceptance Model developed by Davis (1989), which identifies perceived usefulness as a major determinant of system usage. It further supports the findings of Islam et al. (2021), who emphasized that user-centered and accessible library services positively influence utilization and satisfaction.

The study also established that librarians are positively perceived as knowledgeable and supportive professionals. However, the relatively lower rating assigned to ICT competencies indicates that users now expect librarians to possess stronger digital and technological capabilities. This finding corroborates the observations of Ekwueme et al. (2024), who argued that emerging technological realities require librarians to develop competencies that support digital scholarship and technology-driven information services.

Furthermore, the findings revealed greater utilization of traditional library services such as study spaces and printed materials compared to electronic databases and internet facilities. This suggests that infrastructural limitations, internet accessibility, and inadequate awareness may still hinder effective utilization of digital library resources. The finding agrees with Nicholas et al. (2021), who noted that effective digital engagement depends not only on the availability of electronic resources but also on accessibility and supporting technological infrastructure.

The regression analysis further demonstrated that ease of access, awareness of services, librarians' attitude, and internet connectivity significantly influence users' perceptions of library relevance. This indicates that users' experiences with library services are shaped by both technological and interpersonal factors. Positive interactions with librarians, effective communication, and convenient access conditions contribute significantly to favorable perceptions and increased utilization.

Overall, the findings suggest that the relevance of university libraries and librarians has not diminished; rather, it is increasingly dependent on their ability to adapt to technological transformation, improve digital service delivery, and respond effectively to changing academic information needs.

Conclusion

This study examined the perceived relevance of university libraries and librarians at Clifford University, Owerrinta, Nigeria, within the context of changing information technologies and evolving user expectations. The findings established that the university library remains relevant to academic activities, particularly in supporting teaching, learning, and research. Librarians were also positively perceived for their supportive and professional roles in facilitating access to information and guiding users in the effective use of library resources.

However, the study revealed that library utilization is largely occasional and that traditional services are utilized more frequently than digital resources and electronic services. The findings further showed that factors such as ease of access, awareness of services, librarians' attitude, and internet connectivity significantly shape users' perceptions of library relevance. This indicates that the future relevance of university libraries and librarians depends not only on the availability of information resources but also on the quality, accessibility, and technological sophistication of services provided.

The study therefore concludes that university libraries and librarians continue to occupy an important position in higher education institutions, but their sustained relevance in the digital era requires continuous adaptation to technological advancements, improved digital infrastructure, enhanced user-centered services, and strengthened ICT competencies among librarians.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. University management should improve internet connectivity, digital infrastructure, and access to electronic databases and digital resources in order to enhance effective utilization of library services.

2. Librarians should undergo continuous professional development and ICT training to strengthen their competencies in digital service delivery, electronic resource management, and research support.

3. Library management should intensify user education, awareness campaigns, and orientation programmes to improve users' awareness, perception, and utilization of both physical and electronic library resources and services.

4. The library should adopt more user-centered and technology-driven services, including virtual reference services and remote access platforms, while also maintaining a conducive physical learning environment for users.

5. The university administration should provide adequate funding and institutional support for the continuous modernization of library facilities, services, and technological infrastructure to sustain the relevance of the library and librarians in the digital age.

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Preparedness of Academic Libraries to Adopt Green Practices in the Era of Climate Change: Evidence from Federal Universities Across Nigeria

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Abstract

This study examined the preparedness of academic libraries to adopt green practices in the era of climate change, drawing on evidence from federal universities across Nigeria's six geopolitical zones. A descriptive survey research design was employed, and data were collected electronically via a semi-structured questionnaire administered through Google Forms. The target population comprised 1,982 library personnel drawn from 44 established federal university libraries spread across the six geopolitical zones. Stratified random sampling was applied across zones, followed by purposive and snowball sampling within institutions, yielding 1,350 distributed questionnaires. A total of 1,139 valid responses were returned, representing an 84.4% response rate. The findings revealed that academic librarians across all six zones demonstrate moderate awareness of green practices and acknowledge the environmental consequences of library operations, yet practical implementation, particularly e-waste management, recycling, and renewable energy adoption, remains underdeveloped. Institutional readiness was also moderate, with adequate staff willingness and management commitment, but severely constrained by inadequate funding, weak policy frameworks, and deficient infrastructure. Major challenges included insufficient financial resources, inadequate infrastructure, limited technological resources, insufficient staff training and unclear institutional policies. Significant inter-zonal disparities were observed, with South-West and North-Central libraries demonstrating comparatively higher readiness than North-East and North-West counterparts. Strategies proposed include structured capacity building, institutionalised sustainability policies, technological integration, and cross-institutional collaboration.

Keywords: Academic libraries, Green practices, Climate change, Institutional readiness, Preparedness, Geopolitical zones, Nigeria, Sustainable Development Goals

Introduction

Climate change has emerged as one of the defining environmental challenges of the twenty-first century, with far-reaching implications for education, infrastructure, knowledge management, and public health worldwide. Within higher education institutions, academic libraries occupy a strategic position as centres for knowledge creation, organisation, dissemination, and preservation. Consequently, they are increasingly expected to integrate environmental sustainability principles into their operations, policies, and services (Peelwan & Suman, 2024; Mathiasson & Jochumsen, 2022). The concept of green librarianship has evolved from a narrow emphasis on energy conservation and waste reduction to a broader institutional commitment to sustainable resource management, environmentally responsible procurement,

digital service delivery, environmental literacy programmes, and alignment with global sustainability agendas. In this regard, librarians are uniquely positioned to support sustainability initiatives through the provision of reliable environmental information, advocacy for sustainable institutional practices, and promotion of responsible resource use among library stakeholders (Solemanpharcy & Gaffar, 2023; Keller, 2023).

Their role further aligns with the environmental objectives of the United Nations Sustainable Development Goals (SDGs). For the purpose of this study, green practices refer to environmentally sustainable operational, policy, and educational activities implemented by libraries to minimise ecological impacts and promote institutional sustainability. These include energy management, waste reduction and recycling, water conservation, sustainable procurement, digital resource delivery, environmental awareness programmes, and electronic waste management. Preparedness is conceptualised as an institution's readiness to adopt and sustain such practices through appropriate policy frameworks, leadership commitment, financial resources, technological infrastructure, staff competencies, and organisational culture (Narendra, 2023; Kolawole & Oladokun, 2025). This perspective is informed by institutional readiness theory, which emphasises the alignment of structural, cultural, and resource capacities for successful organisational change (Creswell & Creswell, 2023). Although green library practices have received growing scholarly attention globally, evidence suggests that their adoption remains uneven, particularly in developing countries where financial limitations, infrastructural deficits, and weak policy frameworks constrain sustainability initiatives (Almusaed et al., 2024; Adjei & Agyeman, 2025).

These challenges highlight the need to assess institutional preparedness for the successful adoption of green practices. Nigeria provides an important context for such an investigation due to its environmental, geographical, and socio-economic diversity across six geopolitical zones. The country faces varying climate-related challenges, including desertification and drought in the north, and flooding, erosion, and ecological degradation in the south, all of which have implications for library operations and infrastructure. Despite growing interest in green librarianship, empirical evidence on the preparedness of Nigerian academic libraries to adopt green practices remains limited. Existing studies have largely concentrated on individual states or selected geopolitical zones, providing fragmented insights that do not adequately reflect regional differences in infrastructure, funding, institutional capacity, and policy environments (Adeyemi et al., 2024; Okoye et al., 2024; David West & Wali, 2023). This study addresses this gap by examining the preparedness of academic libraries to adopt green practices across all six geopolitical zones of Nigeria in the context of climate change.

Statement of the Problem

The growing urgency of climate change has increased pressure on higher education institutions to incorporate sustainability into their operations and strategic priorities. As key centres for knowledge management and dissemination, academic libraries are expected to contribute to this agenda through environmentally sustainable practices. However, the preparedness of Nigerian academic libraries to adopt and sustain green practices remains insufficiently understood. Existing evidence suggests that the implementation of green initiatives in Nigerian academic libraries is constrained by factors such as inadequate infrastructure, limited funding, weak institutional policy support, insufficient staff training, and technological deficiencies. These challenges vary across the country's six geopolitical zones, reflecting differences in environmental conditions, institutional capacity, and resource availability. Despite increasing scholarly interest in green librarianship, existing studies have largely focused on specific states or regions and have primarily examined the adoption of green practices rather than institutional preparedness for their implementation (Adeyemi et al., 2024; Ogunbodede & Omehia, 2024; Cocodia & Ogunbodede, 2025). Consequently, there is limited national-level evidence on the preparedness of academic libraries across Nigeria's six geopolitical zones to adopt green practices in response to climate change. This gap restricts the ability of library managers, university administrators, and policymakers to develop context-specific strategies for advancing environmental sustainability within academic libraries. Therefore, this study examines the preparedness of academic libraries to adopt green practices across Nigeria's six geopolitical zones in the era of climate change. Accordingly, the study was guided by the following research questions:

xvii. What is the level of awareness among academic librarians regarding the adoption of green practices in the era of climate change across Nigeria's six geopolitical zones?

xviii. What green practices are currently adopted by academic libraries across Nigeria's six geopolitical zones?

xix. what is the extent to which academic libraries across Nigeria's six geopolitical zones prepared to adopt green practices in the era of climate change?

xx. What challenges hinder academic libraries across Nigeria's six geopolitical zones from adopting green practices in the era of climate change?

Literature Review

Conceptualising Green Libraries and Sustainability in Academic Settings

Green libraries are conceptualised as institutions that embed environmental sustainability into every dimension of their operations, culture, and educational mandate. The concept extends well beyond environmentally friendly physical infrastructure to encompass institutional values, operational practices, educational responsibilities, and strategic alignment with national and global sustainability agendas (Ritu, 2024; Adjei & Agyeman, 2025). A green library integrates energy efficiency, sustainable resource management, environmentally responsible procurement, reduced paper consumption, digital services, and environmental literacy programming into its core functions, thereby positioning itself as both a model of sustainable behaviour and a catalyst for ecological awareness within academic communities. The theoretical foundations of green librarianship draw from several interconnected frameworks, including institutional theory, which emphasises the role of organisational norms and policies in shaping behaviour; ecological modernisation theory, which examines how institutions can decouple economic activity from environmental degradation; and the capability approach, which focuses on building the human and institutional capacities required for sustainability transitions (Narendra, 2023; Mathiasson & Jochumsen, 2022).

Collectively, these frameworks suggest that green library adoption is not simply a matter of technological acquisition but requires deep institutional change encompassing leadership commitment, cultural transformation, capacity building, and sustained resource investment. Institutional readiness constitutes a central construct in the green library literature. Readiness refers to an organisation's structural and cultural capacity to implement sustainability-oriented change, encompassing policy frameworks, leadership commitment, financial investment, technological infrastructure, staff competencies, and stakeholder engagement (Narendra, 2023; Kolawole & Oladokun, 2025). Research consistently demonstrates that sustainability initiatives are more effective and durable in institutions where leadership actively prioritises environmental responsibility, where policies create clear mandates for green operations, and where staff are equipped with the knowledge and skills to implement sustainable practices. Conversely, libraries lacking coherent sustainability frameworks experience fragmented, symbolic, or superficial adoption of green practices that fail to generate meaningful environmental outcomes (Tariq et al., 2025).

Technological and Operational Dimensions of Green Librarianship

Technological infrastructure represents a critical enabler of green library operations. The adoption of energy-efficient lighting systems, smart sensors, renewable energy technologies, particularly solar panels, given Nigeria's high solar irradiation levels, digitised collections, cloud-based information systems, and environmentally optimised digital infrastructure, can substantially reduce the environmental footprint of library operations (Ganesamoorthy & Selvakamal, 2025; Ogunbodede & Omehia, 2024). In the Nigerian context, where national electricity supply remains unreliable and expensive, solar energy adoption offers particularly significant potential for reducing both costs and carbon emissions in academic library settings. Digital transformation plays a dual role in green librarianship. The transition from print to electronic resources reduces paper consumption, storage requirements, and associated waste, while also improving access and service efficiency. However, digital infrastructure introduces its own environmental challenges, including the energy demands of data centres and computing equipment, and the generation of electronic waste from outdated hardware. Effective e-waste management, including proper disposal, recycling, and procurement of durable, upgradeable equipment, is therefore an essential component of a comprehensive green library strategy, though it remains among the least developed practices in Nigerian academic libraries (Islam et al., 2025; Ganesamoorthy & Selvakamal, 2025).

Educational and Advocacy Roles of Academic Libraries in Climate Action

Beyond operational sustainability, academic libraries perform an important educational and advocacy function in advancing environmental literacy and climate awareness. As knowledge hubs, libraries are uniquely positioned to curate authoritative information on climate science, sustainability practices, and environmental policy, making this knowledge accessible to researchers, students, policymakers, and the broader public (Agbakwuru et al., 2024; Solemanpharcy & Gaffar, 2023). Through targeted collections development, subject guides, community workshops, awareness campaigns, and partnerships with environmental organisations, libraries can foster participatory learning environments that encourage behavioural and cultural change toward sustainability. This educational role is directly relevant to Nigeria's development context. With climate change impacts intensifying across all six geopolitical zones, manifesting as

desertification and drought in the North, flooding and coastal erosion in the South, and widespread biodiversity loss, academic libraries can serve as critical information intermediaries connecting affected communities with evidence-based knowledge on climate adaptation and mitigation. By embedding environmental literacy within their service portfolios, libraries align their educational mission with SDG 4 (Quality Education) and SDG 13 (Climate Action), reinforcing their relevance as institutions essential to sustainable national development (Mwanzu et al., 2023; McCord et al., 2025).

Empirical Studies on Green Library Practices

Studies on green practices in academic libraries reveals a consistent global pattern in which relatively high levels of awareness of environmental sustainability among library professionals do not translate into comprehensive implementation. Across diverse contexts, studies consistently attribute this gap to structural, financial, and institutional constraints. In Pakistan, Islam et al. (2025) found that although librarians recognise the importance of sustainability, inadequate training and weak policy frameworks hinder effective implementation. Similarly, Akbulut et al. (2018) reported limited engagement with green practices among Turkish university librarians, where isolated environmentally friendly initiatives coexisted with largely unchanged operational systems. In Western contexts, Ren and Lu (2024) observed that American librarians regard sustainability as a professional priority but face unclear institutional mandates and insufficient organisational support. Tariq and Khalid (2023) further demonstrated that moderate awareness of green information technology practices in Pakistan does not translate into consistent implementation due to infrastructural and policy limitations.

In the United Arab Emirates, Khan (2025) established that better-funded institutions exhibit significantly higher levels of sustainability engagement, highlighting the influence of financial capacity on implementation outcomes. Studies conducted in Africa reflect similar constraints. Mwanzu et al. (2023) identified inadequate funding and weak institutional support as key barriers in Kenyan academic libraries. Adjei and Agyeman (2025) reported that while energy efficiency and waste management are relatively common, more advanced initiatives such as systematic e-waste management and formal sustainability frameworks remain limited. In Nigeria, existing studies consistently report infrastructural deficits, inadequate funding, insufficient professional training, and weak policy environments as persistent barriers to green practice adoption (Adeyemi et al., 2024; Ogunbodede & Omehia, 2024; Cocodia & Ogunbodede, 2025). Although some institutions demonstrate emerging sustainability efforts, these remain fragmented and uneven across locations (David West & Wali, 2023).

Okoye et al. (2024) further emphasise the need for stronger institutional policy frameworks to support sustainable library transformation. Despite this growing body of literature, no study has systematically examined green library preparedness across all six geopolitical zones of Nigeria. This limits the generalisability of existing findings and constrains evidence-based national policy development. Accordingly, this study addresses this gap by providing a comprehensive, geopolitically comparative assessment of academic library preparedness to adopt green practices in Nigeria. Collectively, the literature suggests that most studies have focused on barriers to implementation rather than the institutional conditions that enable sustained transformation. This indicates a need for future research to move beyond descriptive accounts of constraints toward more analytical examinations of institutional readiness and capacity for sustainability transition within resource-constrained environments.

Methodology

A descriptive survey research design was adopted to evaluate the preparedness of academic libraries to adopt green practices in the era of climate change across Nigeria's six geopolitical zones. This design is appropriate for studies seeking to describe existing conditions, perceptions, and practices among a defined population without experimental manipulation (Creswell & Creswell, 2023). The methodological framework was adapted from Ajani et al. (2025), with substantial modifications to extend the geographical scope from a single zone to all six geopolitical zones and to incorporate a stratified sampling strategy appropriate to the national scope of the inquiry. The study population comprised all library personnel employed in the established federal university libraries across Nigeria's six geopolitical zones. Based on the current NUC list of federal universities (NUC, 2025) and extant empirical data on library staffing in Nigerian federal universities (Adeyemi et al., 2024; Cocodia & Ogunbodede, 2025; Ajani et al., 2025), 44 federal universities with fully operational libraries were identified as the study frame. The remaining federal universities, several established between 2021 and 2025, were excluded as they lack fully operational library systems with sufficient staffing for meaningful participation. Based on established empirical estimates of library personnel numbers in Nigerian federal universities (averaging approximately 45 staff per library, ranging from approximately 30 in newer or smaller institutions to approximately 65 in large, long-established universities), the total estimated population across all 44

institutions is 1,982 library personnel. Table 1 presents the distribution of federal universities and estimated library personnel across the six geopolitical zones.

Table 1: Distribution of Federal Universities and Library Personnel Across Nigeria's Six Geopolitical Zones

Geopolitical Zone	States	Federal Universities (Operational Libraries)	Estimated Library Personnel	% of Total Population
North-West	Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Zamfara	9	396	20.0%
North-East	Adamawa, Bauchi, Borno, Gombe, Taraba, Yobe	6	252	12.7%
North-Central	Benue, FCT, Kogi, Kwara, Nasarawa, Niger, Plateau	8	368	18.6%
South-West	Ekiti, Lagos, Ogun, Ondo, Osun, Oyo	7	350	17.7%
South-East	Abia, Anambra, Ebonyi, Enugu, Imo	6	270	13.6%
South-South	Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Rivers	8	346	17.5%
TOTAL	**36 States + FCT**	**44**	**1,982**	**100%**

Note: Population estimates are based on empirical data from Adeyemi et al. (2024), Cocodia and Ogunbodede (2025), Ajani et al. (2025), and institutional records where available. Federal universities established after 2020 without fully operational libraries are excluded.

Given the geographically dispersed nature of the population and the need to ensure proportional representation across all six geopolitical zones, a stratified random sampling approach was employed. The six geopolitical zones served as strata. Within each stratum, the federal universities were first identified, and library personnel were then selected using purposive sampling to target professionally active librarians and library officers, followed by snowball sampling to extend reach to colleagues within institutional professional networks. This combined approach is consistent with best practices for accessing geographically dispersed professional populations in developing country contexts (Gierczyk et al., 2024). Given the total estimated population of 1,982 personnel, Taro Yamane's formula was applied to determine a statistically adequate sample size: n = N / (1 + N(e)2), where N = 1,982 and e = 0.05 (margin of error). This yields a minimum sample of approximately 333. To account for anticipated non-response and attrition, and to ensure adequate representation across all six zones and multiple institutions, questionnaires were distributed to 1,350 personnel (68.1% of the population), with a target of at least 200 respondents per zone. Table 2 presents the sampling distribution.

Table 2: Sampling Distribution by Geopolitical Zone

Geopolitical Zone	Population	Questionnaires Distributed	Valid Responses	Response Rate (%)
North-West	396	270	218	80.7%
North-East	252	175	143	81.7%
North-Central	368	240	205	85.4%
South-West	350	235	203	86.4%
South-East	270	200	178	89.0%
South-South	346	230	192	83.5%
TOTAL	**1,982**	**1,350**	**1,139**	**84.4%**

Data were collected using a semi-structured questionnaire developed in line with the study's objectives and informed by the theoretical framework on green library readiness. The instrument consisted of five thematic sections: (A) demographic information; (B) awareness of green practices in the era of climate change; (C) current adoption of green practices; (D) institutional readiness to adopt green practices; and (E) challenges to green practice adoption. Sections B to E employed a four-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree), which eliminates the neutral midpoint and requires respondents to indicate a directional position. This scale has been widely

validated in Nigerian academic library research contexts (Adeyemi et al., 2024; Ajani et al., 2025). Content validity was established through review by five subject experts in Library and Information Science with specialisation in sustainability and green library research. The instrument was subsequently pilot-tested with 30 library personnel from two federal university libraries not included in the main study, and Cronbach's alpha coefficients for all sections ranged from 0.78 to 0.91, confirming satisfactory reliability. The questionnaire was administered electronically via Google Forms between October 2025 and February 2026. Electronic administration was adopted due to the wide geographical coverage of the study, the prevailing security challenges in some regions of Nigeria, and the demonstrated effectiveness of online surveys in reaching professional populations in the Nigerian academic context (Ajani et al., 2025). Data were analysed using descriptive statistics, including frequencies, percentages, mean scores, and standard deviations. Individual item mean scores were interpreted using a decision mean criterion of 2.50 on the four-point scale, whereby items with means of 2.50 and above were classified as agreed upon or affirmed, and items below 2.50 were classified as disagreed upon or not affirmed. Grand mean scores were computed for each section. Responses to open-ended qualitative items were analysed thematically. All ethical protocols were strictly observed: participants were fully informed of the study's purpose, assured of anonymity and data confidentiality, and advised that participation was entirely voluntary with the option to withdraw without consequence. Ethical approval for the study was obtained from the relevant institutional authority prior to data collection. No personally identifiable information was collected, and all data were stored securely and accessed only by the research team. It should be acknowledged that the combination of purposive and snowball sampling within strata, while necessary given the geographically dispersed and professionally networked nature of the target population, introduces a degree of selection bias, as individuals connected through professional networks may hold more informed views on green library practices than those outside such networks. This methodological limitation should be considered when interpreting the study's findings. Additionally, the study's reliance on self-reported perception data, rather than objective observational measures of green practice implementation, means that reported awareness and adoption levels may reflect normative aspirations as much as actual institutional behaviour. Qualitative follow-up studies incorporating direct institutional observation would strengthen the validity of these findings.

Results and Discussion

Awareness of Green Practices in the Era of Climate Change

Table 3 presents the findings on the level of awareness of green practices among academic library personnel across Nigeria's six geopolitical zones. The decision mean is 2.50 on a four-point scale.

Table 3: Awareness of Green Practices in Academic Libraries Across Nigeria's Six Geopolitical Zones (N = 1,139)

S/N	Statement	NW Mean	NE Mean	NC Mean	SW Mean	SE Mean	SS Mean	Grand Mean	SD
1	I am familiar with the concept of green practices in libraries	2.88	2.61	3.04	3.22	3.01	2.97	2.96	0.87
2	I am aware of libraries' role in addressing climate change	2.40	2.19	2.52	2.71	2.58	2.49	2.48	0.91
3	I understand how library operations impact the environment	2.70	2.55	2.91	3.05	2.88	2.80	2.82	0.89
4	I am familiar with institutional/national sustainability policies	2.31	2.12	2.49	2.60	2.43	2.38	2.39	0.98
5	I stay informed about current trends in green library practices	2.58	2.41	2.73	2.87	2.71	2.65	2.66	0.94
6	I have received training on implementing green practices	2.01	1.87	2.19	2.38	2.15	2.09	2.12	1.03
	Grand Mean	**2.48**	**2.29**	**2.65**	**2.81**	**2.63**	**2.56**	**2.57**	

The findings in Table 3 indicate moderate overall awareness of green practices among academic library personnel across Nigeria's six geopolitical zones, with a Grand Mean of 2.57 (above the decision threshold of 2.50). However, the data reveal pronounced inter-zonal disparities. South-West zone respondents demonstrated the highest awareness levels (Zone Grand Mean = 2.81), consistent with the region's comparatively greater institutional resources, longer-established green library initiatives, and higher concentration of professional library training programmes. North-East zone respondents recorded the lowest awareness (Zone Grand Mean = 2.29), falling below the decision threshold, likely reflecting the cumulative impact of prolonged insecurity, institutional underfunding, and limited access to professional development opportunities in that region. Across all zones, familiarity with the general concept of green practices (Grand Mean = 2.96) and understanding of the environmental impact of library operations (Grand Mean = 2.82) emerged as the strongest awareness indicators, consistent with prior findings in Nigeria (Adeyemi et al., 2024) and globally (Islam et al., 2025; Ren & Lu, 2024). These items represent foundational conceptual awareness that does not necessarily require institutional resources or training to develop. In contrast, awareness of institutional and national sustainability policies (Grand Mean = 2.39) and receipt of formal training on green practice implementation (Grand Mean = 2.12) fell below the decision threshold across all zones, indicating that conceptual awareness has not been accompanied by commensurate policy literacy or capacity building. This divergence between conceptual awareness and operational knowledge is a critical vulnerability for green practice adoption, as it suggests that even well-intentioned librarians lack the institutional guidance and technical skills needed to translate environmental consciousness into systematic action (Islam et al., 2025; Akbulut et al., 2018). The consistent deficit in training availability across all six zones is particularly concerning, given the consensus in the green library literature that professional development is a necessary precondition for sustainable practice adoption (Tariq et al., 2025; Kulkarni, 2023). Without structured training pathways, green practice adoption remains dependent on individual initiative rather than institutional systems, producing fragmented and non-scalable outcomes. These findings call urgently for the Nigerian Library Association (NLA), the Librarians' Registration Council of Nigeria (LRCN), and individual university managements to institutionalise green library training within continuing professional development frameworks.

Current Adoption of Green Practices in Academic Libraries

Table 4 presents the findings on the current level of adoption of green practices in academic libraries across Nigeria's six geopolitical zones.

Table 4: Current Adoption of Green Practices in Academic Libraries Across Nigeria's Six Geopolitical Zones (N = 1,139)

S/N	Green Practice	NW	NE	NC	SW	SE	SS	Grand Mean	SD
1	Use of energy-efficient lighting and sensors	2.61	2.40	2.74	2.89	2.72	2.68	2.67	0.93
2	Waste reduction and recycling initiatives	2.35	2.14	2.48	2.61	2.45	2.40	2.41	0.97
3	Utilisation of renewable energy sources (solar, etc.)	2.42	2.22	2.55	2.68	2.51	2.53	2.49	1.02
4	Water conservation measures	2.44	2.25	2.57	2.71	2.53	2.49	2.50	1.01
5	Digital services to minimise paper usage	2.54	2.35	2.69	2.84	2.67	2.62	2.62	0.91
6	Procurement of environmentally friendly materials	2.49	2.29	2.62	2.75	2.58	2.54	2.55	0.98
7	Maintenance of green spaces within/around the library	2.46	2.24	2.59	2.70	2.53	2.51	2.51	0.99
8	Environmental awareness campaigns for staff/users	2.43	2.21	2.56	2.68	2.51	2.48	2.48	1.03
9	Policies to reduce paper/printing use	2.41	2.20	2.54	2.66	2.49	2.44	2.46	0.93

10	Proper e-waste disposal and management	2.19	1.98	2.32	2.47	2.28	2.24	2.25	1.04
	Zone Grand Mean	**2.43**	**2.23**	**2.57**	**2.70**	**2.53**	**2.49**	**2.49**	

The findings in Table 4 indicate that the overall adoption of green practices across Nigerian academic libraries is moderate, with a Grand Mean of 2.49, marginally below the decision threshold. This finding reflects the early-stage, uneven nature of green practice adoption in Nigerian federal university libraries, consistent with Adjei and Agyeman (2025) and Okoye et al. (2024). Energy-efficient lighting (Grand Mean = 2.67) and digital services to reduce paper usage (Grand Mean = 2.62) ranked as the most widely adopted practices, suggesting that librarians favour less infrastructurally intensive interventions that can be implemented incrementally. These findings align with global patterns: Akbulut et al. (2018) found similar tendencies in Turkey, and Mwanzu et al. (2023) documented analogous patterns in Kenya. E-waste management (Grand Mean = 2.25) ranked consistently as the lowest-adopted practice across all six zones, falling well below the decision threshold in every zone, including the South-West. This finding is particularly concerning given Nigeria's burgeoning e-waste crisis: the country is among Africa's largest receivers of discarded electronic equipment, and inadequate e-waste management in institutional settings contributes directly to toxic environmental contamination (Agbakwuru et al., 2024). The consistent failure of Nigerian academic libraries to develop systematic e-waste protocols reflects both a knowledge deficit, as most staff are unaware of formal e-waste disposal channels and an institutional policy gap, as university-level e-waste management frameworks are largely absent (Ogunbodede & Omehia, 2024). Pronounced inter-zonal disparities are again evident. South-West libraries achieved the highest Grand Mean (2.70), with notably stronger adoption across all ten indicators. North-East libraries recorded the lowest (2.23), falling below the decision threshold, reflecting the compounding effects of institutional underfunding, insecurity-related disruptions, and inadequate infrastructure in that zone. North-Central (2.57) and South-East (2.53) libraries demonstrated moderate adoption broadly consistent with the national average, while North-West (2.43) and South-South (2.49) libraries approached but fell marginally below the threshold. These disparities highlight the critical importance of geopolitically differentiated policy interventions rather than uniform national approaches.

Institutional Readiness to Adopt Green Practices in the Era of Climate Change

Table 5 presents the findings on the institutional readiness of academic libraries to adopt green practices across Nigeria's six geopolitical zones.

Table 5: Institutional Readiness to Adopt Green Practices Across Nigeria's Six Geopolitical Zones (N = 1,139)

S/N	Readiness Indicator	NW	NE	NC	SW	SE	SS	Grand Mean	SD
1	The library is ready to adopt green technologies	2.38	2.15	2.51	2.68	2.49	2.44	2.44	0.95
2	Staff possess the skills to implement green practices	2.47	2.28	2.61	2.74	2.58	2.53	2.54	0.97
3	Adequate financial resources available for green initiatives	2.05	1.89	2.18	2.31	2.16	2.11	2.12	1.02
4	The library has established sustainability policies	2.44	2.21	2.57	2.70	2.52	2.47	2.49	0.93
5	Management demonstrates commitment to green practices	2.51	2.30	2.64	2.78	2.61	2.56	2.57	0.92
6	Staff are willing to participate in green initiatives	2.57	2.38	2.71	2.85	2.68	2.63	2.64	0.89
7	The library has the necessary infrastructure for green practices	2.42	2.21	2.55	2.68	2.50	2.46	2.47	1.03

Zone Grand Mean	**2.41**	**2.20**	**2.54**	**2.68**	**2.51**	**2.46**	**2.47**

Table 5 reveals moderate overall institutional readiness for green practice adoption across Nigeria's six geopolitical zones (Grand Mean = 2.47), approaching but not fully reaching the decision threshold. These findings are consistent with the readiness literature, which characterises Nigerian academic libraries as institutions in a transitional phase possessing some foundational readiness capacities but lacking the resource base, policy structures, and infrastructure needed for comprehensive sustainability transition (Narendra, 2023; Kolawole & Oladokun, 2025). Staff willingness to participate in green initiatives (Grand Mean = 2.64) and management commitment (Grand Mean = 2.57) emerged as the strongest readiness indicators across all zones, suggesting that attitudinal and motivational preconditions for green transition are generally in place. This finding is theoretically significant: it suggests that the primary barriers to green practice adoption are not motivational but structural, a conclusion that points to the necessity of resource investment, policy development, and capacity building rather than awareness campaigns alone (Tariq et al., 2025; McCord et al., 2025). In contrast, the availability of adequate financial resources (Grand Mean = 2.12) was consistently the weakest readiness indicator across all six zones, falling substantially below the decision threshold. This finding replicates and extends prior evidence from Nigerian (David West & Wali, 2023; Okoye et al., 2024), African (Mwanzu et al., 2023), and global contexts (Khan, 2025), confirming that financial constraint constitutes the single most binding barrier to green library transition in resource-limited settings. Without dedicated sustainability budgets, libraries cannot invest in renewable energy systems, energy-efficient equipment, digital infrastructure, or staff training at the scale required for meaningful environmental impact. The South-West zone again recorded the highest readiness scores (Grand Mean = 2.68), while the North-East recorded the lowest (Grand Mean = 2.20), falling well below the decision threshold. This differential is consistent with the relative levels of institutional funding, physical infrastructure, and professional development infrastructure observable across these zones. The pattern suggests that green library preparedness in Nigeria is substantially determined by pre-existing institutional inequalities rather than by individual or professional factors, underscoring the need for redistributive federal policy interventions. These findings correspond with and extend international evidence. Khan (2025)'s study of UAE academic libraries and Mwanzu et al. (2023)'s Kenyan investigation similarly identify financial constraint as the dominant structural barrier, suggesting that this is a systemic feature of green library transition in the Global South rather than a Nigeria-specific anomaly. However, Nigerian academic libraries face a compounding challenge not prominent in these comparators: the intersection of chronic underfunding with acute energy insecurity, which makes investment in renewable energy infrastructure simultaneously more urgent and more financially burdensome. This double bind calls for innovative financing mechanisms, including public-private partnerships, sustainability-linked institutional grants, and international climate finance instruments, as potential pathways beyond the constraints of national budgetary allocations. Beyond operational sustainability, the findings also carry implications for the broader educational and advocacy roles of academic libraries. Libraries that struggle with basic green practice adoption are unlikely to be positioned as effective climate education hubs or advocates for institutional sustainability policy. Investing in green library infrastructure is therefore not merely an environmental imperative but an educational one: it creates the institutional foundation from which libraries can fulfil their mandate of advancing climate literacy among students, researchers, and the broader academic community (Solemanpharcy & Gaffar, 2023; Agbakwuru et al., 2024). Looking forward, emerging sustainability imperatives such as net-zero campus commitments, green ICT strategies, and circular economy procurement models represent the next frontier for Nigerian academic libraries. While current preparedness levels suggest these ambitions remain distant for most institutions, the motivational and attitudinal preconditions identified in this study, namely staff willingness and management commitment, provide a promising foundation from which incremental progress toward these higher-order sustainability goals can be pursued.

Challenges Hindering Green Practice Adoption

Table 6 presents the challenges identified by respondents as hindering the adoption of green practices in academic libraries across Nigeria's six geopolitical zones.

Table 6: Challenges Hindering Green Practice Adoption Across Nigeria's Six Geopolitical Zones (N = 1,139)

S/N	Challenge	NW	NE	NC	SW	SE	SS	Grand Mean	SD
1	Limited financial resources	3.48	3.61	3.38	3.25	3.40	3.44	3.42	0.84

2	Inadequate physical infrastructure	3.35	3.49	3.24	3.10	3.28	3.32	3.29	0.91
3	Limited technological resources	3.22	3.35	3.12	2.98	3.14	3.18	3.17	0.93
4	Insufficient staff training in green practices	3.16	3.28	3.07	2.92	3.09	3.13	3.11	0.90
5	Insufficient management support	3.11	3.24	3.02	2.88	3.04	3.07	3.06	0.91
6	Absence of clear institutional policies	3.07	3.19	2.98	2.82	2.99	3.04	3.02	0.93
7	Lack of staff awareness on green practices	2.99	3.10	2.90	2.75	2.91	2.95	2.93	0.89
8	Resistance to change among staff	2.62	2.74	2.55	2.41	2.57	2.59	2.58	0.96
	Zone Grand Mean	**3.13**	**3.25**	**3.03**	**2.89**	**3.05**	**3.09**	**3.07**	

The findings in Table 7 confirm that academic library personnel across all six geopolitical zones perceive substantial challenges to green practice adoption in the era of climate change, with all eight identified challenges registering above the decision threshold at the national level (Zone Grand Mean range = 2.89-3.25). Financial constraint (Grand Mean = 3.42) is rated as the most severe challenge across all zones, with the North-East recording the highest challenge mean (3.61), reflecting the compounding impact of insecurity-related institutional disruptions, limited government allocations to North-East universities, and higher costs of infrastructure maintenance in challenging environments. Inadequate infrastructure (Grand Mean = 3.29) and limited technological resources (Grand Mean = 3.17) rank as the second and third most significant challenges, respectively. These structural constraints are deeply interconnected: without adequate physical facilities, renewable energy systems cannot be installed; without reliable technology, digital services cannot be expanded; and without both, e-waste management systems cannot be established. The co-occurrence of financial, infrastructural, and technological challenges creates a mutually reinforcing barrier complex that cannot be addressed through isolated interventions. Insufficient training (Grand Mean = 3.11) and inadequate management support (Grand Mean = 3.06) complete the set of major challenges, further confirming the systemic nature of the barriers to green library adoption in Nigeria. The relative moderation of resistance to change (Grand Mean = 2.58), though above the threshold, suggests that staff attitudinal resistance is a comparatively lesser constraint than structural barriers, a finding with important policy implications, as it indicates that investment in infrastructure, funding, training, and policy development is more critical than cultural change management at this stage of Nigeria's green library transition. The South-West zone consistently recorded the lowest challenge scores, reflecting comparatively better institutional resource levels in that zone. The North-East recorded the highest challenge scores across all indicators, highlighting the urgent need for targeted federal interventions in that region. These findings are consistent with and extend the conclusions of Kulkarni (2023), David West and Wali (2023), and Okoye et al. (2024).

Conclusion

This study examined the preparedness of academic libraries in federal universities across Nigeria to adopt green practices in the era of climate change. Findings show that while awareness of green practices is moderate, it is not matched by equivalent levels of training, policy support, or institutional capacity. Adoption of green practices is also moderate but uneven, with basic interventions such as energy-efficient lighting and digital services more common, while complex practices like e-waste management remain weak. Institutional readiness follows a similar pattern, with strong staff willingness and management commitment offset by limited funding, weak infrastructure, and inadequate technological resources, indicating that constraints are primarily structural rather than attitudinal. Marked geopolitical disparities were observed, with the South-West consistently recording higher levels across indicators, while the North-East recorded the lowest, reflecting inequalities in funding, infrastructure, security, and institutional support. In conclusion, although academic libraries in Nigeria demonstrate foundational awareness and willingness to engage with sustainability, their preparedness for full-scale implementation of green practices remains moderate and uneven. Addressing this requires strengthened policy frameworks, improved infrastructure, targeted capacity building, and more equitable resource allocation across geopolitical zones.

Recommendations

Based on the findings of this study on the preparedness of academic libraries to adopt green practices in the era of climate change across Nigeria's six geopolitical zones, the following recommendations are proposed:

1 The Federal Government of Nigeria, through the NUC and TETFund, should establish a Green Library Development Fund to support investment in renewable energy, digital infrastructure, and sustainable library technologies, with priority for under-resourced zones such as the North-East, North-West, and North-Central.

2 The NUC should integrate mandatory green library standards into the accreditation framework, requiring federal university libraries to implement and report on Green Library Action Plans covering energy use, waste management, e-waste disposal, water conservation, and environmental awareness.

3 The Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) should embed green librarianship into continuing professional development and introduce a Green Library Certification scheme to strengthen staff competence and implementation capacity.

4 University managements should appoint Sustainability or Green Library Coordinators within library systems to coordinate implementation, ensure compliance with institutional environmental policies, and translate existing staff willingness and management commitment into structured action.

Limitations and Suggestions for Further Research

Several limitations of this study should be acknowledged to contextualise its findings.

1. The study covered all six geopolitical zones and 44 federal university libraries; it excluded newly established federal universities (those post-2020 without fully operational libraries), as well as state and private university libraries. Future research should extend the scope to these categories of institutions to enable cross-sectoral comparisons within the higher education library sector.
2. The cross-sectional design captures a single point in time; longitudinal studies tracking changes in green library preparedness over time, particularly in response to policy interventions or funding changes, would provide more nuanced insights into the dynamics of sustainability transitions in Nigerian academic libraries.
3. The study's quantitative predominance, while appropriate for its descriptive objectives, limits the depth of understanding of the processes and mechanisms underlying the observed patterns. Qualitative case studies and institutional ethnographies would complement these findings by illuminating the contextual factors that shape zone-specific disparities in green library preparedness.

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PRESERVATION AND SAFEGUARDING OF LIBRARY ARTEFACTS AGAINST CHEMICAL DEGRADATION-THE CHEMISTRY APPROACH

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ABSTRACT

Chemical degradation of library articles, including paper, leather and binding materials, a process that involves the breakdown of cellulose fibre and molecular bonds results in the loss of colour and elasticity in the effected materials. A chemical phenomenon, material degradation processes are stimulated by intrinsic weaknesses in the materials as well as external contaminants, of which compromised environmental conditions is significant. Acid hydrolysis, involving acidic sizing, lignin oxidation and acid migration**:** oxidation through photodegradation and air pollution: corrosion through iron gall ink and metallic fasteners: breakdown of binding materials, red rot as well as adhesive failure and biological-chemical interaction are the key methods by which chemical degradation occurs. Material quality and stability are challenged by combinations of high temperature and high humidity as well as high temperature and low humidity. Since libraries are the heart of knowledge and culture, the materials stored therein are treasures that must preserved if the goals of sustainable development must be met. A synergy of environmental controls, fitting storage and effective conservation techniques to neutralize acids and stabilize materials must be implemented to save library materials, whether books, pamphlets, manuscripts, journals, bulletins and newspapers from chemical degradation. The study examines the various external causes of deterioration that library materials undergo and present effective ways to protect and safeguard these invaluable resources that take ages, systematic knowledge, energy and resources to accumulate.

Keywords: Library artefacts, chemical degradation, extreme environmental conditions, preservation and sustainable development.

Introduction

A library is an organized collection of information resources, including books, periodicals, manuscripts and special collections. Modern libraries also house multimedia, electronic resources and technological devices and are maintained for study, research or borrowing. Libraries serve communities or institutions (like schools or corporations) by providing access to knowledge and are managed, maintained or supported by professional librarians who curate collections and assist with research. Libraries are crucial for preserving cultural heritage, supporting education and promoting literacy. Evolving from ancient repositories of manuscripts to modern centres for digital technology, they serve as community hubs, providing free space for learning, gathering and accessing information Whether they are established for academic, national, private, public, school or special purposes, including research, libraries consist of physical and digital spaces created out of brick-and-mortar and structured into the three parts of content, material management as well as preservation as well as inventorying, libraries are the heart of knowledge and culture and the materials within them are treasures that must be preserved for future generations. From the library, discoveries are made through access to information and support of various kinds. Unfortunately, these materials—whether:

Core Collection/Physical Print Materials: These are book materials such as pamphlets/booklets, textbooks, comprising nonfiction and fiction (literature books), for example, novels or short stories.

Reference Materials: Are books like dictionaries, encyclopedias, directories, yearbooks, handbooks, gazettes, indexes, atlases, almanacs, bibliographies, biographies, government documents as well as archival materials like manuscripts and photographs.

Periodicals: Are publications such as daily newspapers, weekly magazines, journals, theses and dissertations, reports, past question papers etc.

Non-book Materials: Include microfilms, electronic resources and audio-visual materials, learning resources, educational and instructional media, visual aids, educational technology, media resources, non-print media or non-book media.

Unconventional Items: include board games, video games or community tools possessed by lending libraries. Library materials, whether ancient manuscripts or modern books contain organic matter (principally cellulose) and are constantly exposed to external forces which breakdown and damage them overtime, threatening their longevity (Jeong *et al*., 2014). The degradation occurs through various routes and can be stimulated or delayed by taking different actions. Understanding the structure and reactivity, in other words; the chemistry of the material from which paper is made is crucial in developing effective strategies to protect the valuable resources.

Chemical Degradation

Chemical degradation is a phenomenon whereby a chemical compound, including polymer materials, pharmaceuticals, plastics and metals deteriorate, breakdown into smaller, simpler parts and become ineffective overtime. It often results in the loss of structural integrity, quality or functional properties in affected materials. Fading colors

(yellowing) in cellulosic materials, embrittlement in polymers and plastics along with mutable colours in medicines are other examples and impacts of chemical degradation. Most library materials originate from polymeric materials such as leather, adhesives as well as wood and paper, with the last two constituting essentially of cellulose shown in Figure 1 as fibres. Chemical degradation affects these materials in their different forms, including, historical manuscripts and drawings, metallic fasteners which develop rust, sulphur-based leather binding materials which breakdown to a powdery mess called red rot and adhesives. Animal-based glues dry out and attract pests while synthetic adhesives become sticky and develop rigidity, causing pages to tear off manuscripts and books in methods classified as adhesive failure. Hydrolysis, oxidation as well as photo and thermal degradation are the key processes by which chemical degradation accomplishes while the presence of acids, bases, water and oxidizing agents facilitate the process.

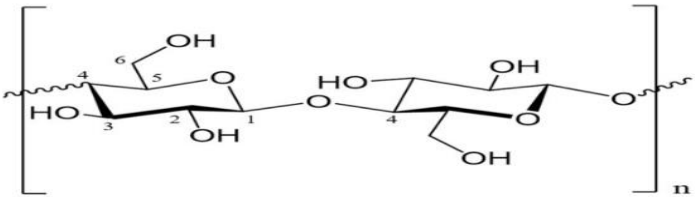


Fig. 1. Cellulose structure with carbon atoms numbering. Numbers (1 and 4) marked to identify the linking β-1,4 bonds between monomer units.

Factors that Accelerate Chemical Degradation of Cellulose

Chemical degradation of cellulose is stimulated by certain conditions which are categorized as external or internal factors:

1*).* **External/Environmental Factors:**

Degradation of cellulose is triggered by the presence of moisture (humidity) in the environment of susceptible materials, prompting chemical reactions that compromise the stability, aesthetics and performance of the materials (Barański *et al*., 2004). High humidity promotes the growth of moulds on paper, instigates warping and facilitates the formation of acids from airborne pollutants while extreme dryness causes paper to dry out and become brittle. Cellulose degradation by humidity in the presence of air pollutants is primarily an acid-catalyzed hydrolysis process, where pollutants like sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) react with moisture to form strong acids (Ahn *et al*., 2013). The later breaks the glycosidic bonds in cellulose, reducing the chain length and decreasing the degree of polymerization (DP) of cellulose significantly Dupont and Tétreault (2000). "Non-freezing water" in form of surface confined water can act as a vehicle for the modification of paper under storage to form gaseous acetic acid (Potthast *et al*., 2022 and Beaumont *et al*., 2021). Manuscripts and texts show to be healthier in an environment of low humidity than in otherwise. Simply put, books are better in cool dry (air-conditioned) rooms. The following steps are involved when the chemical degradation of paper objects is accelerated by humidity:

1*i*. Absorption of gaseous pollutants such as SO_2 or NO_2 by the moisture present cellulose in paper.

1*ii*. Formation of acids through a reaction between gaseous pollutants and moisture in the presence of oxygen in the air to form sulphuric acid (H_2SO_4) or nitric acid (HNO_3).

1*iii*. Protonation, wherein the formed acid dissociates and donates a proton (H^+) to the oxygen atom within the glycosidic bond (β-1, 4-glycosidic linkage) of paper to produce an acidic radical:

1*iv*. Chain Scission (Hydrolysis), wherein the protonated bond breaks to create a carbocation intermediate, which subsequently reacts with water to disrupt the cellulose chain, releasing smaller sugar units and regenerating the H^+ catalyst.

1*v*. **Further Degradation** can occur by anaerobic fermentation of the released glucose microbes to produce organic acids (such as formic acid, lactic acid, and acetic acid), ethanol and volatile organic compounds (VOCs) (Hadi *et al*., 2026 and Battisel *et al*., 2018) as metabolic byproducts.

2). Photodegradation/Photo-oxidation (Light Damage): Exposure to light over time is another external factor that damages library materials. While it is essential for reading, prolonged exposure to certain ranges of light can cause irreversible damage to paper-based library materials, dyes and pigments used in finishing during their processing. A photo-oxidative process that also involves the breakdown of the glycosidic bonds and oxidation of the (-OH), undue exposure to light leads to chain scission, reduced DP and irreversible fading of ink, ultimately weakening paper fibres and yellowing of the pages. According to Gonzalez-Lopez *et al*. (2023), radiation attacks the (-C-O-C-) bonds on the cellulose backbone of paper to form alkoxy and C-centered radicals. The latter undergoes various reactions leading to the scissoring of the cellulose backbone. Newspapers, manuscripts and periodicals are particularly susceptible to these effects (Jablonský *et al*., 2011). The susceptibility of library materials to light, from the sun and fluorescent lamps alike, is a silent but deadly factor that triggers photochemical damage and successively, fades and tints paper. Initiation **(**Absorption and Radical Formation), hydrogen abstraction, chain scission; Propagation (Auto-oxidation cycle/radical transfer), glycosidic bond scission and Termination **(Degradation Products) are the steps involved in the photolytic**

degradation of paper which end encompasses decreased DP, mechanical weakness (reduced structural integrity) and brittleness.

3). Thermal Degradation: High temperatures and fluctuations accelerate all chemical degradation processes significantly, with the rate of degradation approximately doubling for every increase in temperature. When library materials of cellulosic origin are exposed to low heat over a long period, simultaneous dehydration and oxidation are induced in the materials which ultimately damage by thermal degradation. It is a three-step process that can be summarized basically as follows:

3*i*. **Dehydration**: Release of water (associated with the breakdown of chain links) which occurs at lower temperatures.

3*ii*. **Depolymerization**: Ring opening to produce levoglucosan (an intermediate aka 1, 6-Anhydro-β-D-glucopyranose and creation of volatile sugars (like levoglucosan).

3*iii*. **Fragmentation**: Further breakdown of bonds in levoglucosan to form CO, CO_2 and H_2O.

General Thermal Decomposition (Pyrolysis)

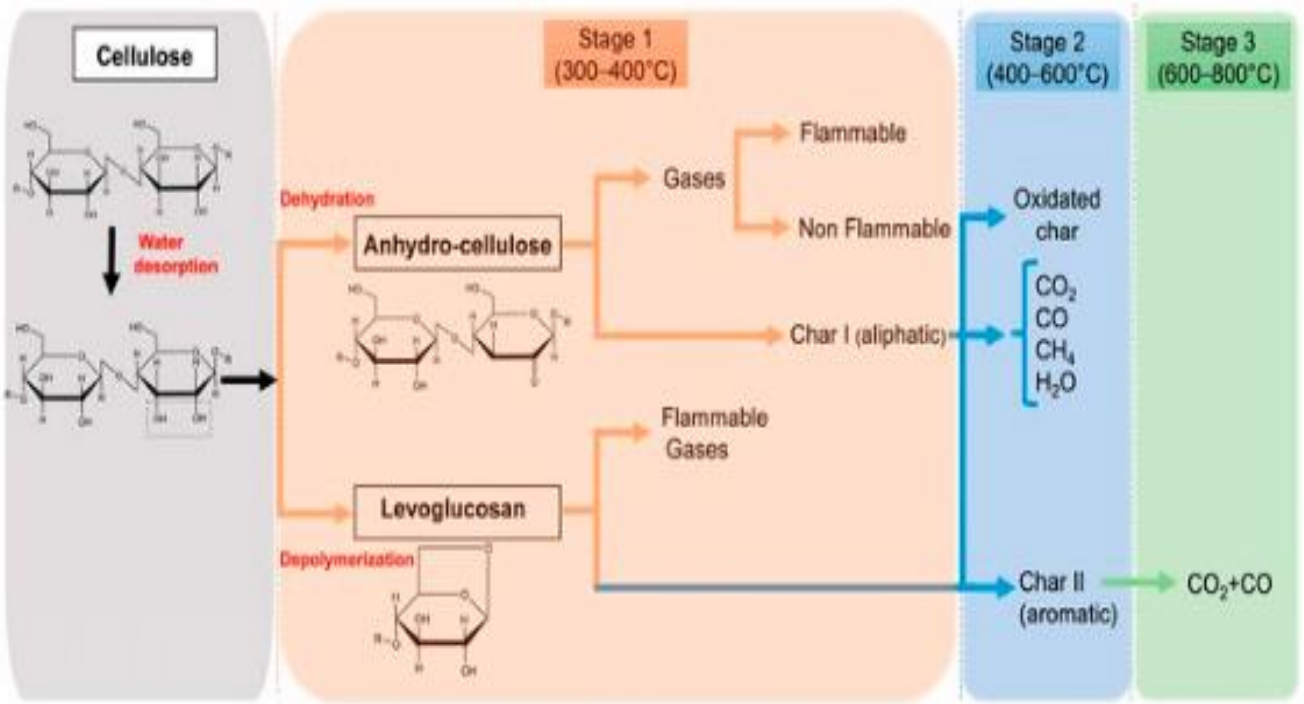
Along with the various products obtained, Alongi and Malucelli (2015) described the different reactions and reaction mechanisms of the thermal degradation of cellulose and cellulosic materials. The main reaction pathway in the pyrolysis (heating to high temperatures) of cellulose breaks the -1, 4-glycosidic bonds to produce the pyrolysis derivative, levoglucosan (Bai *et al*., 2013: Gaspar *et al*., 2010 and Hosoya *et al*., 2008), char and the volatile gases.

$$(C_5H_{10}O_6)_n \xrightarrow{\Delta} {}_n(C_5H_{10}O_6)\ \text{(Levoglucosan)} + \text{Char} + \text{Volatiles}\ (H_2O, CO, CO_2, CH_4)$$

Glucose decomposition also produces black solid residue, commonly referred to as humins in an altrnative reaction according to the scheme shown below:

$$C_6H_{12}O_6\ \text{(glucose)} \xrightarrow{\Delta} \text{Humins}$$

Thus, by thermal degradation, cellulose decomposes into "active cellulose" followed by competing reactions that form char or volatile tar. The entire processes can be shown in scheme 7. Manuscripts and texts show to be healthier at storage conditions that are below room temperature or succinctly in in cool (air-conditioned) rooms.



Scheme 7: Schematic representation of cellulose degradation through thermal oxidation.

4). Biological Agents/Biological-Chemical Interaction: Pests such as termites, cockroaches, rats and silverfish feed on library materials, such as paper and binding adhesives.

```
[ Cellulose Polymer: long $\beta$-1,4-glucan chain ]
                    |
                    ▼
            ┌──────────────┐
            │ Endoglucanase │ ──▶ Randomly cuts internal bonds
            └──────────────┘
                    |
                    ▼
          [ Shorter Oligosaccharides ]
                    |
                    ▼
            ┌──────────────┐
            │ Exoglucanase │ ──▶ Cleaves chain ends to release cellobiose
            └──────────────┘
                    |
                    ▼
          [ Cellobiose (Dimers) ]
                    |
                    ▼
            ┌──────────────┐
            │ $\beta$-Glucosidase│ ──▶ Hydrolyzes dimers into individual glu
            └──────────────┘
                    |
                    ▼
[ Glucose Monomers (Energy / Fermentation) ]
```

Scheme 8. Biological Degradation of Cellulose

Fig. 2. *Insect feeding on paper* -

An enzymatic process called cellulolysis, biological degradation of cellulose is a complex process that is primarily driven by microorganisms (bacteria, fungi and mould) which secrete cellulase enzymes that disrupt hydrogen bonding and breakdown cellulose into glucose (Area and Cheradame, 2011). The enzymes attack cellulose fibrils, decreasing their size and changing their crystalline structure. Degradation of cellulose-based library materials occurs in paper and by a three-step enzymatic process involving *endoglucanases* (which randomly attack cellulose chains (Disruption)), *exoglucanases* (which act on reducing ends to form cellobiose (Depolymerization)) and β-glucosidases (which hydrolyze cellobiose to glucose (*Saccharification*)) illustrated in Scheme 8. A picture of an insect feeding on paper is shown in Fig. 2:

5). Chemical/Internal Factors: Many inks, especially the ones produced after the mid-19th century contain acids that trigger yellowing in paper, weakening the texture over time. One such ink is iron gall ink which is a dark brown, water-resistant and indelible ink produced from an iron (II) salt, tannic acids, water and Arabic gum which coagulates the mixture. It was the standard writing and drawing ink from the 5th to 19th Centuries and was popular because it embedded into parchment, promoting effective bonding to paper surface. As a result of their characteristic acid nature, iron gall inks are unstable and cause paper and some cellulose-base photographic films to burn, turning the dark brown colour of the ink to blue-black and eating through the materials in a manner termed iron gall ink corrosion. Also called ink corrosion, ink degradation and metallic/ink reactions, iron gall ink corrosion (Henniges *et al.,* 2008) is a destructive process caused by the interaction of excess iron (II) ions (Fe^{2+}) and phenolic acids in the ink by oxidation reaction (Potthast *et al*., 2008). Explaining further, Potthast *et al*. (2008) described *it* as a synergy of hydrolysis and oxidation reactions which products cause corrosion, promote brittleness and tear paper, creating holes and finally destroy paper materials. The reaction, termed Fenton effect is an advanced oxidation process that generates hydroxyl radicals ($^{\cdot}OH$) from a mixture of hydrogen peroxide (H_2O_2) and Fe^{2+} catalysts. Fig. 3a and Fig. 3b, respectively are a composite picture of the Fenton effect and that of an ink corroded paper crumbling away. Fenton oxidation occurs via the 4- stages of fluorescence, brownish haloformation and paper brittleness/loss-driven by acid hydrolysis and redox reactions.

Fig. 3a: Iron gall oxidized paper

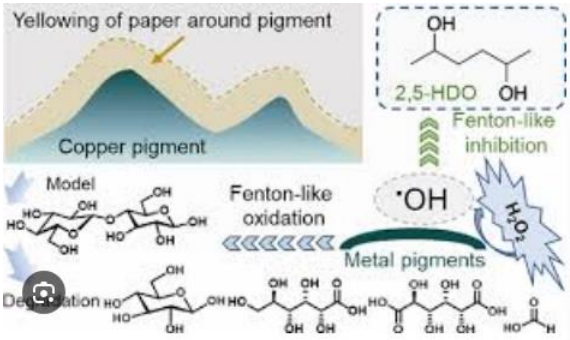
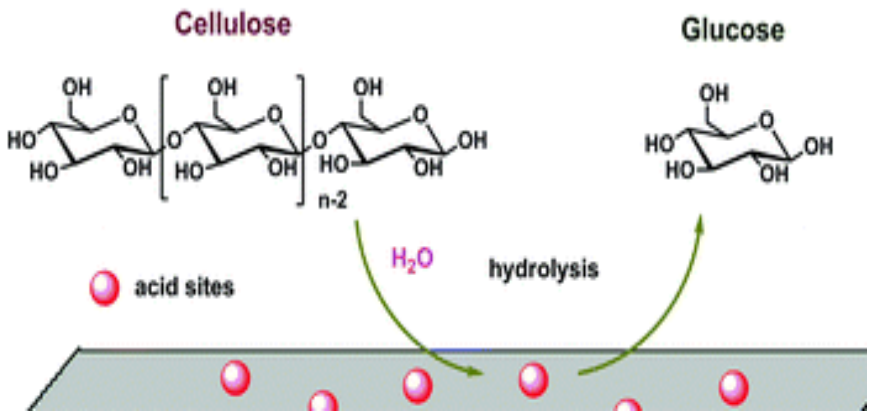


Fig. 3b: Fenton effect

6). Acid Hydrolysis: Acid hydrolysis is a chemical reaction in which the covalent bonds in a compound is broken by a water molecule in the presence of an acid catalyst. Acid hydrolysis splits the original molecule into two new products by adding H^+ to one fragment and an ^-OH to the other. The general chemical equation for acid hydrolysis is:

$$\mathbf{A\text{-}B + H_2O \xrightarrow{H^+} A\text{-}H + B\text{-}OH}$$

Termed slow fires, hydrolysis is the most common form of degradation in modern paper. If the condition of the immediate environment in the library is acidic, the glycosidic bonds in the cellulose chains of paper are attacked and broken-down into short chains by the acid (Bludova *et al*., 1984). The process turns the compact (crystalline) and strong cellulose fibres into a fragile mass, manifested by brittleness and yellowing of paper. Acid hydrolysis occurs through reactions between moisture and any of sulphur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3) and other pollutants to form strong acids like sulphuric acid (H_2SO_4)) and nitric acid (HNO_3) that attack paper, leather and ink. The overall reaction which relies on a molecule of water for every glycosidic bond broken down is shown in Scheme 9.



Scheme 9. Acid hydrolysis of cellulose

In summary, slow fires, acidic sizing, acid migration, alkaline degradation and structural rearrangement are the key processes while reduced DP evidenced by tiny pores on paper, loss of tensile strength and elasticity (compromised mechanical properties) (Jablonský *et al*., 2012 and Watson, 1976) and increased solubility are the consequences of chemical degradation of library materials. Citing temperature, irradiation, relative humidity or moisture content in the paper, exposure to various chemicals, including the presence of acids and metal ions and fluctuation of environmental conditions as major factors (Jablonský *et al*., 2020), Potthast *et al.* (2022) described cellulose degradation as an unavoidable effect of natural aging in paper (Milichovsky *et al*., 2013) that propagates over time. Gibson *et al*. (2012) and Gasper *et al*. (2010) carried out studies that showed that VOCs are associated with the aging of paper. Moreover, the high levels of acetic acid and furfural recorded for paper-storage locations (Gibson *et al*., 2012) indicate that both chemicals along with their associates: trimethylbenzenes, ethyltoluene, decane and camphor may compromise the indoor atmosphere. Air quality in these locations would be poor (Meyer *et al*., 2014), consequently, bring diseases and endanger the lives of workers at the facility through breathing of toxins and ultimately impair on the goals of sustainable development. In Nigeria, as in other tropical climates, library materials are faced with the challenges of dampness due to exposure to high humidity, frequent insect infestations and rapid deterioration of paper and binding materials. Having examined the key factors that cause deterioration, here are some practical steps libraries can take to protect their materials from damage.

Conservation of Library Materials

Conservation is the planned management and protection of a resource and heritage. It aims at preventing exploitation and destruction and comprises all actions taken to safeguard a resource and historical artifacts, keep them in a healthy and sustainable state for current and future generations. Preservation and restoration are specific subsets or methods of conservation. While preservation focuses on maintaining an article in its state to avoid damage, restoration actively alters or rebuilds an article to return it to a specific historical appearance. In restoring a library material, specific actions such as replacement or repair of missing pieces/pages may be undertaken and later additions removed from the material. On the other hand, preservation of library materials embraces the actions carried out to stop/forestall decay of the material so that its condition remains nearly the same in future. When the preservation of literary heritage is focal, restoration becomes a conscious activity that must be undertaken in libraries and archives to conserve their possessions. In a study to explore the ways by which research on paper degradation transforms into real-world, actionable preservation strategies for archives, libraries and museums, Havermans (2002) posited the availability of assorted techniques, including incorporation of anti-oxidants and stabilizers (Jancovicová *et al*., 2012) which library conservators can engage to fix specific types of damages and materials (Zervos and Alexopoulou, 2015). In line with sustainable development goals, the methods are renewable and guarantee that treatment methods are replaced with better ones as they materialize in the future. The ultimate goal of conservation, whether by restoration or preservation is to extend the

service life (utility) of a material while sustaining its integrity and accessibility. The two techniques require both scientific knowledge and artistic skill to accomplish.

Prevention Science:

Preservation of library materials from chemical degradation can be accomplished through the following techniques. The methods involve a combination of environmental control, proper storage and dynamic treatment to neutralize acids and stabilize materials. Since the primary goal is to slow down oxidation, hydrolysis and other chemical reactions that compromise paper quality, library materials can be protected against damage by chemical degradation through the following methods:

a. Environmental Controls

Temperature and humidity were highlighted as critical external factors that influence the degradation of library materials. Since books, manuscripts and paper-based materials are sensitive to changes in the environment, with potential to cause long-term damage; appreciation of how temperature and humidity impact their preservation is crucial in their management. As indicated earlier, the ideal temperature and humidity levels for storage lie between 18 °C and 22 °C and 45% and 60% respectively and are therefore recommended. These conditions which translate to stable, cool and dry environments help to maintain the structural integrity of paper and prevent chemical breakdown, the growth of fungi, acid formation and decay. Concisely, effective preservation requires environmental control and proper handling (for example, never to hold paper material with wet or oily hands) as well as regular cleaning to extend life expectancy.

Risks of Fluctuating Environments: Fluctuations in temperature and humidity are damaging to library materials. When the materials are exposed to high humidity, the fibres in the paper absorb moisture, leading to warping, discoloration and breakdown of the chemical structure of paper. On the other hand, extremely dry conditions renders paper inelastic and fragile. Furthermore, sudden changes in temperature or humidity can cause paper to expand or contract, producing stress that instigate tear, cracks or development of creases. Maintenance of a stable environment is therefore essential. Libraries should install climate control systems that regulate both temperature and humidity, especially in locations where rare or invaluable materials are housed. The use of data loggers and sensors to monitor environmental conditions can help in maintaining optimum storage conditions.

a. **Light Management:** UV radiation and to a lesser extent, visible light cause photodegradation. Consequently, windows of the library as well as light bulbs should be covered with UV filters to reduce the intensity of light (to say from 50-100 lux for sensitive items) and maintain items in a relatively dark storage. Books, manuscripts and other photodegradation-prone library materials should be stored in archival boxes or folders to protect them. The following strategies may be adopted by libraries to reduce the exposure of materials to damaging light. Materials should be stored in the dark or environment of low-light intensity whenever it is possible. Where necessary, items for display should be housed in UV-filtering glass and exposure time minimized to decrease the risk of damage. Finally, rather than fluorescent, tungsten or tungsten-halogen bulbs should be used to light the library.

Air Filtration and Quality: Heating, Ventilation and Air Conditioning (HVAC) and High-Efficiency Particulate Arrester (HEPA) filters, respectively should be installed in every section of the library. While HVAC, which is a comprehensive, centralized mechanical system regulates indoor temperature and maintains humidity, HEPA improves indoor air quality by capturing particulate matter such as dust, pollen, pathogens and smoke. When it is equipped with an activated carbon filters, HEPA also removes odour, VOCs, chemical fumes and gaseous pollutants like NO_2 ((Menart *et al*., 2014), SO_2, and O_3 responsible for the formation of acids in paper.

b. **Control of Fungi and Pests:** Good house-keeping is crucial in the preservation of library materials because it keeps the environment dry and clean, thus, prevents infestations by pests. Non-poisonous pest management methods and freezing techniques (where affordable) rather than chemical pesticides should be used to treat infested library materials and articles.

c. **Conservation:** Regular cleaning and periodic pest management must be sustained.

f. Storage and Protective Housing

***f1.* Acid-Free/Buffered Enclosures:** Books, especially in the cataloguing section, historical documents, artworks, including photographs and textiles (like cotton or linen) should be stored in acid-free, lignin-free folders or archived in boxes laced with an alkaline buffer, such as calcium carbonate to help prevent acid migration and damage, maintain an alkaline environment and check degradation over time. Becker *et al*. (2016) studied the influence of VOCs such as acetic and formic acid generated from storage materials on the degradation of paper and discovered that the combination of both acids produced a near real-world situation and improved the risk assessment for paper-based collections. Ahn *et al*. (2019) found out that the presence of hydroxycarbonyls (–COOH) caused yellowing of paper (Bludova *et al*., (1984)) more promptly than carbonyls (-C==O).

***fii.* Inert Plastics:** Envelopes, jackets and sheaths designed with inert plastics such as polyester (Mylar), polyethylene or polypropylene only should be used as book covers to forestall the permeation of harmful additives.

***fiii*. Proper Shelving:** Paper articles should not be deposited for storage on the floor and close to damp-prone external walls. Shelves must be tidy and uncrowded at all times to prevent chemical transfer and eventual damage.

Deacidification refers to chemical treatments intended to slow down *acid* hydrolysis and embrittlement of *books* and *paper* documents (Hubbe *et al*., 2017).

g. Chemicals Treatment

***gi.* Deacidification:** Hubbe *et al*. (2017) explained *deacidification* as a procedure that is intended to slow down *acid* hydrolysis and embrittlement of *books* and *paper* documents. The process neutralizes acids in paper and adds an alkaline reserve to prevent degradation in future. Deacidification may be accomplished by the following methods:

***gii.* Aqueous Treatment:** Washing items (photographic films and artefacts) in aqueous solutions like magnesium bicarbonate.

***giii.* Mass Deacidification:** Treating many books at once with an alkaline gas or liquid (Jablonský and Šima, 2020 and Potthast and Ahn, 2017).

***giv.* Strengthening:** Reinforcing brittle paper, often combined with deacidification, such as by applying Japanese tissue or using leaf casting for damaged paper documents.

***gv.* Chemical Stabilizers:** Addition of anti-oxidants and stabilizers to prevent the degradation of iron-gall ink or other materials. If material destruction occurs through degradation of iron gall ink, the damage can be stabilized by deactivating with calcium phytate (Jancovicová *et al*., 2012) which abates the acid catalyzed oxidation of the metals by binding the iron ions.

h. Handling and Management

***hi.* Handling Procedures:** Books and library materials should be held with clean, dry hands or white cotton gloves to prevent the transfer of oil and dirt to them. The use of pressure sensitive tapes as well as carrying too many books at a time must be discouraged avoid damaging the books.

***hii.* Staff Training:** Library workers and users must continually undergo training on proper handling of library materials to prevent physical damages that can leave them vulnerable to chemical degradation.

***hiii.* Digitization:** Creating digital, microfilmed or photocopied copies of library materials reduces the need for handling, thus conserving the original artifact.

***hiv*. Digital Preservation:** Scanning or photographing of delicate materials allows access without damaging the original material.

5. Cleaning and Maintenance

Regular Dusting: Soft brushes or vacuums, both of which can absorb moisture that create acidic and abrasive surfaces on books should be used to remove dirt and dust particles from them.

Protecting library materials from external causes of deterioration requires careful attention to environmental factors, regular maintenance and the implementation of preventive measures. Zhang *et al*. (2025) stated that the destructive effects of temperature, exposure to light and air pollutants in libraries and artefact storage rooms can be effectively moderated in controlled indoor environments. If books in the library are saved from damage, the propensity to replace them will reduce and vegetables will be spared, our environment will be preserved and the next generation will have vegetation to live with. Moreover, the resources expended to replace damaged library materials can be channeled to other critical areas of development such as health, infrastructure and social welfare for the benefit of the citizens. These are consistent with the goals of sustainable development.

Conclusion

By understanding the risks of chemical degradation posed by external and internal factors and taking deliberate and practical steps to protect against them, library managers and administrators can guarantee that their collections are preserved and remain accessible for generations to come.

Suggestions:

By way of suggestion, The National Library in Nigeria and the National Archives of Nigeria should develop specialized restoration laboratories where chemically degraded library books and artefacts can be rehabilitated.

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PROFESSIONAL ASSOCIATIONS AS CATALYST FOR CAPACITY BUILDING AND SERVICE INNOVATION AMONG LIBRARIANS IN NORTH-EAST NIGERIA

By

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Abstract

Professional associations play a crucial role in strengthening the professional competence of librarians and promoting innovative service delivery in the rapidly evolving information environment. In the contemporary digital knowledge economy, librarians are required to continuously update their skills, adopt emerging technologies, and develop innovative strategies for information services delivery. Professional associations provide the platform through which these competencies are developed through training programmes, conferences, workshops, networking opportunities, and professional advocacy. This paper examines the role of professional associations as catalysts for capacity building and service innovation among librarians in North-East Nigeria. Using a reflective and conceptual approach supported by relevant literature like what and how, the study discusses the functions of professional associations in professional development, knowledge sharing, collaborative learning, and innovation diffusion. The paper also highlights the major challenges confronting professional associations in promoting capacity building, including inadequate funding, limited participation, and infrastructural constraints. The paper concludes that professional associations remain essential instruments for strengthening librarians' professional competencies and improving innovative service delivery in academic libraries. It recommends increased institutional support, stronger collaboration among professional bodies, and greater integration of digital training programmes to enhance librarians' capacity for innovation in library services.

Keywords: Professional Associations, Capacity Building, Service Innovation, Librarians, Academic Libraries, North-East Nigeria

Introduction

The rapid transformation of the global information environment has significantly altered the roles and responsibilities of librarians in academic institutions. The emergence of digital technologies, electronic resources, artificial intelligence, and networked information systems has compelled librarians to continuously upgrade their professional competencies in order to remain relevant in the knowledge economy. Academic libraries are no longer merely repositories of printed materials but have evolved into dynamic knowledge centres that support teaching, learning, research, and innovation.

Professional associations have become an essential mechanism for strengthening the capacity of librarians in response to these changes. According to Ocholla and Shongwe (2019), professional library associations provide platforms for professional development, knowledge exchange, and the promotion of best practices within the library and information science profession. Through conferences, workshops, seminars, and training programmes, professional associations help librarians acquire the skills necessary to manage emerging technologies and provide innovative information services. According to the Nigerian Library Association (2026), one of its major objectives is "to safeguard and promote the professional interests of librarians" and "to promote the establishment and development of libraries and information centers" in Nigeria. These objectives underscore the Association's commitment to professional development, advocacy, and capacity building within the library profession. This assertion was supported by Chukwusa (2024) who in his paper found that Professional associations are critical mechanisms for continuing professional development among librarians. Conferences, seminars, workshops, and short courses constitute the most frequently utilized methods of professional development among Nigerian librarians, highlighting the importance of professional bodies such as the Nigerian Library Association in facilitating lifelong learning and professional competence.

Evidence from empirical studies indicates that academic libraries in North-East Nigeria continue to face challenges relating to infrastructure, technology, and professional capacity development. Pantuvo, Joseph, and Minakaro (2024) found that university electronic libraries in the region experience "inadequate infrastructural facilities, lack of essential software subscriptions, and a scarcity of trained system librarians." Similarly, Habib, Abubakar, and Abatcha (2025) reported that ICT facilities in federal university libraries in the region are often "insufficient, outdated, and poorly maintained," thereby constraining effective collaboration and technology-driven services. Furthermore, Kukuri, Audu, and Abubakar (2022) identified inadequate funding, lack of expertise, and insufficient retraining opportunities as major impediments to library modernization in North-East Nigeria. These challenges underscore the importance of professional associations in providing continuous professional development, capacity building, networking opportunities, and exposure to innovative library practices.

The Nigerian Library Association (NLA), established in 1962, is the foremost professional body for librarians and information professionals in Nigeria. The Association was established to unite persons interested in librarianship and information services, safeguard the professional interests of librarians, and promote the development of libraries and information centres across the country (Nigerian Library Association, 2025). Professional associations perform several

critical functions that contribute to the growth and advancement of the library profession. First, they promote professional development through conferences, workshops, seminars, webinars, and continuing education programmes that enable librarians to update their knowledge and acquire new competencies required in the evolving information environment (Raju, 2017). Second, they facilitate knowledge sharing by providing platforms where professionals exchange experiences, research findings, best practices, and emerging trends in librarianship (IFLA, 2022). Third, professional associations encourage collaborative learning by fostering professional networks and partnerships among librarians, institutions, and researchers, thereby creating opportunities for mentorship, peer learning, and joint professional initiatives (Garoufallou & Siatri, 2019). Finally, they promote innovation diffusion by exposing members to emerging technologies, innovative service models, and global best practices through professional meetings, publications, and specialized interest groups, thereby accelerating the adoption of new ideas and technologies within libraries (Ocholla & Shongwe, 2019). Through these functions, professional associations serve as important catalysts for capacity building and service innovation among librarians

Literature Review

Concept of Professional Associations in Librarianship

Professional associations are widely recognized as important institutions for advancing professions, promoting professional standards, fostering ethical conduct, and supporting the continuous development of practitioners. Across various disciplines, these organizations provide a collective platform through which professionals can pursue common goals, strengthen their competencies, advocate for their interests, and contribute to the development of their respective fields. At the international level, professional associations are increasingly regarded as strategic mechanisms for professional regulation, capacity building, policy advocacy, and the dissemination of best practices within professional communities (IFLA, 2022; Ocholla & Shongwe, 2019).

Within the library and information science profession, professional associations occupy a central position in promoting the growth and advancement of librarianship. Globally, organizations such as the International Federation of Library Associations and Institutions (IFLA) provide leadership in strengthening the profession through the development of standards, guidelines, professional networks, and capacity-building initiatives. These associations facilitate collaboration among librarians across different countries and institutions, thereby creating opportunities for knowledge exchange, professional interaction, and collective responses to emerging challenges in the information environment (IFLA, 2022). As the information landscape continues to evolve due to technological advancement, digital transformation, and changing user expectations, professional associations have become increasingly important in preparing librarians to adapt to new professional realities.

The literature suggests that professional associations perform multiple functions that contribute to the development of librarianship. They provide avenues for professional networking, continuing education, research dissemination, advocacy, leadership development, and policy engagement. Through conferences, seminars, workshops, publications, and professional forums, librarians are exposed to current developments in the profession and are provided opportunities to acquire new knowledge and competencies required for effective service delivery (Raju, 2017; Garoufallou & Siatri, 2019). In addition, professional associations contribute to the development and maintenance of professional standards and ethical principles that guide library practice, thereby enhancing the quality and credibility of library and information services (Ocholla & Shongwe, 2019).

Another important contribution of professional associations is the promotion of professional identity and a sense of belonging among practitioners. By bringing together individuals with shared professional interests and aspirations, these associations foster a culture of collaboration, mutual support, and collective responsibility for the advancement of the profession. Such interactions strengthen professional commitment while encouraging the sharing of experiences, innovative ideas, and best practices among members (Garoufallou & Siatri, 2019). Professional associations also serve as channels through which librarians can participate in broader professional discourse and contribute to shaping the future direction of library and information services.

In the Nigerian context, the Nigerian Library Association (NLA) serves as the umbrella professional body for librarians and information professionals. Since its establishment in 1962, the Association has played a significant role in promoting librarianship through advocacy, professional development programmes, conferences, workshops, publications, and networking activities. The Association provides a platform for librarians to engage in professional discussions, exchange ideas, and develop competencies required to respond to emerging trends in library and information service delivery (Nigerian Library Association, 2025). Through its national conferences, state chapters, sections, and interest groups, the NLA continues to contribute to the professional growth of librarians and the advancement of library services in Nigeria.

The growing complexity of the contemporary information environment has further increased the relevance of professional associations in librarianship. The emergence of digital technologies, artificial intelligence, data-driven services, and new models of scholarly communication requires librarians to continuously update their knowledge and skills. Professional associations therefore serve as important vehicles for professional renewal by providing opportunities for lifelong learning, professional collaboration, and exposure to innovative practices. Consequently, they

remain indispensable institutions for strengthening professional competencies, supporting service innovation, and enhancing the overall development of the library and information profession.

Capacity Building among Librarians

Capacity building has emerged as a critical component of professional growth and organizational effectiveness in the library and information profession. As academic libraries increasingly operate within complex and technology-driven information environments, the ability of librarians to acquire, update, and apply relevant knowledge and skills has become essential for effective service delivery. Broadly, capacity building encompasses the development of individual competencies, institutional capabilities, and organizational structures required to improve performance, adapt to change, and achieve professional objectives. Within librarianship, capacity building focuses on enhancing the knowledge, skills, attitudes, and technological competencies required for managing information resources and delivering high-quality library services.

The growing emphasis on capacity building in librarianship is closely linked to rapid developments in information and communication technologies, digital scholarship, research support services, and evolving user expectations. Contemporary librarians are expected to perform roles that extend beyond traditional collection management to include digital content curation, research data management, information literacy instruction, scholarly communication support, digital preservation, and technology-enabled service delivery. These emerging responsibilities require librarians to continuously develop new competencies and adapt to changing professional demands (Raju, 2017; Corrall, 2018). Consequently, capacity building has become a strategic requirement for ensuring that librarians remain relevant and effective in supporting teaching, learning, and research activities.

The literature identifies continuing professional development as one of the principal mechanisms through which capacity building is achieved in the library profession. Continuing professional development enables librarians to update their knowledge, improve existing skills, and acquire new competencies necessary for addressing emerging challenges in the information environment. Professional development activities such as conferences, workshops, seminars, webinars, mentoring programmes, and specialized training courses provide opportunities for librarians to engage in lifelong learning and professional renewal (Garoufallou & Siatri, 2019). These activities contribute to strengthening professional competence while promoting adaptability and innovation in library practice.

Capacity building is also closely associated with knowledge sharing and professional learning. The exchange of ideas, experiences, and best practices among librarians facilitates the acquisition of new knowledge and enhances problem-solving capabilities within the profession. Professional interactions that occur through conferences, professional networks, communities of practice, and collaborative projects create opportunities for peer learning and collective knowledge creation (Aina, 2018). Such interactions enable librarians to learn from one another's experiences, identify effective service models, and develop solutions to common professional challenges.

Another important dimension of capacity building is the development of technological competencies required for modern library operations. The increasing adoption of digital technologies in libraries has created a demand for skills in areas such as electronic resource management, institutional repositories, research data management, digital preservation, artificial intelligence applications, and information systems administration. Studies have shown that training and professional development programmes play a significant role in enhancing librarians' ability to adopt and utilize these technologies effectively (Cox & Pinfield, 2014). As libraries continue to integrate emerging technologies into their operations, sustained investment in capacity-building initiatives becomes essential for ensuring successful technology adoption and utilization.

Professional associations constitute one of the most important institutional mechanisms for promoting capacity building among librarians. Through conferences, workshops, seminars, certification programmes, webinars, and professional publications, these associations provide structured opportunities for skills development and professional learning. They also facilitate access to current developments in the profession, promote networking among practitioners, and create platforms for the dissemination of innovative ideas and best practices (Garoufallou & Siatri, 2019). As a result, professional associations contribute significantly to strengthening librarians' competencies and enhancing their capacity to respond to emerging professional challenges.

In developing countries, including Nigeria, capacity building assumes even greater importance due to the rapid growth of digital information resources, increasing demand for technology-driven services, and persistent skills gaps among information professionals. Many academic libraries operate within environments characterized by limited resources, technological constraints, and inadequate access to specialized training opportunities. Under such circumstances, continuous capacity-building initiatives become essential for equipping librarians with the competencies needed to support digital transformation, scholarly communication, research productivity, and innovative service delivery (Nwogo & Chukwuji, 2021). Strengthening librarians' capacities therefore remains a fundamental requirement for improving library performance and ensuring that academic libraries effectively contribute to knowledge creation and dissemination.

Overall, the literature demonstrates that capacity building is not merely a professional development activity but a strategic process for enhancing librarians' competencies, improving organizational effectiveness, facilitating technological adaptation, and promoting service innovation. As libraries continue to evolve in response to technological

and societal changes, sustained investment in capacity-building initiatives remains critical for the advancement of librarianship and the provision of quality information services.

Service Innovation in Academic Libraries

Service innovation has become a central pillar in the transformation of contemporary academic libraries. It refers to the deliberate introduction and application of new ideas, technologies, and service processes aimed at improving the quality, efficiency, and responsiveness of library services to users' evolving information needs. In the context of academic libraries, innovation is not merely technological adoption but a broader reconfiguration of service design, delivery models, and user engagement strategies.

The emergence of digital scholarship has compelled academic libraries to expand their service portfolio beyond traditional information provision. Consequently, libraries now provide specialized services such as research data management, institutional repositories, digital preservation, and scholarly communication support, all aimed at enhancing the visibility and impact of academic outputs. Recent studies confirm that institutional repositories have become central infrastructure for managing research data and improving scholarly communication in universities, particularly in developing countries where visibility of local content remains a key priority (Idiedo, Omigie, & Ebhomeye, 2024). These developments reflect a shift in academic libraries from passive storage institutions to active partners in research dissemination and knowledge production.

Corrall (2018) conceptualizes innovation in academic libraries as encompassing the redesign of traditional services, the integration of emerging technologies, and the development of user-centered service models that enhance access to scholarly information. This perspective highlights a shift from librarian-centered service provision to a more participatory, user-driven approach, where services are tailored to support diverse academic activities such as teaching, learning, and research.

The rapid digital transformation of higher education has further intensified the need for service innovation. In addition, Garoufallou and Siatri (2019) emphasize that service innovation in libraries is increasingly driven by the integration of emerging technologies, including artificial intelligence, big data analytics, cloud computing, and mobile technologies. These innovations enhance the capacity of libraries to provide real-time information services, automate routine tasks, personalize user experiences, and improve overall operational efficiency. As a result, academic libraries are becoming more dynamic, responsive, and technology-enabled environments.

Furthermore, the expansion of virtual and remote library services represents a significant dimension of service innovation. According to the International Federation of Library Associations and Institutions (IFLA, 2022), academic libraries globally are increasingly adopting virtual reference services, online research consultations, and digital learning support systems to meet the needs of geographically dispersed users. This shift has been particularly accelerated by changes in academic delivery models and the growing demand for flexible access to information resources.

Service innovation also extends to the development of collaborative and interdisciplinary support services. Corrall (2018) argues that academic libraries are progressively evolving into collaborative knowledge hubs where librarians actively engage with researchers, faculty members, and students to support research productivity and knowledge creation. This collaborative orientation reinforces the strategic role of libraries in institutional research ecosystems.

Professional associations further play a critical role in fostering service innovation among academic librarians. Through conferences, workshops, training programs, and professional networks, these associations provide platforms for knowledge exchange and exposure to global best practices. Ocholla and Shongwe (2019) note that professional associations are instrumental in diffusing innovative practices by enabling librarians to learn about emerging service models, technologies, and competencies required in modern librarianship.

In summary, service innovation in academic libraries represents a multidimensional transformation involving technological adoption, service redesign, and collaborative knowledge support. It is closely linked to the continuous professional development of librarians, while professional associations act as key drivers in facilitating the diffusion and adoption of innovative practices within academic library environments.

Role of Professional Associations in Capacity Building and Service Innovation

Professional associations play a critical role in enhancing the capacity of librarians and fostering service innovation in academic libraries through structured professional development, knowledge exchange, networking, and advocacy. Rather than functioning as isolated training bodies, these associations operate as integrated platforms where continuous learning, collaborative engagement, and innovation intersect to strengthen library practice.

A major contribution of professional associations lies in capacity building through continuing professional education, workshops, and structured training programmes. Raju (2017) emphasizes that such programmes equip librarians with emerging competencies in digital librarianship, including the management of electronic resources and the delivery of advanced information services. In a complementary view, Aina (2018) argues that conferences organized by professional associations serve not only as dissemination platforms for research findings but also as interactive learning spaces where librarians engage with current trends, share professional experiences, and critically reflect on evolving practices in librarianship. Synthesizing these perspectives, it is evident that professional associations function as both

formal and informal learning environments that collectively strengthen librarians' professional competence and adaptability to technological change.

In addition, professional associations significantly contribute to service innovation through professional networking and collaborative engagement. Garoufallou and Siatri (2019) observe that networking opportunities within professional associations enable librarians to build professional relationships across institutions and geographic boundaries. Such interactions often result in collaborative research, shared problem-solving, and the development of innovative service models that respond to changing user needs. When combined with Aina's (2018) emphasis on conferences as interactive platforms, it becomes clear that professional associations create a synergistic environment where knowledge exchange and collaboration directly translate into innovative library practices.

Beyond capacity building and networking, professional associations also play a crucial advocacy role in advancing library development and professional recognition. Ocholla and Shongwe (2019) note that library associations actively advocate for improved funding, better working conditions, and stronger institutional recognition of libraries as essential contributors to national development. This advocacy function indirectly supports service innovation by creating enabling environments in which libraries can adopt new technologies, implement user-centered services, and engage in transformative practices.

Overall, when synthesizing the views of Aina (2018) with Raju (2017), Garoufallou and Siatri (2019), and Ocholla and Shongwe (2019), it becomes evident that professional associations serve as multi-dimensional drivers of both capacity building and service innovation. They achieve this by integrating training, knowledge exchange, networking, and advocacy into a cohesive framework that enhances librarians' competencies and promotes the continuous transformation of academic library services

Challenges Affecting Professional Associations in Promoting Capacity Building

Despite their critical role in strengthening librarians' competencies and fostering service innovation, professional associations face several interconnected challenges that limit their effectiveness, particularly in developing regions such as North-East Nigeria. These challenges are not isolated but are structurally linked, often reinforcing one another across financial, institutional, technological, and participation dimensions.

Funding Constraints and Financial Sustainability

A major limiting factor is inadequate and unstable funding, which directly affects the scope and sustainability of professional association activities. In most cases, associations depend on membership dues, conference fees, and occasional institutional sponsorship, which are often insufficient to support continuous capacity-building programmes. Aina (2018) and Ocholla and Shongwe (2019) collectively observe that many library associations in developing contexts operate under severe financial constraints, which restricts their ability to organize regular training, publish professional outputs, or sustain long-term development initiatives.

This financial limitation also affects the adoption of digital learning infrastructure. Garoufallou and Siatri (2019) emphasize that without adequate funding, professional associations struggle to develop virtual training platforms and digital repositories that are now central to modern professional development. In the Nigerian context, Ossai-Ugbah (2013) similarly notes that even when conferences and workshops are organized, their effectiveness is often undermined by inadequate logistical and financial support. Collectively, these studies indicate that funding limitations do not only reduce activity frequency but also constrain innovation in delivery modes.

Low Participation and Weak Professional Engagement

Closely linked to funding challenges is the problem of low participation in professional association activities. Participation in conferences, workshops, and seminars is essential for knowledge exchange and innovation diffusion, yet many librarians are unable to engage fully due to financial limitations, workload pressures, and institutional constraints.

Aina (2018) highlights that limited participation reduces exposure to emerging practices and weakens professional competence development. Corrall (2018) further reinforces that active engagement in professional networks is a key driver of collaborative learning and innovation in academic libraries. Synthesizing these views, low participation should be understood not merely as individual reluctance but as a systemic issue influenced by cost barriers and workplace demands.

In addition, heavy institutional workloads reduce librarians' availability for professional development activities, while geographical dispersion in regions such as North-East Nigeria further limits physical attendance at events. The combined effect is reduced knowledge exchange and weakened professional networking, both of which are essential for capacity building.

Infrastructural and Technological Limitations

The effectiveness of professional associations is also constrained by weak technological and infrastructural systems that limit both physical and virtual engagement. Modern professional development increasingly depends on digital platforms such as webinars, online courses, and virtual conferences. IFLA (2022) emphasizes that digital technologies are now central to inclusive and continuous professional learning in librarianship.

However, in many developing regions, inadequate internet connectivity, unstable power supply, and limited access to digital tools hinder the effective use of these platforms. Nwogo and Chukwuji (2021) observe that such infrastructural deficiencies significantly restrict librarians' access to online professional development opportunities. When combined with poor physical conference facilities, these constraints reduce the overall effectiveness and reach of professional association programmes.

Limited Institutional Support

Another critical challenge is the lack of consistent institutional support for librarians' participation in professional association activities. While professional development is widely recognized as essential for service improvement, many academic institutions provide limited financial or administrative backing for staff attendance at conferences and training programmes.

Garoufallou and Siatri (2019) argue that institutional support through funding, study leave, and travel grants is essential for sustaining professional growth. However, Aina (2018) notes that in many cases librarians are required to self-fund participation in professional activities, which discourages engagement and limits inclusivity.

When viewed collectively, limited institutional support, funding constraints, and infrastructural weaknesses form a reinforcing cycle that weakens the overall capacity of professional associations to drive meaningful professional development and service innovation.

Strategies for Strengthening the Role of Professional Associations

Strengthening the effectiveness of professional associations in promoting capacity building and service innovation among librarians requires a coordinated set of strategic interventions that address institutional, technological, collaborative, and professional practice dimensions. These strategies are interdependent and collectively aim to enhance accessibility, sustainability, and impact of professional development initiatives.

Institutional Support for Professional Development

A fundamental strategy for improving the effectiveness of professional associations is the strengthening of institutional support for librarians' continuous professional development. Academic and research institutions play a critical enabling role by providing financial backing, study leave opportunities, and sponsorship for participation in conferences and training programmes. When institutions actively invest in staff development, librarians are better positioned to acquire the competencies required for managing modern information environments and supporting advanced academic activities.

Corrall (2018) emphasizes that institutional investment in professional development is essential for equipping librarians with the skills needed in evolving research and learning ecosystems. In a complementary perspective, Aina (2018) underscores that institutional sponsorship of conferences and workshops significantly enhances librarians' professional competence and exposure to emerging practices. Synthesizing these perspectives, institutional support should be viewed not merely as financial assistance but as a strategic investment in service quality improvement and innovation capacity within academic libraries.

Expansion of Digital Training and Learning Platforms

The integration of digital technologies into professional development represents another critical strategy for strengthening professional associations. The increasing shift toward virtual learning environments has made it necessary for associations to adopt webinars, online workshops, and virtual conferences as complementary or alternative modes of training delivery. This approach not only expands access but also addresses geographical and financial barriers that often limit participation in traditional face-to-face programmes.

The International Federation of Library Associations and Institutions (IFLA, 2022) highlights that digital training platforms are essential for ensuring inclusive and continuous professional learning in contemporary librarianship. Similarly, Garoufallou and Siatri (2019) argue that online professional development environments provide flexible, scalable, and cost-effective learning opportunities for librarians. Taken together, these perspectives indicate that digital platforms are not simply supplementary tools but central mechanisms for democratizing access to professional development and enhancing participation across diverse regions.

Strengthening Collaboration and Strategic Partnerships

Another important strategy involves strengthening collaboration and partnerships among professional associations, academic institutions, and international organizations. Such collaborations enhance resource sharing, broaden access to expertise, and facilitate exposure to global best practices in librarianship. In an increasingly interconnected information environment, no single professional body can effectively address capacity-building needs in isolation.

Ocholla and Shongwe (2019) note that partnerships between library associations and external organizations have significantly contributed to the advancement of librarianship in Africa through joint training programmes, conferences, and professional exchanges. When integrated with institutional and digital strategies, collaboration becomes a mechanism for scaling capacity-building efforts and fostering innovation through shared learning experiences and cross-institutional engagement.

Promotion of Research and Scholarly Communication

Strengthening the research capacity of librarians is also central to enhancing the effectiveness of professional associations. By encouraging active participation in research and scholarly communication, associations help librarians transition from passive service providers to knowledge producers who contribute to evidence-based library practice and innovation.

The emergence of digital scholarship has compelled academic libraries to expand their service portfolio beyond traditional information provision. Consequently, libraries now provide specialized services such as research data management, institutional repositories, digital preservation, and scholarly communication support, all aimed at enhancing the visibility and impact of academic outputs. Recent studies confirm that institutional repositories have become central infrastructure for managing research data and improving scholarly communication in universities, particularly in developing countries where visibility of local content remains a key priority (Idiedo, Omigie, & Ebhomeye, 2024). These developments reflect a shift in academic libraries from passive storage institutions to active partners in research dissemination and knowledge production.

Conclusion

Professional associations remain vital instruments for promoting capacity building and service innovation among librarians. Through training programmes, conferences, professional networking, and advocacy, these associations contribute significantly to the professional development of librarians and the improvement of library services.

In North-East Nigeria, where academic libraries face numerous challenges, including limited resources and infrastructural constraints, professional associations provide critical support for librarians to acquire new competencies and adapt to emerging technologies.

Strengthening the role of professional associations through increased funding, institutional support, and digital training initiatives will enhance librarians' capacity to provide innovative and effective library services in the region.

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Professional Associations in Shaping Information Professionals: A Comparative Analysis of the American Library Association (ALA) and the Nigerian Library Association (NLA)

by

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Abstract

Professional associations play a critical role in defining standards, regulating professional conduct, advancing advocacy initiatives, and shaping the identity of information professionals worldwide. This study presents a comparative analysis of the American Library Association (ALA) and the Nigerian Library Association (NLA), examining their contributions to the development of librarianship and information science within their respective national contexts. Using a qualitative comparative research design and thematic content analysis, the study explores the historical evolution, professional development functions, advocacy roles, policy influence, technological adaptation, and capacity-building initiatives of both associations. Findings reveal that the ALA operates within a highly developed information ecosystem characterized by strong institutional frameworks, emphasizing intellectual freedom, information ethics, diversity, equity and inclusion, artificial intelligence governance, and digital rights advocacy. In contrast, the NLA functions within a developing information environment where professional advocacy focuses on infrastructural challenges, ICT adoption, digital inclusion, professional recognition, and national educational development. Despite contextual differences, both associations serve as indispensable mechanisms for professional growth, lifelong learning, policy influence, and the advancement of library and information services. The study proposes a collaborative consortium model that integrates the ALA's accreditation and professional development frameworks with the NLA's contextual resilience and developmental advocacy strategies. Such a model may strengthen global librarianship and enhance the capacity of information professionals to respond to emerging technological and societal challenges.

Keywords: American Library Association, Comparative Librarianship, ICT Integration, Nigerian Library Association, Professional Associations, Professional Identity.

1. Introduction

Professional associations are recognized globally as essential institutions for the development, regulation, and advancement of professions. They establish professional standards, promote ethical conduct, facilitate continuing education, advocate for members' interests, and contribute to policy formulation affecting professional practice. In the field of Library and Information Science (LIS), professional associations play a particularly significant role because of the dynamic nature of information creation, organization, dissemination, and use. As information environments continue to evolve, professional associations have become critical mechanisms through which librarians and information professionals acquire new competencies, adapt to technological changes, and maintain professional relevance.

Historically, library associations emerged to provide collective representation for librarians and to promote the development of library services. Over time, their functions expanded beyond professional networking to include accreditation of educational programs, continuing professional development, policy advocacy, promotion of intellectual freedom, diversity and inclusion initiatives, and guidance on emerging technologies. Consequently, professional associations have become central actors in shaping the identity, competence, and societal contributions of information professionals.

The rapid transformation of the information landscape has further increased the importance of professional associations. Advances in digital technologies, artificial intelligence, data analytics, digital preservation, and information governance

have fundamentally altered the traditional roles of librarians. Contemporary information professionals are expected not only to manage information resources but also to facilitate digital literacy, support research data management, promote equitable access to information, and address ethical issues relating to privacy, intellectual property, and artificial intelligence. These developments require professional associations to continuously revise standards, strengthen capacity-building initiatives, and advocate for policies that support effective information services.

Among the most influential professional associations in librarianship are the American Library Association (ALA) and the Nigerian Library Association (NLA). The ALA, established in 1876, is widely recognized as one of the most influential library associations globally. It has played a leading role in accreditation, professional development, intellectual freedom advocacy, policy engagement, and the promotion of diversity, equity, and inclusion within the profession. The NLA, founded in 1962, serves as the principal professional body for librarians and information professionals in Nigeria. The association has contributed significantly to professional regulation, advocacy for library development, continuing professional education, and the advancement of library services within a developing socio-economic context.

Despite their shared commitment to advancing librarianship, the two associations operate within substantially different political, economic, technological, and institutional environments. While the ALA functions within a highly developed information infrastructure characterized by extensive technological resources and strong institutional support, the NLA operates within a context where challenges such as inadequate funding, infrastructural deficits, digital inequalities, and policy implementation constraints remain significant concerns. These contextual differences influence how both associations pursue professional development, advocacy, policy engagement, digital transformation, and inclusion initiatives.

Although several studies have examined professional associations within individual national contexts, limited comparative research exists on how professional associations in developed and developing countries respond to contemporary professional challenges. This study addresses this gap by comparatively examining the American Library Association and the Nigerian Library Association with particular attention to their historical evolution, professional development functions, advocacy activities, policy influence, responses to digital transformation, and efforts to promote equity, diversity, and inclusion. Through this comparative analysis, the study seeks to provide insights into how professional associations contribute to the advancement of librarianship within different socio-economic environments and identify lessons that may strengthen professional associations globally.

2. Objectives of the Study

The main objective of this study is to comparatively examine the roles of the American Library Association (ALA) and the Nigerian Library Association (NLA) in shaping the development of information professionals within their respective national contexts.

Specifically, the study aims to:

1. examine the roles of the ALA and NLA in shaping professional identity and socialization among information professionals.
2. compare the mechanisms employed by both associations in promoting education standards, accreditation, and continuing professional development (CPD).
3. analyze the advocacy functions and policy influence of the ALA and NLA within their respective environments.
4. evaluate the responses of both associations to digital transformation and emerging professional competencies.
5. examine the efforts of the ALA and NLA in promoting equity, diversity, and inclusion within the profession.
6. propose a collaborative framework for strengthening professional associations and enhancing global librarianship.

3. Theoretical Framework

This study is anchored on Abbott's Systems of Professions Theory and Wenger's Communities of Practice Theory. The combination of these theoretical perspectives provides a comprehensive framework for understanding the roles of professional associations in regulating professional practice, developing competencies, and fostering professional identity (Abbott, 1988; Wenger, 1998).

3.1 Abbott's Systems of Professions Theory

Abbott's Systems of Professions Theory explains how professions establish and maintain jurisdiction over specialized bodies of knowledge. According to Abbott (1988), professional groups compete for authority, legitimacy, and control over professional work through the establishment of professional standards, educational requirements, and regulatory mechanisms. Professional associations serve as important institutional structures through which professions define boundaries, regulate conduct, influence policy, and maintain professional jurisdiction. Within librarianship, professional associations contribute to the development of accreditation systems, ethical standards, continuing professional education, and professional regulations that sustain the legitimacy and social standing of the profession (Aina, 2014; Rubin & Rubin, 2020).

3.2 Wenger's Communities of Practice Theory

Complementing Abbott's perspective, Wenger's Communities of Practice Theory emphasizes the social dimensions of professional learning and identity formation. Wenger (1998) argues that professional knowledge develops through active participation in communities where individuals share experiences, exchange knowledge, and collectively construct meaning. Professional associations function as communities of practice by providing opportunities for networking, mentoring, collaboration, continuing professional development, and professional socialization. Through conferences, workshops, committees, and professional networks, associations facilitate the acquisition of professional competencies and strengthen collective professional identity (Wenger, 1998; Wenger, McDermott, & Snyder, 2002).

3.3 Integration of Theories

The integration of these theories is particularly relevant for comparative analysis. While Abbott's theory explains how associations contribute to professional regulation, accreditation, and policy influence, Wenger's framework highlights their role in professional learning, capacity building, and identity formation. Together, these theories provide a useful lens for examining how the American Library Association (ALA) and the Nigerian Library Association (NLA) contribute to the advancement of librarianship despite operating within different institutional, technological, and socio-economic contexts (Lor, 2019; Rubin & Rubin, 2020).

4. Methodology

This study adopted a qualitative comparative research design to examine the similarities and differences between the American Library Association (ALA) and the Nigerian Library Association (NLA). The qualitative comparative approach was considered appropriate because it enables an in-depth exploration of institutional characteristics, professional practices, and contextual factors that influence the operations of professional associations.

Data for the study were obtained from secondary sources, including official publications of the ALA and NLA, policy documents, strategic plans, annual reports, conference proceedings, accreditation guidelines, professional standards documents, and relevant scholarly literature on professional associations and librarianship. These sources provided comprehensive information regarding the historical development, professional activities, advocacy initiatives, policy engagement, and technological responses of both associations.

The collected data were analyzed using thematic content analysis. The analysis focused on six themes derived from the study objectives and literature review:

1. Professional identity and socialization
2. Education standards and accreditation
3. Continuing professional development
4. Advocacy and policy influence
5. Digital transformation and emerging competencies
6. Equity, diversity, and inclusion

Comparative analysis was subsequently employed to identify areas of convergence and divergence between the two associations and to assess how contextual factors shape their strategies and contributions to the development of information professionals. The use of documentary and comparative analysis enabled the study to generate a comprehensive understanding of the roles of professional associations in different socio-economic environments while providing a basis for proposing strategies for strengthening professional associations globally.

5. Literature Review

5.1 Historical Evolution of Professional Library Associations

Professional associations have historically served as the institutional foundation for the development and regulation of professions. According to Abbott's theory of professional systems, professional associations establish jurisdiction over specialized knowledge and create mechanisms for professional control and legitimacy. Within librarianship, associations emerged in response to the need for standardization, professional recognition, and collective representation.

The American Library Association (ALA), founded in 1876, is recognized as the oldest and most influential library association globally. Since its establishment, the association has played a significant role in developing professional standards, promoting library education, and advocating for intellectual freedom. Over time, the ALA expanded its mandate from professional networking to include accreditation, policy advocacy, diversity initiatives, digital literacy promotion, and information rights protection (Rubin & Rubin, 2020).

The Nigerian Library Association (NLA), established in 1962 shortly after Nigeria's independence, emerged within a different socio-economic and political environment. The association was created to promote professional unity, strengthen library services, and facilitate national educational development. Since its inception, the NLA has contributed to professional recognition, the establishment of library schools, and advocacy for the enactment of legislation supporting librarianship, particularly through its role in facilitating the establishment of the Librarians' Registration Council of Nigeria (LRCN) (Aina, 2014). Comparative studies suggest that while library associations in developed countries evolved toward policy leadership and knowledge governance, associations in developing countries often

prioritize professional survival, infrastructure development, and capacity building (Lor, 2019). These historical differences continue to shape the priorities and activities of both organizations.

5.2 Professional Development and Continuing Professional Education

Professional development remains one of the core functions of professional associations. Lifelong learning is increasingly important in the information profession due to rapid technological change and evolving user needs. Professional associations provide opportunities for continuing professional development (CPD) through conferences, workshops, seminars, certifications, publications, and online learning platforms. The ALA has established a comprehensive CPD framework through its divisions, committees, conferences, and learning initiatives. Research indicates that ALA's continuing education programs contribute significantly to librarians' competencies in information literacy, digital services, leadership, and emerging technologies (Jaeger et al., 2021). The association's accreditation responsibilities further strengthen professional competence by ensuring quality standards in Library and Information Science (LIS) education.

In contrast, the NLA relies largely on annual conferences, chapter activities, and professional workshops to support professional growth. Studies by Abubakar (2022) and Saleh and Tsagem (2019) indicate that while the NLA has contributed substantially to professional development in Nigeria, challenges such as inadequate funding, limited technological infrastructure, and uneven participation across states constrain the effectiveness of CPD initiatives. The literature suggests that effective professional development frameworks contribute not only to skill acquisition but also to professional identity formation, career advancement, and organizational effectiveness (Wenger, 1998).

5.3 Advocacy Roles of Professional Associations

Advocacy represents a central function of professional associations worldwide. Professional associations advocate for the interests of members, influence public perception of the profession, and promote the societal value of information services. The ALA has gained international recognition for its advocacy activities related to intellectual freedom, freedom of expression, privacy protection, equitable access to information, and public library funding. Through initiatives such as the Office for Intellectual Freedom and the Freedom to Read Foundation, the association actively participates in policy debates affecting libraries and information access (American Library Association, 2024).

The NLA's advocacy activities focus primarily on professional recognition, library funding, infrastructure development, literacy promotion, and educational advancement. Research shows that the association has consistently advocated for improved library legislation, better working conditions for librarians, and increased governmental support for library services (Aina, 2014). Advocacy efforts have also contributed to the strengthening of professional regulation through collaboration with the LRCN. Scholars argue that advocacy functions differ according to national contexts. While associations in developed countries often defend established professional rights, associations in developing countries frequently advocate for basic infrastructural support and institutional recognition (Lor, 2019).

5.4 Policy Influence and Professional Regulation

Professional associations play a significant role in influencing policies that affect education, information access, professional practice, and societal development. Through policy engagement, associations contribute to governance structures that shape the information environment. The ALA exerts considerable policy influence through legislative advocacy, policy development, and stakeholder engagement. The association contributes to discussions on copyright, digital rights, information privacy, artificial intelligence governance, and equitable information access. Studies indicate that ALA policy interventions have significantly shaped public library funding and information legislation in the United States (Jaeger et al., 2021).

The NLA's policy influence is largely directed toward educational development, professional regulation, and library infrastructure. The association's advocacy contributed to the establishment of the Librarians' Registration Council of Nigeria, which regulates professional practice and professional qualifications. However, literature suggests that policy implementation challenges, inconsistent governmental support, and limited institutional influence continue to affect the association's effectiveness in shaping national information policies (Saleh & Tsagem, 2019). The literature emphasizes that policy influence strengthens professional legitimacy and enhances the ability of associations to respond to emerging societal and technological challenges.

5.5 Digital Transformation and Emerging Professional Competencies

Digital transformation has fundamentally altered the practice of librarianship and information management. Professional associations increasingly play a strategic role in preparing information professionals for technological change. The ALA has been proactive in promoting digital literacy, data ethics, artificial intelligence governance, cybersecurity awareness, and emerging technological competencies. Through conferences, policy statements, and professional development programs, the association provides guidance on the integration of advanced technologies into library services (Association of College and Research Libraries, 2024).

The NLA has similarly recognized the importance of digital transformation. Numerous conference themes and professional initiatives have focused on digitization, ICT integration, institutional repositories, digital preservation, and electronic information services. However, empirical studies indicate that infrastructural limitations, unreliable electricity, inadequate internet connectivity, and funding shortages remain major barriers to effective digital

transformation in Nigerian libraries (Abubakar, 2022). Researchers argue that successful digital transformation requires not only technological investment but also professional training, institutional support, and strategic leadership from professional associations (Ajani et al., 2024).

5.6 Professional Identity and Socialization

Professional identity refers to the values, beliefs, competencies, and ethical commitments that distinguish members of a profession. Professional associations are critical agents in the socialization process through which individuals acquire professional norms and standards. Wenger's Communities of Practice theory emphasizes the importance of professional communities in facilitating learning and identity formation. Professional associations create opportunities for networking, mentoring, collaboration, and knowledge exchange, thereby strengthening professional commitment and cohesion (Wenger, 1998).

The ALA promotes professional identity through leadership programs, professional divisions, mentoring schemes, and ethical guidelines. Similarly, the NLA fosters professional identity through conferences, chapter activities, publications, and collaboration with regulatory bodies such as the LRCN. Studies suggest that strong professional identity contributes to job satisfaction, professional commitment, ethical conduct, and career success among information professionals (Rubin & Rubin, 2020).

5.7 Equity, Diversity, and Inclusion in Professional Associations

Equity, diversity, and inclusion (EDI) have emerged as major priorities for contemporary professional associations. EDI initiatives seek to promote representation, reduce barriers to participation, and ensure equitable access to professional opportunities. The ALA has implemented extensive diversity programs, including the Spectrum Scholarship Program, diversity recruitment initiatives, and policy frameworks aimed at fostering inclusive library environments. These initiatives address historical inequalities and promote representation among underrepresented populations within the profession (ALA & Gallup, 2025).

In Nigeria, diversity and inclusion are often framed in terms of equitable access to information services across geographical, socio-economic, linguistic, and educational divides. The NLA promotes inclusion through advocacy for rural library development, digital inclusion programs, literacy initiatives, and equitable access to information resources. The literature demonstrates that diversity and inclusion initiatives strengthen professional relevance, improve service delivery, and enhance social justice outcomes in librarianship (Lor, 2019).

Summary of Literature Reviewed

The reviewed literature demonstrates that professional associations perform multifaceted functions that extend beyond membership administration. Their contributions encompass professional development, advocacy, policy influence, professional identity formation, technological adaptation, and promotion of diversity and inclusion. While the ALA operates within a highly institutionalized and resource-rich environment, the NLA functions within a developing context characterized by infrastructural and funding challenges. Despite these differences, both associations contribute significantly to the advancement of librarianship and information services within their respective environments.

6. Comparative Analysis and Discussion

6.1 Professional Identity and Socialization

Professional identity formation is one of the most important functions performed by professional associations. Both the ALA and the NLA provide platforms through which librarians acquire professional values, ethical standards, and a sense of belonging to the profession. However, the mechanisms employed by the two associations differ considerably due to variations in institutional maturity and professional environments.

The ALA utilizes a highly structured membership framework consisting of divisions, round tables, committees, mentoring programs, and leadership development initiatives. Programs such as Emerging Leaders facilitate active participation of early-career professionals in professional governance and decision-making processes. These initiatives strengthen professional socialization and encourage continuous engagement within the profession.

The NLA similarly promotes professional identity through annual conferences, workshops, state chapters, publications, and collaboration with the Librarians' Registration Council of Nigeria (LRCN). The establishment of the LRCN represents a significant achievement in defining professional boundaries and regulating entry into the profession. Nevertheless, challenges such as uneven chapter activities, limited resources, and inconsistent participation reduce opportunities for continuous professional interaction.

Membership composition also influences professional identity formation. While the ALA enjoys broad participation from public, academic, school, and special librarians, the NLA's membership is predominantly composed of academic librarians from universities, polytechnics, and colleges of education. These demographic characteristic shapes the professional discourse within the association and influences its developmental priorities. Despite differences in scale and structure, both associations serve as important mechanisms for professional socialization and the cultivation of professional values.

6.2 Education Standards, Accreditation, and Continuing Professional Development (CPD)

Education standards and accreditation constitute critical mechanisms through which professional associations maintain professional quality and competence. The ALA plays a leading role in accrediting Library and Information Science (LIS) programs in North America through its Committee on Accreditation. These accreditation activities contribute to curriculum development, quality assurance, and the continuous modernization of professional education.

The NLA contributes to professional education primarily through collaboration with the LRCN and relevant educational regulatory agencies. While the association has played an important role in promoting professional standards, its influence on curriculum development and accreditation remains less extensive than that of the ALA.

In terms of continuing professional development (CPD), the ALA operates a comprehensive framework supported by annual conferences, LibLearnX events, online learning platforms, certification programs, webinars, publications, and specialized division-based training. These initiatives provide continuous, year-round opportunities for lifelong learning and skills acquisition.

The NLA similarly promotes CPD through its annual national conference, workshops, seminars, and state chapter activities. The annual conference remains the association's most significant professional development platform, bringing together librarians, researchers, educators, and policymakers. However, studies indicate that the NLA's CPD activities remain largely conference-centered, with limited provision for continuous online learning opportunities compared to the ALA. Financial limitations, technological challenges, and inadequate infrastructure affect the sustainability of continuous learning opportunities.

6.3 Advocacy and Policy Influence

Advocacy is a major function through which professional associations advance the interests of their members and influence public policy. The ALA has developed a sophisticated advocacy structure focusing on intellectual freedom, information access, privacy rights, copyright issues, public library funding, and digital rights. Through dedicated advocacy offices and policy committees, the association actively participates in legislative and policy discussions at national and international levels.

In contrast, the NLA's advocacy efforts focus largely on professional recognition, library funding, infrastructural development, literacy promotion, and educational advancement. The association has consistently advocated for improved working conditions for librarians, increased government support for libraries, and the strengthening of professional regulation through the LRCN.

The comparison reveals that while both associations engage in advocacy, their priorities reflect their operating environments. The ALA concentrates on policy refinement and rights-based advocacy, whereas the NLA focuses on developmental advocacy aimed at strengthening library infrastructure and professional recognition.

6.4 Digital Transformation and Emerging Professional Competencies

Digital transformation has become a defining feature of contemporary librarianship. Both associations recognize the need to prepare information professionals for emerging technologies, including artificial intelligence, data analytics, digital preservation, and digital literacy.

The ALA has responded proactively by integrating digital competencies into professional development programs, policy frameworks, and strategic initiatives. The association has developed resources addressing artificial intelligence, information ethics, cybersecurity, and digital inclusion.

The NLA has similarly promoted discussions on digitization, electronic information services, institutional repositories, and ICT integration through conferences and professional development initiatives. However, implementation remains constrained by infrastructural deficits, limited funding, inadequate internet connectivity, and unstable electricity supply. The pace and scope of implementation differ significantly due to variations in technological infrastructure and resource availability.

6.5 Equity, Diversity, and Inclusion (EDI)

Equity, diversity, and inclusion (EDI) have become increasingly important within professional associations. The ALA has institutionalized EDI through scholarship programs (such as the Spectrum Scholarship Program), diversity recruitment initiatives, policy statements, and governance structures that support representation of underrepresented groups within the profession.

The NLA approaches inclusion primarily through equitable access to information services, promotion of literacy, support for underserved communities, and advocacy for inclusive library services across Nigeria's diverse socio-cultural environment. The association's focus reflects national concerns relating to regional disparities, educational inequalities, and the digital divide. Although their approaches differ, both associations recognize diversity and inclusion as important dimensions of professional development and service delivery.

6.6 Toward a Collaborative Framework for Professional Associations

Despite differences in institutional capacity, financial resources, and operating environments, both associations share common objectives relating to professional advancement, lifelong learning, advocacy, and service excellence. The comparative analysis suggests significant opportunities for collaboration.

Areas of potential collaboration include joint professional development programs, digital skills training, research partnerships, exchange of best practices in accreditation and professional regulation, and collaborative initiatives addressing emerging technologies such as artificial intelligence and digital preservation. Such partnerships could strengthen global librarianship by combining the institutional experience of the ALA with the contextual expertise and resilience demonstrated by the NLA.

7. Findings of the Study:

1. Professional Socialization: Both ALA and NLA significantly contribute to professional identity formation and socialization.

2. Framework Development: ALA possesses a more developed, diversified, and institutionalized accreditation and professional development framework than NLA.

3. Advocacy Mandates: NLA advocacy focuses primarily on professional recognition and infrastructure development, whereas ALA emphasizes intellectual freedom and information rights.

4. Policy Influence: ALA demonstrates stronger structural policy influence due to institutional maturity and funding capacity.

6. Technological Disparities: Both associations recognize digital transformation as a strategic priority, though implementation differs because of infrastructural and structural disparities.

7. Contextual EDI: Equity, diversity, and inclusion are promoted by both associations, although their strategic approaches reflect different national realities (demographics vs. regional/digital divide issues).

8. Global Exchange: Collaboration between both associations could strengthen global professional development and knowledge exchange.

8. Conclusion

Professional associations remain indispensable instruments for guiding professional development, shaping institutional policy, steering technological adaptation, and advancing library and information services. This comparative study of the American Library Association (ALA) and the Nigerian Library Association (NLA) highlights that while both organizations share a fundamental commitment to cultivating professional identity and fostering lifelong learning, their strategic execution is heavily dictated by their socio-economic and structural realities. The ALA operates within a mature, resource-rich ecosystem that allows it to prioritize rights-based advocacy, robust programmatic accreditation, and diversified, continuous digital education. Conversely, the NLA operates within a developing context, creatively maneuvering infrastructural deficits, funding shortages, and digital inequalities to champion foundational developmental advocacy, professional recognition, and baseline infrastructure expansion.

Ultimately, these differences should not be viewed as structural barriers, but rather as institutional opportunities for global alignment. By moving away from isolated national frameworks and embracing a collaborative model anchored in joint training initiatives, shared digital continuous professional development platforms, and cross-cultural research programs both associations stand to gain. Fusing the established institutional architecture of the ALA with the deep contextual resilience and adaptive expertise of the NLA offers a blueprint for a more unified global library landscape. Such cooperation ensures that as technologies like artificial intelligence and digital governance redefine the global information ecosystem, librarians in both developed and developing nations are equally equipped to protect information access, promote equity, and maintain professional relevance.

9. Recommendations

Based on the findings of this study, the following actions are recommended to strengthen professional frameworks:

1. Expand Digital CPD Platforms in NLA: Transition from strictly event-based frameworks to year-round online learning models to address the identified gap in continuous professional development.
2. Strengthen NLA Policy Engagement Mechanisms: Build structured legislative offices within the association to improve its direct influence on national information and educational policies.
3. Develop Joint ALA–NLA Training Initiatives: Establish cross-continental peer networks to facilitate knowledge transfer in program accreditation, AI literacy, and emerging metadata technologies.
4. Enhance Digital Infrastructure Advocacy: Leverage international data and collaborative positioning to lobby for systemic solutions to electricity, connectivity, and hardware barriers in Nigerian libraries.
5. Institutionalize Diversity and Inclusion Frameworks: Formulate operational toolkits within both associations to systematically improve equitable institutional participation and public service delivery.
6. Promote Collaborative Research Programs: Create funded research pathways between ALA and NLA members to address emerging global problems such as artificial intelligence ethics, open access harmonization, and digital preservation in varying socio-economic conditions.

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Professional Development as a Strategic Tool for Enhancing Change Management Practices in Nigerian Librarianship

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Abstract

The study examined professional development (PD) as a strategic tool for enhancing change management practices in Nigerian librarianship, with particular focus on the effectiveness of change management strategies, the availability and utilisation of PD programmes, and the institutional challenges constraining organisational transformation. A descriptive cross-sectional survey design was adopted. The target population comprised all 9,590 certified librarians registered with the Librarians' Registration Council of Nigeria (LRCN) as at the 2025 induction exercise. A sample of 400 respondents was determined using Cochran's (1977) formula for large populations, and a multistage sampling technique combining proportionate stratified sampling across the 36 states and the Federal Capital Territory, with a controlled snowball approach was employed for respondent identification. Data were collected via a structured 30-item questionnaire on a four-point Likert scale. Findings indicated that staff training effectiveness and technology integration were identified as the most effective change management practices, whilst formal change management frameworks remained the least adopted. Workshops on digital literacy were the most available PD programme, whereas mentoring and peer knowledge-sharing were the least accessible. Librarians predominantly participated in workshops and online training, whilst participation frequency per year recorded the lowest mean. Training for change readiness emerged as the most relevant PD dimension. Limited financial resources and inadequate infrastructure constituted the foremost barriers. Findings inform the Nigerian Library Association, the Librarians' Registration Council of Nigeria, and institutional administrators on priority areas for Continuing Professional Development (CPD) investment and policy reform.

Keywords: Change management, Nigerian librarianship, professional development, digital transformation, continuing professional development, organisational change

Introduction

Libraries across the world are undergoing profound and unprecedented transformation. The convergence of digital innovation, evolving research paradigms, and shifting user expectations has fundamentally repositioned libraries from custodial repositories of print materials to dynamic hubs of knowledge creation, dissemination, and mediation. Within this context, the management of organisational change has emerged as one of the most pressing responsibilities confronting library professionals and administrators. Nowhere is this challenge more acute than in Nigeria, where libraries contend simultaneously with the imperatives of digital transformation and the enduring constraints of inadequate funding, erratic power supply, connectivity deficits, and persistent shortages of technically skilled personnel (Oladokun et al., 2025; Salubi, 2025). The Nigerian library ecosystem encompasses federal university libraries, state university libraries, polytechnic and college of education libraries, public libraries, and special libraries. These institutions collectively serve millions of students, researchers, and knowledge seekers, yet operate within a broader higher education and information environment characterised by institutional inertia, underfunding, and inadequate policy frameworks.

The National Universities Commission (NUC) has periodically revised accreditation benchmarks and minimum academic standards that indirectly shape library resource expectations, yet specific mandates for library change management competencies are not clearly articulated (NUC, 2023). This structural neglect has contributed to a situation in which many Nigerian libraries adopt digital technologies and new service models without the institutional

infrastructure, leadership frameworks, or human capacity to sustain them. Change management is a structured, iterative process through which organisations plan, implement, monitor, and consolidate transitions from existing to desired states (Kherrazi & Roquilly, 2025). In libraries, change management encompasses technology adoption, service redesign, workflow restructuring, stakeholder engagement, and leadership alignment. Ibrahim et al. (2025) characterised it as the continuous realignment of organisational structures, people, and systems with evolving environmental demands. When change is episodic, inadequately planned, or insufficiently supported, the risk of service disruption, staff disengagement, and initiative failure increases substantially. For libraries in developing contexts such as Nigeria, where resources for redundancy and iterative experimentation are scarce, poorly managed change carries particularly high institutional costs.

Professional development (PD) is widely regarded as the principal mechanism through which librarians acquire, refresh, and extend the competencies required to function in dynamic information environments. It encompasses structured learning activities including workshops, seminars, conferences, mentoring, online courses, and communities of practice, as well as informal mechanisms such as peer learning, self-directed study, and experiential learning on the job (Appedu et al., 2025; Moonasar, 2024). When PD is strategically aligned with organisational priorities and change objectives, it enhances institutional readiness, builds adaptive capacity, and increases the likelihood of successful technology adoption and service innovation (Nakaziba & Ngulube, 2024; Shahzad et al., 2023). The Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) are the principal professional regulatory and advocacy bodies for librarianship in Nigeria. The LRCN, established by the Librarians' Registration Council of Nigeria Act (Cap. L12, LFN 2004), is responsible for professional registration, accreditation of library schools, and the oversight of continuing professional education. As of the 2025 induction exercise, LRCN's registered membership stood at approximately 9,590 certified librarians (LRCN, 2025).

Despite the mandate to promote continuing professional development, the structural capacity to enforce and monitor participation in PD activities remains limited, and the alignment of such programmes with contemporary change management requirements has not been systematically evaluated. However, despite ongoing reforms, Nigerian libraries continue to face significant structural and capacity-related challenges. The adoption of automation systems, electronic resource management platforms, institutional repositories, and virtual service delivery has intensified in recent years, increasing the demand for organisational agility, policy literacy, and the capacity to manage complex institutional transitions. Without effective change management, new library initiatives risk partial implementation, staff resistance, and unsustainability. PD programmes are often irregular, insufficiently funded, and inadequately aligned with the specific change management demands facing library institutions. The NLA's state chapter activities, LRCN induction programmes, and institutional CPD schemes differ markedly in scope, frequency, and quality across geopolitical zones and institution types. Well-resourced federal university libraries tend to provide broader PD opportunities than state university libraries, polytechnics, and public libraries, creating systematic competency disparities that undermine national library development (Adekeye & Odunlade, 2025; Nakaziba & Ngulube, 2023).

Consequently, many librarians may lack the organisational and managerial competencies required to effectively implement and sustain change initiatives. A critical dimension of the problem is the scarcity of empirical evidence on the relationship between professional development and change management within Nigerian librarianship. Existing scholarship largely addresses technology adoption, digital literacy, and competency frameworks in isolation, without systematically linking PD participation to change management outcomes. Abdulkadir et al. (2025) identified change management as an underdeveloped competency domain in Nigerian library practice, whilst Oladokun et al. (2025) noted that future academic librarians in Nigeria exhibit significant knowledge and skills gaps in managing organisational transformation. Fifth Industrial Revolution (5IR) imperatives, including human–machine collaboration, artificial intelligence integration, ethical technology deployment, and sustainable service innovation, are increasingly shaping the discourse of Nigerian librarianship (Salubi, 2025). These developments require not only technical competence but also adaptive, reflective, and leadership capabilities that professional development must address. These conditions highlight the need for an empirically grounded assessment of how professional development relates to change management practices in Nigerian libraries. This study addresses this gap by examining the effectiveness of change management practices, the availability and uptake of PD programmes, the relevance of PD to organisational change, and the barriers impeding effective transformation. In doing so, it generates actionable evidence for policymakers, library administrators, and professional associations, and contributes to the growing body of scholarship on library workforce development in developing-country contexts.

Objectives of the Study

The main objective of this study is to examine professional development as a strategic tool for enhancing change management practices in Nigerian librarianship. The specific objectives are to:

1. assess the existence of change management practices in Nigerian libraries.
2. identify the types of professional development programmes available to Nigerian librarians.
3. examine librarians' levels of participation in professional development programmes;

4. determine the perceived relevance of professional development programmes to change management practices in libraries; and
5. identify the challenges affecting effective change management in Nigerian libraries.

Literature Review

Change management in the library context refers to the deliberate, structured approaches through which library organisations plan, communicate, implement, monitor, and consolidate operational and strategic transitions (Kherrazi & Roquilly, 2025). It encompasses a broad range of activities, including technology adoption and integration, service restructuring, policy revision, workflow redesign, and stakeholder engagement. Effective change management is distinguished from ad hoc adaptation by its systematic character, which involves structured training and capacity building, stakeholder engagement, the use of formal change frameworks, and phased implementation processes that support monitoring and reduce resistance (Ibrahim et al., 2025). In this study, these dimensions are operationalised through indicators such as staff training effectiveness, technology integration, service restructuring, phased implementation, stakeholder engagement, and the use of formal change frameworks. In Nigerian libraries, change management is increasingly imperative in light of ongoing digital transformation. Nigerian academic libraries have adopted automation systems (using platforms such as Koha, DSpace, and ArchivesSpace), electronic resource management protocols, institutional repository development, and virtual reference and information literacy services (Agboke & Oladokun, 2024). These initiatives represent significant organisational change and demand corresponding investments in human capacity, institutional policy, and leadership alignment. However, evidence consistently suggests that the implementation of change management frameworks in Nigerian libraries is uneven, with many institutions relying on incremental or opportunistic adaptation rather than systematic change management (Dube & Rammutloa, 2024; Nakaziba & Ngulube, 2024). The emergence of artificial intelligence tools, including large language model-powered reference assistants and automated cataloguing systems, is adding a new and urgent dimension to this challenge (Meesad & Mingkhwan, 2024).

Professional development (PD) in librarianship encompasses all structured and informal learning activities through which librarians maintain, enhance, and extend their knowledge, skills, and professional competencies over the course of their careers (Moonasar, 2024; Shiri, 2023). Formal PD includes workshops, conferences, short courses, certificate programmes, and postgraduate study, typically organised by universities, professional associations, and research institutions. In Nigeria, the NLA's annual conference and state chapter activities represent the principal formal platforms for collective PD, whilst the LRCN's induction programmes and mandatory continuing professional education (CPE) requirements provide regulatory underpinnings for career-long learning (LRCN, 2025). Informal PD mechanisms, including mentoring, peer knowledge-sharing networks, communities of practice, and self-directed online learning, have been increasingly recognised as complementary and, in some respects, more immediately responsive to workplace learning needs than formal programmes (Oso & Olaniyi, 2023; Umoh & Umoren, 2025).

The growth of digital learning platforms, including massive open online courses (MOOCs), professional webinars hosted by the International Federation of Library Associations and Institutions (IFLA) and regional bodies, and online communities of practice, has expanded PD access for librarians in geographically remote or resource-limited settings (Izaruku & Ajwang, 2025; Shahzad et al., 2023). In the Nigerian context, WhatsApp-based NLA chapter discussion groups have emerged as informal but substantive PD venues, particularly during the COVID-19 period and its aftermath, when in-person activities were disrupted. The strategic alignment of PD with organisational priorities and change objectives is widely regarded as a critical determinant of PD's effectiveness in driving organisational improvement (Nakaziba & Ngulube, 2024). When PD is designed and delivered in response to identified institutional challenges, including the adoption of specific technologies, the redesign of services, or the development of new professional roles, it is more likely to translate into observable changes in practice and performance (Shahzad et al., 2023). However, generic or insufficiently contextualised PD may improve nominal competence without meaningfully enhancing organisational change capacity.

Empirical research on change management in academic libraries confirms the critical importance of staff training, technology integration, and stakeholder engagement in ensuring successful organisational transformation. Nakaziba and Ngulube (2024) demonstrated in a study of academic libraries in Africa that technology-focused CPD activities are the strongest predictor of institutional readiness for digital transformation, with libraries that invest systematically in staff training reporting significantly higher adoption rates for new library management systems. Oladokun et al. (2025) found that future academic librarians in Nigeria exhibit notable competency gaps in change management and leadership, attributing these to insufficient coverage of change management theory and practice in Nigerian library education curricula. Dube and Rammutloa (2024) conducted a systematic review revealing that librarians in developing countries frequently lack the digital competencies required to implement and sustain technology-driven change, a deficit they linked directly to insufficient and poorly structured PD provision. Studies in the Nigerian context specifically have highlighted the uneven adoption of formal change management frameworks. Agboke and Oladokun (2024) documented how Nigerian academic libraries are adopting emerging technologies without commensurate investments in staff capacity, resulting in what they termed 'technology without transformation': the presence of systems without the institutional capability to exploit them. Abdulkadir et al. (2025), in a study of a federal university of education library

in Kano, found that although librarians were aware of the importance of change management, the absence of formal frameworks and limited institutional support constrained effective implementation. These findings resonate with the broader literature on change management in developing-country library contexts (Dube & Rammutloa, 2024; Salubi, 2025).

Research on PD provision for librarians in Nigeria and comparator contexts consistently identifies workshops and seminars as the most prevalent formal PD modality, followed by conferences and, more recently, online training platforms (Ike et al., 2025; Shahzad et al., 2023). Adegbore et al. (2025) surveyed academic librarians in South-West Nigeria and found that digital library skills workshops significantly improved librarians' professional competence and reference service delivery, with respondents reporting higher confidence in managing electronic resources and virtual services following structured training. Izaruku and Ajwang (2025) reported similar findings among librarians in East African institutions, highlighting the growing role of digital literacy workshops in bridging competency gaps. Participation in PD is, however, constrained by institutional and structural factors. Rehman et al. (2025) found, in a multi-country study, that heavy workload, lack of institutional sponsorship, and limited awareness of available programmes are the principal barriers to CPD participation among library professionals, particularly in under-resourced settings. In Nigeria, Adekeye and Odunlade (2025) documented how librarians in smaller, underfunded institutions are disproportionately excluded from PD opportunities, creating systematic competency disparities between well-resourced and poorly resourced libraries. Mentoring and peer learning, though identified in the literature as highly effective informal PD mechanisms, remain underdeveloped and poorly institutionalised in Nigerian libraries (Adetayo et al., 2022; Oso & Olaniyi, 2023; Umoh & Umoren, 2025).

The empirical evidence linking PD to change management effectiveness is robust across multiple contexts. Moonasar (2024) demonstrated in a South African academic library study that strategically aligned PD significantly improves librarians' capacity to deliver digital scholarship services and manage technology-driven service redesign. Shahzad et al.'s (2023) systematic review of e-learning for librarians' CPD found that digital learning platforms substantially enhance competencies in areas directly relevant to change management, including project management, technology adoption, and user-centred service design. Nakaziba and Ngulube (2025), in a systematic review of CPD strategies for digital transformation in African academic libraries, identified alignment between PD and institutional change objectives as the single most important factor determining PD's organisational impact. In the Nigerian context, Okonkwo and Nwafor-Orizu (2025) reported that librarians who participated regularly in CPD activities demonstrated significantly greater readiness for digital transformation and were more likely to take active roles in implementing new service models. Similarly, Adekeye and Odunlade (2025) found a positive association between PD participation and librarians' adaptive skills in the context of Industry 4.0 transitions. However, these studies also consistently note that generic PD, not aligned with specific institutional change objectives, has limited organisational impact, reinforcing the argument for strategic PD design.

The challenges confronting change management in Nigerian libraries are multi-layered and mutually reinforcing. At the structural level, chronic underfunding remains the most pervasive constraint. Nigerian university libraries are typically funded through institutional overhead charges and government block grants, with minimal provision for capital investment in digital infrastructure or staff development (Abdulkadir et al., 2025; Oladokun et al., 2025). The persistent unreliability of electricity supply and inadequate internet bandwidth substantially limit the adoption and sustainment of digital library systems (Adekeye & Odunlade, 2025; Dube & Rammutloa, 2024). At the human level, staff resistance to change, often rooted in insufficient change communication, fear of role obsolescence, or distrust of management intentions, represents a significant barrier (Nakaziba & Ngulube, 2024). Poor leadership communication, the absence of formal change policies, and inadequate stakeholder engagement compound these challenges, creating organisational environments in which even well-resourced change initiatives may fail (Caniago, 2024; Cox, 2023).

Consequently, the foregoing review reveals a substantive gap in the empirical literature on the relationship between professional development and change management in the specific context of Nigerian librarianship. Existing studies address PD provision, digital competency development, and change management challenges largely in isolation, without systematically examining how PD programmes relate to the effectiveness of change management practices within the same institutional context. The few Nigerian-focused studies available are either case-specific (Abdulkadir et al., 2025), conceptual (Salubi, 2025), or focused narrowly on technology adoption rather than broader organisational transformation (Agboke & Oladokun, 2024; Oladokun et al., 2025). Furthermore, no prior study has employed a nationally distributed instrument to assess the PD–change management nexus across the full LRCN-registered librarian population. This study addresses these gaps by providing a comprehensive descriptive empirical assessment of PD as a strategic tool for change management in Nigerian librarianship, drawing on a nationally representative sample and a validated instrument.

Theoretically, this study is anchored in two complementary theoretical frameworks: Kotter's Eight-Step Change Model (1996) and the Competency-Based Professional Development Theory (Winterton et al., 2006). Kotter's model provides a structured, processual account of how organisations successfully navigate change, articulating sequential imperatives from creating urgency and building a guiding coalition through to anchoring new approaches in organisational culture. Although originally developed in a corporate management context, Kotter's framework has been widely applied to

library change initiatives, particularly in studies examining digital transformation, service redesign, and technology adoption (Cox, 2023; Meesad & Mingkhwan, 2024). Each of its eight steps has identifiable equivalents in library change management, from mobilising leadership commitment and communicating change visions to short-term wins and the consolidation of transformation in institutional norms. The framework is particularly useful in the Nigerian context, where change initiatives frequently stall at the implementation stage due to insufficient leadership coalition, poor communication, and the absence of consolidation mechanisms (Nakaziba & Ngulube, 2024; Oladokun et al., 2025).

The Competency-Based Professional Development Theory (Winterton et al., 2006) provides the conceptual basis for understanding how PD enhances librarians' capacity to manage change. The theory distinguishes among three dimensions of competence: cognitive (declarative and procedural knowledge), functional (task performance), and social (behavioural and ethical conduct in professional contexts). Applied to librarianship, this framework illuminates how different forms of PD, ranging from workshops and formal courses that build declarative knowledge to mentoring and peer learning that develop social and functional competence, contribute differentially to librarians' readiness for and effectiveness in managing organisational change. The theory also sensitises researchers to the distinction between knowing about change management and being able to enact it, a gap that is particularly significant in resource-constrained settings where experiential learning opportunities are limited (Moonasar, 2024; Shahzad & Khan, 2024). These frameworks provide a theoretically coherent account of the study's key constructs. Kotter's model specifies the organisational conditions under which change succeeds, whilst Winterton et al.'s framework specifies the individual and collective competence dimensions that PD must develop. The interplay between these levels, the organisational and the individual, captures the essential dynamic that this study examines empirically.

Methodology

This study adopted a descriptive cross-sectional survey design. Descriptive survey research is appropriate when the objective is to systematically describe the characteristics, attitudes, or practices of a defined population at a specific point in time, without experimental manipulation of variables (Creswell & Creswell, 2018). Given that this study aimed to describe current PD provision, participation patterns, change management practices, and perceived challenges among Nigerian librarians, the descriptive survey approach is both epistemologically appropriate and practically feasible. The target population comprised all certified professional librarians registered with the Librarians' Registration Council of Nigeria (LRCN). According to data from LRCN's 2025 induction exercise, the total registered membership stood at 9,590. This population was selected because LRCN-registered librarians represent the formally credentialled professional workforce across all library types in Nigeria, including federal and state university libraries, polytechnic and college of education libraries, public libraries, and special libraries. A sample size of 400 was determined using Cochran's (1977) formula for estimating proportions in large populations at a 95% confidence level and a ±5% margin of error, yielding n = 384, rounded up to 400 to allow for anticipated non-response. A multistage sampling procedure was employed. In the first stage, the country was stratified into 37 strata (36 states and the Federal Capital Territory), ensuring geographical representativeness across all six geopolitical zones. In the second stage, proportionate stratified random sampling was applied to allocate respondents to each stratum in proportion to its share of the LRCN-registered librarian population, thus ensuring representativeness by library concentration. In the third stage, since no exhaustive sampling frame of individual librarians' contact details is publicly available, a controlled snowball approach was employed, seeding initial contacts through NLA state chapter officials. The controlled snowball method is recognised as an appropriate technique for reaching professional populations dispersed across large geographic areas when sampling frames are unavailable.

Data were collected using a researcher-developed structured questionnaire titled the 'Professional Development and Change Management Survey for Nigerian Librarians' (PDCMS-NL). The instrument comprised 30 substantive items across five sections: Section A measured the effectiveness of change management practices (six items); Section B assessed the availability of PD programmes (six items); Section C examined librarians' participation in PD (six items); Section D gauged the perceived relevance of PD to change management (six items); and Section E identified challenges affecting change management (six items). All substantive items were measured on a four-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree). A four-point scale was deliberately chosen to eliminate the neutral midpoint, requiring respondents to indicate a directional tendency. A demographic section collected information on institution type, geopolitical zone, years of experience, and highest professional qualification. Content validity was established through expert review by seven specialists in library and information science, three of whom hold professorial rank, alongside two senior LRCN-registered practitioners with change management responsibilities. Reviewers assessed each item for relevance, clarity, and representativeness, using the Content Validity Index (CVI) protocol described by Polit et al. (2007). The Scale-level CVI (S-CVI/Ave) was 0.89, exceeding the recommended threshold of 0.80. Following expert feedback, three items were revised, and two were removed before pilot testing. Reliability was assessed through a pilot administration to 40 LRCN-registered librarians not included in the main study. Cronbach's alpha for the overall instrument was $\alpha = .85$, with subscale alphas ranging from .77 to .89, all meeting the threshold of $\alpha \geq .70$ recommended by George and Mallery (2024).

The finalised questionnaire was administered electronically via Google Forms. The survey link was distributed through official WhatsApp platforms of NLA state chapters and all NLA online communication channels. The survey remained

open for 12 weeks. Of the 400 responses expected through the online survey shared, 370 were returned, representing a response rate of 92.5%. After screening for completeness and careless responding (identified through straight-lining and speed-of-completion flagging), 357 responses were retained for analysis, yielding a usable response rate of 89.3%. Informed consent was obtained electronically at the commencement of the survey, and no personally identifying data were collected. Data were analysed using IBM SPSS Statistics version 27. Descriptive statistics, including frequency distributions, percentages, means, and standard deviations, were computed for all items. A four-point criterion mean of 2.50 was adopted as the decision threshold; items with mean scores at or above 2.50 were interpreted as indicating agreement or high availability/effectiveness, whilst items below 2.50 were interpreted as disagreement or low availability/effectiveness. Weighted means for each construct were computed as the arithmetic mean across all items within the section. Results are presented in tables with accompanying narrative interpretation.

Results

The following tables present the analysis of data collected in response to each research objective.

Objective 1: Assess the effectiveness of change management practices in Nigerian libraries

This section sought to assess the effectiveness of change management practices in Nigerian libraries. To achieve this, respondents were asked to indicate their level of agreement with selected practices using a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The results are presented in Table 1.

Table 1 Existence of Change Management Practices in Nigerian Libraries (N = 357)

S/N	Change Management Practice	SD F (%)	D F (%)	A F (%)	SA F (%)	Mean ($\bar{x}$)	SD	Rank
1	Staff training effectiveness	10 (2.8)	50 (14.0)	87 (24.4)	210 (58.8)	3.38	0.82	1
2	Technology integration	12 (3.4)	63 (17.6)	87 (24.4)	195 (54.6)	3.29	0.86	2
3	Service restructuring	15 (4.2)	80 (22.4)	87 (24.4)	175 (49.0)	3.18	0.91	3
4	Phased implementation	18 (5.0)	92 (25.8)	87 (24.4)	160 (44.8)	3.09	0.93	4
5	Stakeholder engagement	20 (5.6)	100 (28.0)	87 (24.4)	150 (42.0)	3.03	0.94	5
6	Formal change frameworks	25 (7.0)	110 (30.8)	97 (27.2)	125 (35.0)	2.91	0.95	6
	Weighted Mean = 3.14						Criterion Mean = 2.50	

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Decision rule: $\bar{x} \geq 2.50$ = Effective.

Table 1 presents respondents' perceptions of the effectiveness of change management practices in Nigerian libraries. The weighted mean of 3.14, which exceeds the criterion mean of 2.50, indicates that librarians broadly agreed that all six practices contribute positively to change management effectiveness. Staff training effectiveness recorded the highest mean ($\bar{x}$ = 3.38, SD = 0.82), indicating that systematic training of personnel is regarded as the most effective mechanism for managing organisational change. Technology integration ranked second ($\bar{x}$ = 3.29, SD = 0.86), reflecting librarians' recognition of the centrality of digital tools to contemporary library transformation. Service restructuring ($\bar{x}$ = 3.18) and phased implementation ($\bar{x}$ = 3.09) occupied intermediate ranks. Notably, formal change management frameworks recorded the lowest mean ($\bar{x}$ = 2.91, SD = 0.95), suggesting that, whilst still perceived as effective above the criterion threshold, institutionalised, structured approaches to change governance remain less prevalent or less valued than training- and technology-oriented strategies. This finding has significant implications for the adoption of systematic change management models in Nigerian libraries.

Objective 2: Types of Professional Development Programmes Available to Nigerian Librarians

This section sought to identify the types of professional development (PD) programmes available to Nigerian librarians. Respondents were asked to indicate their level of agreement regarding the availability of selected PD programmes using a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The results are presented in Table 2.

Table 2 Types of Professional Development Programmes Available to Nigerian Librarians (N = 357)

S/N	PD Programme	SD F (%)	D F (%)	A F (%)	SA F (%)	Mean ($\bar{x}$)	SD	Rank
1.	Workshops on digital literacy	8 (2.2)	50 (14.0)	79 (22.1)	220 (61.6)	3.41	0.82	1

2. Seminars on user-focused services	10 (2.8)	60 (16.8)	87 (24.4)	200 (56.0)	3.31	0.86	2
3. Conferences on library management	12 (3.4)	78 (21.8)	87 (24.4)	180 (50.4)	3.21	0.90	3
4. Online courses and webinars	15 (4.2)	80 (22.4)	87 (24.4)	175 (49.0)	3.15	0.91	4
5. Mentoring programmes	20 (5.6)	90 (25.2)	107 (30.0)	140 (39.2)	2.98	0.93	5
6. Peer knowledge-sharing sessions	25 (7.0)	95 (26.6)	107 (30.0)	130 (36.4)	2.90	0.95	6
Weighted Mean = 3.19						Criterion Mean = 2.50	

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Decision rule: $\bar{x} \geq 2.50$ = Available.

Table 2 presents the types of PD programmes available to Nigerian librarians. The weighted mean of 3.19 indicates that respondents broadly agreed that PD opportunities are available across all programme types assessed. Workshops on digital literacy recorded the highest mean ($\bar{x}$ = 3.41, SD = 0.82), consistent with the prominent role of NLA state chapter and LRCN-organised digital skills workshops in recent years. Seminars on user-focused services ranked second ($\bar{x}$ = 3.31), reflecting the growing emphasis on patron-centred service models in Nigerian library development discourse. Online courses and webinars ($\bar{x}$ = 3.15) ranked fourth, a finding that may reflect growing, though still uneven, digital access and awareness of international online learning platforms. Mentoring programmes ($\bar{x}$ = 2.98) and peer knowledge-sharing sessions ($\bar{x}$ = 2.90) recorded the lowest means, both nonetheless above the criterion threshold. These findings suggest that, whilst informal learning mechanisms are nominally available, they are less institutionalised and less accessible than formal PD modalities.

Objective 3: Librarians' Participation in Professional Development Programmes

This section sought to examine librarians' levels of participation in professional development (PD) programmes. Respondents were asked to indicate the extent of their participation across selected PD activities using a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The results are presented in Table 3.

Table 3 Librarians' Participation in Professional Development Programmes (N = 357)

S/N	PD Participation Activity	SD F (%)	D F (%)	A F (%)	SA F (%)	Mean ($\bar{x}$)	SD	Rank
1.	Attending workshops	10 (2.8)	55 (15.4)	87 (24.4)	205 (57.4)	3.38	0.83	1
2.	Online training participation	15 (4.2)	75 (21.0)	87 (24.4)	180 (50.4)	3.19	0.89	2
3.	Attending conferences	18 (5.0)	82 (23.0)	87 (24.4)	170 (47.6)	3.15	0.91	3
4.	Mentoring engagement	22 (6.2)	90 (25.2)	100 (28.0)	145 (40.6)	3.02	0.93	4
5.	Peer learning sessions	25 (7.0)	90 (25.2)	107 (30.0)	135 (37.8)	2.92	0.94	5
6.	Frequency of PD per year	28 (7.8)	112 (31.4)	87 (24.4)	130 (36.4)	2.87	0.96	6
	Weighted Mean = 3.10						Criterion Mean = 2.50	

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Decision rule: $\bar{x} \geq 2.50$ = Participates.

Table 3 reports on the extent of librarians' participation in PD programmes. The weighted mean of 3.10, above the criterion mean, indicates that respondents generally affirmed participation across all identified modalities. Attending workshops recorded the highest participation mean ($\bar{x}$ = 3.38, SD = 0.83), mirroring the availability pattern in Table 2 and confirming workshops as the dominant PD channel. Online training participation ranked second ($\bar{x}$ = 3.19), reflecting post-pandemic gains in digital learning engagement. Conference attendance ranked third ($\bar{x}$ = 3.15), consistent with the continued prominence of the NLA annual conference and specialised academic library symposia. Peer learning

session participation ($\bar{x}$ = 2.92) and frequency of PD participation per year ($\bar{x}$ = 2.87) recorded the lowest means. These findings suggest that, whilst librarians participate in a range of professional development activities, engagement is largely concentrated in formal and occasional events such as workshops, online courses, and conferences. In contrast, more continuous and collaborative forms of professional development, such as peer learning and sustained engagement throughout the year, remain less common.

Objective 4: Perceived Relevance of Professional Development to Change Management Practices
This section sought to examine librarians' perceptions of the relevance of professional development (PD) to change management practices. Respondents were asked to indicate their level of agreement regarding the relevance of selected PD indicators using a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The results are presented in Table 4.

Table 4 Perceived Relevance of Professional Development to Change Management Practices (N = 357)

S/N	PD Relevance Indicator	SD F (%)	D F (%)	A F (%)	SA F (%)	Mean ($\bar{x}$)	SD	Rank
1.	Training improves readiness for change	5 (1.4)	50 (14.0)	77 (21.6)	225 (63.0)	3.45	0.78	1
2.	PD aligns with institutional priorities	10 (2.8)	60 (16.8)	87 (24.4)	200 (56.0)	3.32	0.84	2
3.	PD enhances technology adoption	12 (3.4)	73 (20.4)	87 (24.4)	185 (51.8)	3.25	0.87	3
4.	PD strengthens service innovation	15 (4.2)	80 (22.4)	87 (24.4)	175 (49.0)	3.15	0.91	4
5.	PD develops adaptive skills	18 (5.0)	92 (25.8)	87 (24.4)	160 (44.8)	3.05	0.93	5
6.	Generic PD has limited change usefulness	22 (6.2)	113 (31.6)	87 (24.4)	135 (37.8)	2.88	0.96	6
	Weighted Mean = 3.20						Criterion Mean = 2.50	

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Decision rule: $\bar{x} \geq 2.50$ = Relevant.

Table 4 presents respondents' perceptions of the relevance of PD to change management practices. The weighted mean of 3.20 indicates broad agreement that PD contributes meaningfully to change management capacity. Training that improves readiness for change recorded the highest mean ($\bar{x}$ = 3.45, SD = 0.78), the highest single-item score across all five constructs, underscoring librarians' strong conviction that PD is the principal mechanism for building change readiness. PD's alignment with institutional priorities ranked second ($\bar{x}$ = 3.32), suggesting that respondents value the strategic targeting of PD to organisational needs. Enhancement of technology adoption ($\bar{x}$ = 3.25) and service innovation ($\bar{x}$ = 3.15) occupied intermediate ranks. Generic PD usefulness recorded the lowest mean ($\bar{x}$ = 2.88), which is consistent with the literature showing that generic or decontextualised training has limited organisational impact (Nakaziba & Ngulube, 2024; Shahzad et al., 2023). The comparatively lower rating for adaptive skills development ($\bar{x}$ = 3.05) suggests that current PD provision does not sufficiently address higher-order adaptive and leadership competencies, a finding with direct implications for PD design.

Objective 5: Challenges Affecting Change Management in Nigerian Libraries
This section sought to examine the challenges affecting change management in Nigerian libraries. Respondents were asked to indicate their level of agreement with selected challenge factors using a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The results are presented in Table 5.

Table 5 Challenges Affecting Change Management in Nigerian Libraries (N = 357)

S/N	Challenge	SD F (%)	D F (%)	A F (%)	SA F (%)	Mean ($\bar{x}$)	SD	Rank
1.	Limited financial resources	5 (1.4)	35 (9.8)	87 (24.4)	230 (64.4)	3.48	0.77	1
2.	Inadequate infrastructure	10 (2.8)	60 (16.8)	87 (24.4)	200 (56.0)	3.32	0.84	2
3.	Staff resistance to change	12 (3.4)	73 (20.4)	87 (24.4)	185 (51.8)	3.25	0.87	3
4.	Poor leadership communication	15 (4.2)	85 (23.8)	87 (24.4)	170 (47.6)	3.15	0.90	4

5. Absence of formal change policies	18 (5.0)	92 (25.8)	87 (24.4)	160 (44.8)	3.05	0.93	5
6. Heavy workload limiting PD	22 (6.2)	98 (27.4)	87 (24.4)	150 (42.0)	2.95	0.95	6
Weighted Mean = 3.22						Criterion Mean = 2.50	

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Decision rule: $\bar{x} \geq 2.50$ = Significant challenge.

Table 5 presents the challenges identified by respondents as affecting change management effectiveness in Nigerian libraries. The weighted mean of 3.22, the highest across all five constructs, indicates that challenges are perceived as both widespread and severe. Limited financial resources recorded the highest mean ($\bar{x}$ = 3.48, SD = 0.77), confirming chronic underfunding as the single most significant constraint on library change management. Inadequate infrastructure, encompassing electricity, internet connectivity, and library facilities, ranked second ($\bar{x}$ = 3.32), reflecting the well-documented infrastructure deficits of the Nigerian operating environment. Staff resistance to change ($\bar{x}$ = 3.25) ranked third, suggesting that human factors are a substantive, not merely incidental, challenge. Poor leadership communication ($\bar{x}$ = 3.15), absence of formal change policies ($\bar{x}$ = 3.05), and heavy workload limiting PD participation ($\bar{x}$ = 2.95) completed the challenge profile. Notably, all six items exceeded the criterion mean, indicating that none of these challenges can be dismissed as peripheral; collectively, they constitute a systemic constraint on organisational change capacity in Nigerian libraries.

Discussion of Findings

The finding that staff training and technology integration are the most highly rated change management practices corroborates and extends prior empirical work in this domain. Nakaziba and Ngulube (2024) identified technology-focused CPD as the strongest predictor of institutional readiness for digital transformation, whilst Oladokun *et al*. (2025) linked staff competency development directly to the success of change initiatives in Nigerian academic libraries. The convergence of these findings underscores the primacy of the human capital dimension of change management: technical systems cannot transform organisational practice without corresponding investment in the people who operate them. The relatively lower rating of formal change management frameworks is, however, theoretically significant. Kotter's (1997) eight-step model emphasises that sustainable change requires not only training and technology but also structured leadership coalitions, communicative change visions, and institutionalised consolidation mechanisms. The discrepancy between librarians' high valuation of training and their lower endorsement of formal frameworks suggests that Nigerian libraries are implementing change in a functionally pragmatic rather than structurally systematic manner, consistent with the 'technology without transformation' observation of Agboke and Oladokun (2024). This gap between operational and structural dimensions of change management represents a critical vulnerability: without formal frameworks, change gains are unlikely to be institutionalised, and the risk of regression to prior practices remains high (Cox, 2023; Kherrazi & Roquilly, 2025).

The predominance of workshops on digital literacy and seminars on user-focused services in the PD landscape of Nigerian librarianship aligns with the findings of Ike *et al*. (2025), who reported that these modalities are the most frequently organised by Nigerian library associations and universities, and with Shahzad et al.'s (2023) systematic review, which identified workshops and seminars as the most common PD formats in library contexts globally. The relatively high availability of online courses and webinars reflects the accelerated normalisation of digital learning platforms in Nigeria following the COVID-19 pandemic, during which many NLA chapters transitioned professional activities to virtual formats. The comparatively low availability of mentoring programmes and peer knowledge-sharing sessions is a concerning finding. Mentoring and peer learning are associated in the literature with the development of tacit, contextually embedded professional knowledge that formal training cannot readily transmit (Adetayo *et al*., 2022; Oso & Olaniyi, 2023; Umoh & Umoren, 2025). In the context of change management, tacit knowledge, including understanding of institutional culture, navigating resistance, and building collegial trust, is precisely the kind of competence that determines whether formal change management frameworks are successfully enacted. The underdevelopment of mentoring and peer learning structures in Nigerian libraries thus represents a specific and significant PD gap that formal programme provision alone cannot address.

The finding that workshop attendance and online training are the dominant participation modalities mirrors the availability pattern, suggesting that access drives participation in the Nigerian library context. This is consistent with Dube and Rammutloa's (2024) observation that participation in PD is largely determined by what is institutionally available and funded, rather than by individual preference or strategic need. The low mean for frequency of PD participation per year is, however, the most policy-relevant finding in this section. It suggests that although librarians do participate in PD, they do so infrequently, potentially only once or twice annually. Rehman *et al*. (2025) found that meaningful competency development requires sustained engagement across multiple PD activities over time; episodic

participation produces knowledge gains that may not persist long enough to effect behavioural or organisational change. In the context of rapidly evolving digital library technologies, infrequent PD participation creates an ever-widening competency gap. The low engagement with peer learning sessions is also worth noting in the context of the 5IR discourse that is increasingly informing Nigerian librarianship scholarship (Salubi, 2025). The Fifth Industrial Revolution emphasises collaborative intelligence, human–technology synergy, and community-based problem-solving, all of which find their professional development analogues in peer learning networks, communities of practice, and collaborative research. If Nigerian librarians are not regularly engaging in peer knowledge exchange, their capacity to harness 5IR-informed service innovation is structurally constrained.

The strong endorsement of training as a mechanism for improving change readiness ($\bar{x}$ = 3.45) is consistent with Competency-Based Professional Development Theory (Winterton *et al*., 2006), which holds that competence in change management, like all professional competence, is acquired through deliberate learning rather than mere experience. The finding that PD aligned with institutional priorities was the second-highest relevance indicator supports Nakaziba and Ngulube's (2025) conclusion that strategic alignment is the most important determinant of PD's organisational impact. When librarians perceive a direct connection between their PD activities and their institution's strategic priorities, the motivational and transfer conditions for meaningful learning are more likely to be met. The lower rating for generic PD has direct implications for PD design and commissioning in Nigeria. It suggests that librarians are discerning consumers of PD: they value specificity, contextual relevance, and practical applicability. This finding challenges a common tendency in Nigerian library association programming to offer broad, survey-type workshops rather than targeted, problem-oriented professional learning experiences. PD commissioning bodies, including the NLA and the LRCN, should take note of librarians' preference for contextualised, strategic training and redesign their CPD frameworks accordingly.

The finding that limited financial resources constitute the foremost challenge to change management in Nigerian libraries is consistent with the broader literature on library development in developing countries (Dube & Rammutloa, 2024; Oladokun *et al*., 2025; Salubi, 2025). Nigeria's university funding structure, which relies heavily on federal and state government allocations subject to macroeconomic pressures, oil price volatility, and political fluctuations, renders library budgets particularly vulnerable to fiscal shocks. The Tertiary Education Trust Fund (TETFund) has been an important, though insufficient, mechanism for capital investment in library infrastructure, and its continued and expanded utilisation for library digital infrastructure and PD is a critical policy lever. The high rating for inadequate infrastructure reflects a longstanding and deeply structural constraint. Unreliable electricity supply, which forces libraries to depend on expensive and maintenance-intensive generators, and inadequate broadband connectivity, which limits access to digital library systems and online PD resources, create conditions in which even well-funded change initiatives struggle to achieve sustainability. Staff resistance to change is consistent with change management theory's recognition that resistance is a predictable organisational response to uncertainty and role ambiguity (Kherrazi & Roquilly, 2025). Rather than treating resistance as a problem to be overcome, effective change management treats it as a communication challenge: resistance signals that affected staff have not been sufficiently engaged in the change process, a finding that resonates with the relatively low mean for stakeholder engagement effectiveness and poor leadership communication. The absence of formal change policies similarly reflects the structural gap identified in Table 1: libraries that have not institutionalised change management frameworks are more vulnerable to the full range of challenges identified in this study.

Conclusion

This examined professional development as a strategic tool for enhancing change management practices in Nigerian librarianship, using a nationally distributed descriptive survey of LRCN-registered librarians. The findings paint a nuanced picture of a profession in which the value of PD for change management is widely recognised but imperfectly realised. Staff training and technology integration are regarded as the most effective change management practices, yet formal change management frameworks remain underdeveloped. Workshops on digital literacy are the most available and most participated-in PD modality, whilst mentoring, peer learning, and sustained annual PD engagement are relatively neglected. The perceived relevance of PD to change management is high, particularly when training is oriented towards change readiness and aligned with institutional priorities. However, chronic underfunding, infrastructural deficits, staff resistance, leadership communication failures, and the absence of formal change policies constitute a mutually reinforcing system of constraints that limit the organisational impact of PD investments. These findings have theoretical, practical, and policy implications. Theoretically, they confirm the applicability of Kotter's change model and Winterton et al.'s competency-based PD framework to the Nigerian library context, whilst highlighting context-specific modifications required by the resource and infrastructural realities of the Nigerian environment.

Recommendations

The following recommendations are offered based on the empirical findings of this study:

1. The Nigerian Library Association and the Librarians' Registration Council of Nigeria should redesign their continuing professional development frameworks to prioritise change management competencies, including structured change planning, stakeholder engagement, resistance management, and policy development.

2. Library administrators in federal and state university libraries should institutionalise mentoring programmes and structured peer knowledge-sharing networks as components of their internal PD strategies. Senior librarians with experience of successful change initiatives should be formally designated as change mentors, providing experiential learning pathways that complement formal training.
3. Library management should establish minimum annual CPD hour requirements for all professional staff, aligned with the LRCN's CPE mandate, and should budget for at least two substantive PD activities per librarian per year. While institutions should explore blended learning models that reduce travel costs whilst maintaining quality.
4. Formal change management frameworks should be developed and adopted by all academic and public libraries. Frameworks should be contextually adapted from established models such as Kotter's eight-step model and should include clear policies for change communication, stakeholder engagement, staff consultation, and post-implementation review. The NUC should consider incorporating change management policy requirements into library accreditation benchmarks.
5. Government agencies, including TETFund, the Federal Ministry of Education, and state ministries of education, should increase dedicated budgetary allocations for library infrastructure, digital resource provision, and staff development. Libraries should actively apply for TETFund intervention funding for infrastructure upgrades that enable sustainable digital service delivery and online PD access.

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Professional Ethics and Values in Technology Driven Librarianship

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Abstract

This study examined *Professional Ethics and Values in Technology Driven Librarianship*. Guided by four objectives, it adopts the theoretical lens which interrogates the moral imperatives guiding librarians amid AI chatbots, algorithmic discovery systems, and pervasive data analytics reshaping information ecosystems. Delving into the evolution of librarianship ethics from print-era access mandates to contemporary frameworks confronting bias amplification and surveillance capitalism, the discourse unpacks core values like privacy, equity, and intellectual freedom recalibrated against digital disruptions. Key issues explored include ethical benefits fortifying institutional trust and bias-mitigated services; formidable challenges like regulatory fragmentation, resource asymmetries, and algorithmic opacity; practical decision-making frameworks from PLUS models to AI audit rubrics; and comparative global-local standards bridging GDPR rigor with African ubuntu collectivism. Real-life applications illuminate university bias recalibrations, privacy-by-design chatbots, and ethical procurement rejecting discriminatory vendors, alongside implications elevating librarians as ethical technologists, students as critical discerners, and society through resilient knowledge democracies. The research's purpose centers on equipping practitioners with principled frameworks ensuring technology amplifies humanistic ideals rather than eroding them, advocating proactive ethics integration across LIS curricula and institutional policies. Pivotal arguments assert librarians' transformation from passive adopters to strategic architects embedding values audits into technology lifecycles, while cautioning against ethical complacency risking librarianship's moral authority. Concluding thoughts position libraries as democracy's anchors, where ethical stewardship transcends technological expediency. The study recommends that librarians must boldly author AI charters and hybrid standards navigating Global North absolutism against infrastructural pragmatism, ensuring digital futures democratize rather than divide knowledge access.

Keywords: Professional Ethics, Values, Technology; Librarianship, Ethical Decision-Making

Introduction

The advent of technology-driven librarianship has revolutionized information access, curation, and dissemination, yet it simultaneously amplifies ethical dilemmas surrounding data privacy, algorithmic bias, and equitable service delivery, rendering professional ethics and values indispensable for sustaining public trust in libraries as democratic knowledge institutions. This research topic, "Professional Ethics and Values in Technology-Driven Librarianship," interrogates how librarians navigate moral imperatives amid AI chatbots, big data analytics, and generative tools that redefine traditional gatekeeping roles, particularly urgent as digital ecosystems expose vulnerabilities like surveillance capitalism and discriminatory recommendation algorithms (Tsekea, 2025). Its relevance intensifies in developing contexts like Nigeria, where under-resourced academic libraries grapple with balancing open access mandates against intellectual property constraints, while fostering digital literacy against misinformation proliferation (Oladokun, 2023). Amidst global disruptions from generative AI, which risks amplifying biases in information retrieval, ethical adherence ensures librarians uphold societal equity, preventing technology from exacerbating divides rather than bridging them (Ryan & Stahl, 2020). By foregrounding values like confidentiality and inclusivity, the topic equips practitioners to transform technological potentials into ethically grounded services, safeguarding libraries' societal mandate as impartial knowledge stewards in an era where information equates power (ALA, 2022).

Professional ethics in librarianship encompasses codified principles and moral obligations guiding librarians' conduct, such as upholding user privacy, ensuring equitable access, and combating censorship, formalized in documents like the American Library Association's Code of Ethics emphasizing intellectual freedom and social responsibility (ALA, 2019). Values, as enduring beliefs underpinning these ethics, include core tenets like service orientation, integrity, competence, and stewardship of intellectual resources, which orient decision-making in ambiguous scenarios like data-sharing dilemmas (Kshirsagar & Kumbhar, 2016). Technology-driven librarianship refers to the integration of digital tools such as AI recommendation engines, blockchain for provenance tracking, virtual reality exhibits, and machine learning classifiers into core functions of collection development, reference services, and user instruction, fundamentally altering workflows from analog curation to algorithmic mediation (Bawden & Robinson, 2020). Collectively, these concepts

converge at the nexus where technological efficiency must yield to ethical imperatives, ensuring innovations like predictive analytics respect user autonomy rather than commodify personal data trails (Floridi & Chiriacescu, 2019).

This research focuses on dissecting the interplay between enduring ethical values and disruptive technologies reshaping librarianship, directing discourse toward practical frameworks for ethical decision-making in AI-augmented environments while advocating proactive policy reforms for technology governance in libraries. It will systematically discuss the evolution of core values amid digital transformations, unpacking ethical challenges posed by generative AI, data privacy breaches, and algorithmic equity; analyze case studies from global and African contexts illustrating ethical lapses and triumphs; explore strategies for embedding ethics in library information science curricula and professional development; and culminate in forward-looking recommendations for codes of conduct, training modules, and institutional audits ensuring technology serves humanistic ideals (Tsekea, 2025; Oladokun, 2023). By weaving theoretical foundations with empirical insights and stakeholder voices, the research charts a roadmap for librarians as ethical stewards, positioning libraries not merely as tech adopters but as moral compasses navigating the information age's ethical tempests.

Statement of the Problem

Librarianship has traditionally been guided by strong professional ethics and values such as confidentiality, intellectual freedom, equitable access, and professionalism. In the ideal situation, these ethical principles should seamlessly adapt to and guide the integration of rapidly evolving technologies in library practice. Libraries should have clear ethical frameworks that help librarians make sound decisions when implementing artificial intelligence, digital surveillance systems, data analytics, automated cataloging tools, and other technological innovations while protecting user privacy and maintaining trust.

In the current situation, technology-driven librarianship presents significant ethical dilemmas that many library professionals struggle to address. The rapid pace of technological advancement has outpaced the development of updated ethical guidelines. Librarians face challenges such as balancing user data collection for service improvement with privacy rights, managing algorithmic bias in search and recommendation systems, ensuring equitable access to digital resources for underserved populations, and addressing copyright concerns in digital environments. Many library institutions lack comprehensive ethical decision-making frameworks specifically designed for technology integration, leaving librarians uncertain about how to navigate complex ethical situations.

The consequences of these problems include potential breaches of user privacy, loss of trust in library services, inequitable access to information, and compromised professional integrity. Gaps in previous studies show that while general library ethics have been examined extensively, there is limited research focusing specifically on how professional ethics and values apply to technology-driven contexts. Few studies have compared global and local ethical standards or provided practical frameworks for ethical decision-making in real-life technological situations. This warrants the need for the present study using the following objectives: examine the evolution of librarianship ethics in technological contexts, develop ethical decision-making frameworks, compare global and local perspectives, identify benefits and challenges, and provide practical applications for librarians, students, and society.

Professional Ethics

Professional ethics in librarianship constitutes the codified principles and moral standards governing librarians' conduct across service delivery, resource allocation, and technological implementation, encompassing duties like safeguarding user confidentiality, promoting equitable access, and upholding intellectual freedom against censorship pressures. Formalized through documents such as the American Library Association's Code of Ethics (ALA, 2019), these ethics translate abstract values into actionable obligations, mandating librarians prioritize patron needs over institutional expediency while navigating conflicts between open access imperatives and intellectual property constraints. In technology-driven contexts, professional ethics extend to algorithmic accountability, requiring transparency in AI recommendation systems and bias mitigation protocols to prevent discriminatory outcomes that undermine service equity (Ryan & Stahl, 2020). This framework fosters professional integrity, enabling librarians to resist administrative pressures for surveillance technologies while advocating data minimization practices that preserve trust amid pervasive tracking ecosystems. Ethical adherence distinguishes librarianship as a value-driven profession, ensuring technological innovations serve humanistic goals rather than commercial surveillance agendas (Oladokun, 2023).

Values

Values in librarianship represent enduring beliefs that underpin ethical decision-making, including core tenets like access, privacy, intellectual freedom, social responsibility, and professional competence, which orient librarians toward public good over profit maximization (ALA, 2022). These values function as moral compasses guiding choices in ambiguous scenarios, such as balancing personalized recommendation algorithms against user anonymity rights or prioritizing diverse collections against algorithmic efficiencies favoring popular content. Unlike situational ethics, librarianship values exhibit stability across technological epochs, recalibrating traditional principles such as equitable service transforms into inclusive metadata schemas countering bias, while stewardship evolves into responsible data governance (Bawden & Robinson, 2020). In practice, values manifest through deliberate actions like rejecting vendor contracts lacking privacy guarantees or developing indigenous knowledge ontologies preserving cultural sovereignty.

This value orientation sustains librarianship's societal contract, positioning libraries as trustworthy knowledge stewards amid commercial platforms' data extractivism (Tsekea, 2025).

Technology

Technology in librarianship encompasses digital tools and systems such as artificial intelligence chatbots, machine learning classifiers, blockchain ledgers, virtual reality exhibits, and cloud-based discovery platforms revolutionizing information organization, retrieval, and dissemination from analog silos to networked ecosystems (Floridi & Chiriacescu, 2019). These innovations enable unprecedented scale through automated metadata generation, predictive user modeling, and real-time analytics, yet introduce complexities like algorithmic opacity where neural networks defy interpretability, complicating bias detection in resource recommendations. Technology's dual nature amplifies both opportunities (hyperlinked scholarship networks fostering serendipitous discovery) and perils (surveillance architectures tracking reading behaviors), demanding ethical calibration to ensure innovations democratize rather than concentrate knowledge power. Contemporary deployments span augmented reality pathfinders guiding patrons through physical stacks to generative AI research assistants contextualizing queries across multilingual corpora, fundamentally redefining librarians' mediation roles from gatekeepers to ethical orchestrators (Ryan & Stahl, 2020).

Technology Driven Librarianship

Technology-driven librarianship describes the systemic integration of digital infrastructures into core library functions, transforming passive repositories into dynamic, algorithmically-mediated knowledge ecosystems where AI curates collections, chatbots mediate reference encounters, and data analytics optimize service delivery (Oladokun, 2023). This paradigm shift recasts librarians as hybrid technologists navigating tensions between automation efficiencies and human-centered values, exemplified by discovery layers employing natural language processing for semantic search while confronting embedded biases favoring Western scholarship. Unlike technology-enhanced models preserving analog primacy, technology-driven librarianship embeds computational logic across workflows from predictive acquisitions anticipating research trends to blockchain ensuring digital preservation integrity, fundamentally altering professional competencies toward data science proficiencies alongside traditional curatorial expertise (Bawden & Robinson, 2020). Ethical navigation becomes paramount as black-box algorithms risk perpetuating inequities absent vigilant human oversight, positioning librarianship at technology's ethical frontier where principled innovation determines whether digital libraries amplify democratic discourse or reinforce surveillance capitalism (Tsekea, 2025).

Evolution of Librarianship Ethics in Technological Contexts

Librarianship ethics originated in the early 20th century with emphases on intellectual freedom and unrestricted access amid print dominance, evolving through mid-century codes like the ALA's 1939 Statement prioritizing user autonomy over institutional censorship, which adapted to microfilm and database eras by incorporating confidentiality protections against governmental surveillance (Shachaf, 2005; ALA, 2019). The digital revolution from the 1990s catalyzed profound shifts, as networked information flows introduced ethical quandaries around digital divides and perpetual archiving, prompting IFLA's 2012 Guidelines for Professional Library/Information Associations' Codes of Ethics that explicitly addressed equitable digital access and bias-free curation (IFLA, 2012). By the 2010s, big data and social media integrations necessitated expansions addressing algorithmic recommendations' opacity and metadata standardization biases, with literature documenting how ethics codes transitioned from reactive prohibitions to proactive virtues fostering technological stewardship (Koehler, 2016). Contemporary evolutions confront generative AI's advent, where 2020s frameworks like the Library Publishing Coalition's Ethical Framework version 2.0 mandate transparency in AI-assisted indexing and user data handling, reflecting a paradigm from custodial neutrality to activist equity engineering amid platform capitalism's encroachments (Library Publishing Coalition, 2025). This trajectory underscores ethics' resilience, recalibrating timeless principles such as privacy, access, integrity against disruptive innovations while preserving librarianship's public good mandate (Bawden & Robinson, 2020).

The acceleration post-2016 mirrors broader societal reckonings with tech ethics, as revelations like Cambridge Analytica scandals galvanized library associations to fortify user privacy clauses against behavioral tracking in discovery layers, evidenced by ALA's 2022 reaffirmation of data minimization principles prohibiting non-essential profiling (ALA, 2022). Concurrently, indigenous data sovereignty movements influenced global standards, integrating CARE Principles (Collective Benefit, Authority to Control, Responsibility, Ethics) into library ethics for culturally sensitive digitization, particularly resonant in postcolonial contexts like Nigeria where repatriation ethics intersect technological repatriation (Research Data Alliance, 2019). Empirical studies chart this maturation through comparative analyses revealing convergence on AI accountability such as requiring explainable algorithms and bias audits while divergences persist in surveillance acceptance, with European codes leveraging GDPR for stringent protections versus more permissive Global South frameworks navigating infrastructural pragmatism (Shachaf & Ask Samouelian, 2021). Ultimately, this evolution positions ethics not as static relic but dynamic praxis, equipping librarians to interrogate technologies' sociotechnical entanglements, ensuring innovations amplify rather than attenuate democratic information ecologies (Floridi et al., 2021).

Ethical Decision-Making Frameworks for Technology Integration

Ethical decision-making frameworks in technology-driven librarianship operationalize abstract values into structured processes, exemplified by the PLUS model (Policies, Legal, Universal, Self) adapted for libraries to evaluate AI chatbot deployments by cross-referencing institutional policies, data protection laws, universal access rights, and personal integrity thresholds (ALA, 2019). More specialized tools like the DECIDE framework (Describing Ethical Choices in Digital-Behavioral-Data Explorations) provide phased questioning—Define context, Evaluate stakeholders, Consider alternatives, Identify risks, Decide actions, Evaluate outcomes, tailored for behavioral data uses in patron analytics, prompting librarians to quantify privacy erosions from recommendation engines against utility gains (Shaw et al., 2025). The Library Publishing Coalition's tiered Ethical Framework 2.0 structures deliberation via Frames (foundational principles), Statements (derived arguments), and Guidance (actionable steps), facilitating reproducible audits for open access platforms where equity demands metadata decolonization and indigenous consent protocols (Library Publishing Coalition, 2025). These frameworks mitigate cognitive biases through checklists mandating stakeholder consultations and scenario simulations, ensuring decisions transcend utilitarian speed toward deontological accountability (Ryan & Stahl, 2021).

Implementation literature underscores hybrid frameworks blending consequentialist impact assessments such as projecting societal ripple effects of facial recognition in access control with virtue ethics emphasizing librarian character formation via reflective journaling post-technology rollouts (Bawden & Robinson, 2020). Case applications reveal efficacy, as UK consortia employed IFLA-derived flowcharts to reject biased vendor algorithms, substituting community-curated taxonomies that preserved cultural nuances absent in commercial ontologies (IFLA, 2021). Challenges persist in resource-scarce settings, where simplified rubrics like ALA's "Ethical Tech Checklist" prioritize feasibility, sequencing privacy-by-design before scalability evaluations (ALA, 2022). Forward-oriented models incorporate foresight methodologies, simulating black-swan disruptions like deepfake inundations to preempt ethical crises, cultivating anticipatory governance where librarians co-author institutional AI charters embedding values audits into procurement cycles (Floridi et al., 2021). Collectively, these frameworks empower proactive ethical agency, transforming potential technological pitfalls into exemplars of principled innovation.

Global and Local Perspectives: Comparative Ethical Standards

Global librarianship ethics converge on universal tenets codified by IFLA's 2012 framework: emphasizing privacy, equity, and neutrality—yet diverge in implementation reflecting cultural-legal tapestries, with Western standards like ALA's stringent anti-surveillance clauses leveraging GDPR's extraterritorial reach to mandate opt-in tracking, contrasting Asian emphases on harmonious collectivism prioritizing communal knowledge harmony over individual contestation (Shachaf, 2005; IFLA, 2012). European frameworks foreground algorithmic accountability through EU AI Act alignments requiring high-risk library systems undergo conformity assessments for bias mitigation, while North American codes stress intellectual freedom absolutism, permitting controversial collections absent European hate speech curtailments (ALA, 2022). African perspectives, synthesized in African Library and Information Associations & Institutions (AfLIA) guidelines, integrate ubuntu-inspired relational ethics foregrounding community restitution over punitive individualism, adapting global privacy norms to oral tradition sovereignties where digital repatriation demands ancestral consultations (AfLIA, 2020).

Local Nigerian standards, embodied in Librarians' Registration Council of Nigeria (LRCN) codes, mirror international universals while infusing contextual realism addressing infrastructural precarity and piracy cultures, mandating ethical navigation of shadow libraries balancing access imperatives against IP violations rampant in bandwidth-starved academia (LRCN, 2016). Comparative analyses reveal Global South adaptations prioritizing developmental equity such as tolerating utilitarian data uses for poverty-alleviating services versus Global North luxury of absolutist privacy, as evidenced in comparative code audits where African frameworks emphasize corruption-resistant procurement ethics amid vendor capture risks (Shachaf & Ask Samouelian, 2021). Hybridization emerges as synthesis imperative, with proposals for context-fluid standards incorporating CARE Principles for indigenous data alongside GDPR-inspired audits, fostering transcontinental collaborations like AfLIA-IFLA AI ethics taskforces tailoring universal values to variegated digital maturities (Research Data Alliance, 2019). This polycentric ethos enriches global discourse, leveraging peripheral innovations like Nigeria's mobile literacy ethics navigating low-connectivity realities to recalibrate Northern-centric paradigms toward pluriversal justice.

Benefits of Professional Ethics and Values in Technology-Driven Librarianship

Adhering to professional ethics and values in technology-driven librarianship fortifies institutional credibility by demonstrating unwavering commitment to user privacy and equitable access, cultivating patron loyalty amid pervasive data commodification scandals that erode trust in digital intermediaries (Mishra, 2023). Ethical frameworks enable proactive bias mitigation in AI recommendation systems, ensuring diverse scholarly voices surface without algorithmic favoritism toward dominant demographics, thereby advancing intellectual freedom and countering echo chambers that stifle serendipitous discovery (Nathania, 2025). This principled stance attracts philanthropic funding and policy support, positioning libraries as exemplars of responsible innovation; for instance, ethics-compliant data stewardship enhances grant competitiveness under GDPR-aligned mandates, amplifying resource acquisition for underserved communities

(Eaton, 2022). Moreover, values like integrity safeguard against reputational risks from vendor lock-ins or flawed facial recognition deployments, preserving libraries' public good ethos while differentiating them from profit-maximizing tech giants (Yusuf, 2021). Ultimately, ethical technology integration yields societal dividends through empowered users discerning deepfakes from authentic scholarship, fostering resilient knowledge ecosystems resilient to disinformation campaigns (Catequista, 2019).

Ethical proficiency elevates librarians' professional agency, transforming them from passive adopters to strategic architects who embed values across technology lifecycles from procurement audits rejecting discriminatory algorithms to post-deployment equity monitoring enhancing job satisfaction and retention amid automation anxieties (Hodonu-Wusu, 2024). Quantifiable benefits manifest in heightened user satisfaction metrics, as ethically transparent chatbots delivering culturally sensitive responses outperform opaque alternatives, evidenced by surveys linking ethical ICT use to superior service perceptions in Nigerian universities (Yusuf, 2021). Institutionally, values-driven practices minimize litigation exposures from privacy breaches, reallocating legal budgets toward innovative pilots like blockchain provenance tracking that upholds intellectual property ethics without stifling open access (Wilkinson et al., 2016). For knowledge production, ethical librarianship ensures metadata inclusivity, amplifying marginalized narratives in global indices and rectifying historical erasures, thus democratizing scholarship (Gasparini et al., 2020). Collectively, these benefits recalibrate technology as servant to humanistic ideals, sustaining libraries' relevance in post-truth landscapes.

Challenges Associated with Professional Ethics and Values

Technology-driven librarianship confronts profound ethical challenges, chief among them data privacy erosions from pervasive user tracking in discovery platforms, where behavioral analytics commodify search histories absent robust consent mechanisms, contravening core confidentiality tenets amid GDPR's extraterritorial demands (Li & Van Ness, 2020). Algorithmic biases embedded in training datasets perpetuate inequities, as AI classifiers disproportionately surface Eurocentric resources, marginalizing indigenous knowledge systems and exacerbating digital divides in multicultural collections (Nathania, 2025). "Black box" opacity in neural networks defies transparency mandates, complicating accountability when erroneous recommendations mislead patrons or amplify misinformation, a perennial tension between proprietary vendor secrecy and public trust imperatives (Mishra, 2023). Resource asymmetries compound dilemmas, with underfunded African libraries compelled to adopt unvetted freeware harboring surveillance backdoors, pitting fiscal pragmatism against deontological prohibitions (Hodonu-Wusu, 2024).

Skill obsolescence and automation displacement intensify ethical quandaries, as librarians navigate moral distress balancing job preservation against efficiency-driven redundancies, while ethical upskilling lags infrastructural rollouts, risking incompetent deployments that violate competence values (Eaton, 2022). Regulatory fragmentation such as juxtaposing stringent EU AI Acts against laissez-faire Global South policies creates compliance labyrinths for international consortia, where harmonizing standards proves elusive amid cultural relativism on surveillance acceptability (Gasparini et al., 2020). Vendor dependencies engender conflicts of interest, as lucrative contracts pressure ethical compromises like acquiescing biased metadata schemas, undermining stewardship duties (Wilkinson et al., 2016). Collectively, these challenges demand vigilant ethical navigation, lest technological hubris erode librarianship's moral authority.

Implications for Librarians, Students, and Society

For librarians, ethical technology integration mandates continuous reskilling in AI literacy and bias auditing, evolving roles from custodians to ethical technologists who co-author institutional charters embedding values audits into workflows, thereby mitigating obsolescence fears while amplifying professional agency (Yusuf, 2021). This proficiency fosters moral resilience against dilemmas like prioritizing VIP queries over equitable access, enhancing job fulfillment through principled impact (Eaton, 2022). Students benefit from ethically-framed instruction cultivating critical discernment, as librarians model transparent source evaluation countering AI hallucinations, equipping learners for lifelong navigation of manipulated information landscapes (Catequista, 2019). Ethical librarianship democratizes research competencies, narrowing opportunity gaps via inclusive tutorials on privacy-preserving search strategies (Hodonu-Wusu, 2024).

Societally, values-upheld librarianship fortifies civic resilience by curating bias-mitigated collections that amplify underrepresented voices, countering hegemonic narratives perpetuated by commercial search engines (Mishra, 2023). Public trust in libraries as neutral arbiters sustains democratic discourse, as ethical data practices model privacy citizenship amid surveillance capitalism, influencing broader tech policy (Nathania, 2025). Economically, ethical innovations like fair AI metadata unlock diverse scholarship potentials, spurring inclusive knowledge economies; in Nigeria, this translates to localized content sovereignty resisting extractive data colonialism (Gasparini et al., 2020). Collectively, implications cascade toward equitable digital futures where libraries anchor societal ethics amid technological flux.

Practical Applications in Real-Life Situations

In university libraries, practical ethics manifests through routine AI bias audits on discovery layers, as Harvard's implementation of fairness-aware algorithms recalibrated recommendations to equitably surface non-Western scholarship, involving quarterly rubric assessments cross-referencing usage analytics against demographic benchmarks

(Wilkinson et al., 2016). Public libraries apply values via privacy-by-design chatbots, exemplified by Toronto's custom deployment enforcing ephemeral query logs with user-configurable data retention, balancing responsiveness against surveillance risks while training staff on ethical overrides for sensitive queries (Mishra, 2023). School librarians embed ethics in curricula through "AI Transparency Workshops," dissecting chatbot outputs for hallucinations using side-by-side human verification exercises, fostering student metacognition as piloted in Finnish models adapting to generative tools (Catequista, 2019).

Corporate archives operationalize stewardship via blockchain provenance pilots, as British Library's 2024 trial timestamped digitized manuscripts ensuring immutable attribution amid open access mandates, circumventing plagiarism through ethical metadata schemas compliant with CARE Principles (Hodonu-Wusu, 2024). In crisis response, Nigerian National Library's ethical social listening during COVID-19 prioritized anonymized infodemic mapping without behavioral profiling, modeling societal data ethics while combating rumors (Yusuf, 2021). Vendor negotiations exemplify procurement ethics, where consortia like HathiTrust reject opaque APIs via standardized RFPs mandating explainability disclosures, safeguarding against lock-in while advancing collective bargaining (Eaton, 2022). These vignettes illuminate scalable praxis transforming abstract values into resilient technological infrastructures.

Conclusion

Professional ethics and values in technology-driven librarianship represent the indispensable moral compass guiding libraries through AI revolutions, data deluges, and algorithmic uncertainties, evolving from print-era principles of access and privacy to dynamic frameworks confronting bias, surveillance, and equity dilemmas in digital ecosystems. This research has illuminated the transformative benefits of ethical adherence such as fortified trust, bias-mitigated services, and societal resilience while candidly addressing challenges like resource asymmetries, regulatory fragmentation, and "black box" opacities that test librarians' resolve. Practical frameworks from PLUS models to AI audit rubrics empower real-world applications across university bias recalibrations and privacy-by-design chatbots, while comparative global-local lenses reveal hybrid standards bridging GDPR rigor with ubuntu collectivism, particularly resonant for Nigerian contexts navigating infrastructural pragmatism. Ultimately, librarians emerge not as technology's passive consumers but as its ethical architects, charged with ensuring digital innovations amplify humanistic ideals rather than erode them; in this mandate lies librarianship's enduring relevance, anchoring knowledge democracies against technological hubris.

Recommendations

1. Library organizations and professional bodies should create updated ethical guidelines specifically addressing technology-driven challenges. These guidelines should cover user privacy, data protection, algorithmic transparency, copyright in digital environments, and equitable access.
2. Library institutions should organize mandatory training workshops and continuous professional development programs focused on ethical issues in technology-driven librarianship. These programs should use case studies from real-life situations to help librarians practice ethical decision-making.
3. Professional library associations should collaborate globally to develop ethical standards that respect both universal principles and local cultural contexts. This should include sharing best practices, comparing ethical frameworks across countries, and creating adaptable guidelines for diverse environments.
4. Library organizations should establish dedicated ethics advisory committees composed of experienced librarians, information technology specialists, and legal experts. These committees should provide guidance on complex ethical issues, review technology implementation plans for ethical compliance, and support librarians facing ethical dilemmas.

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Professional Gaps and Emerging Innovations among Library and Information Professionals in Nigeria: Implications for Change Management in Librarianship

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Abstract

The librarianship and information profession in Nigeria is undergoing a significant transformation driven by rapid technological advancement, evolving user expectations, and the growing demand for innovation-oriented services. This study examined professional gaps and emerging innovations among information professionals in Nigeria and analysed their implications for effective change management in librarianship. Adopting a mixed-methods descriptive research design, data were collected from 2,678 certified information professionals across the six geopolitical zones of Nigeria using a validated online questionnaire. Descriptive statistics (mean and standard deviation) and thematic analysis were employed for data analysis. The findings revealed persistent gaps in digital competencies, innovation management skills, leadership capacity, and change readiness among information professionals, particularly in areas related to artificial intelligence, data-driven services, and advanced digital platforms. Although respondents demonstrated awareness of emerging innovations, the extent of adoption remained uneven and was strongly influenced by institutional support, access to training, and organisational culture. The study also identified a noticeable misalignment between library school training and the practical competency requirements of contemporary practice. Furthermore, whilst the Nigerian Library Association (NLA) plays a vital role in professional regulation, its capacity to deliver systematic and inclusive continuing professional development (CPD) remains constrained. The study concludes that unresolved professional gaps undermine innovation adoption and weaken change management efforts in Nigerian librarianship. It recommends curriculum reform, strengthened CPD frameworks, and a more strategic role for professional associations in driving sustainable professional transformation.

Keywords: change management, competency gaps, continuing professional development, emerging innovations, information professionals, librarianship, Nigerian Library Association

Introduction

The profession of librarianship and information science is being fundamentally reshaped by rapid technological change, digital transformation, and evolving patterns of knowledge production and use. Globally, information professionals are now expected to perform roles that extend well beyond traditional custodial and reference functions to include digital curation, research data management, scholarly communication support, systems design, and innovation leadership (Corrall, 2014; Saunders, 2019; Tenopir et al., 2017). This shift has redefined professionalism in librarianship as a competency-driven enterprise anchored in continuous learning, adaptability, and strategic engagement with change. In response, international professional bodies such as the American Library Association (ALA), the Chartered Institute of Library and Information Professionals (CILIP), and the International Federation of Library Associations and Institutions (IFLA) have revised competency frameworks to emphasise digital skills, leadership, innovation, and evidence-based practice (ACRL, 2025; CILIP, 2020; IFLA, 2016). In many advanced library systems, structured continuing professional development, certification, and strong alignment between professional education and workplace practice now underpin professional relevance (Hallam & Partridge, 2013; Varlejs & Walton, 2009).

Despite these developments, a persistent challenge is the widening gap between theory taught in library schools and competencies required in contemporary practice. Studies consistently report that curricula often lag behind professional realities, producing graduates who are theoretically grounded but inadequately prepared for technologically intensive and innovation-driven environments (Audunson et al., 2016; Gorman, 2003; Ocholla & Shongwe, 2013). This theory–practice divide is particularly acute in the era of digital librarianship, where emerging technologies and user-centred service models demand skills rarely fully embedded in formal training. In the Global South, these challenges are compounded by limited funding, uneven digital infrastructure, weak industry-academia linkages, and fragile continuing professional development systems (Mutula, 2010; Ocholla, 2009; Rosenberg, 2005). Consequently, many professionals

enter practice with limited exposure to emerging innovations, whilst institutions struggle to provide systematic in-service training. In Nigeria, these global pressures intersect with distinctive national conditions. The Nigerian Library Association (NLA) plays a significant role in promoting the interests and advancement of librarianship in Nigeria through professional advocacy, continuing professional development, networking opportunities, conferences, workshops, publications, and policy engagement.

The Association has also contributed to the growth of the profession by mobilising practitioners, encouraging professional excellence, and advocating for library development and supportive legislation (Nigerian Library Association [NLA], 2025). However, the statutory responsibility for regulating professional practice, maintaining professional standards, registering librarians, and accrediting Library and Information Science (LIS) programmes in Nigeria rests with the Librarians' Registration Council of Nigeria (LRCN), a regulatory body established by Act No. 12 of 1995 (LRCN, 2025; Omotoso & Igiamoh, 2025). Through their complementary roles, the NLA and LRCN contribute to the professional development, regulation, and advancement of librarianship in Nigeria. However, the pace of technological change has outstripped the capacity of existing professional development structures. Empirical evidence indicates persistent gaps in digital competencies, innovation management, leadership capacity, and change readiness among Nigerian information professionals (Aina, 2014; Issa et al., 2018; Oladokun et al., 2025). At the same time, libraries are increasingly adopting innovations such as institutional repositories, electronic resource management systems, virtual services, and research support platforms, creating a misalignment between professional preparedness and innovation adoption. This study, therefore, examines professional gaps and emerging innovations among information professionals in Nigeria, situating the analysis within global debates on professionalism and the coordinating role of the NLA, to generate empirical insights that can strengthen the alignment between professional education, workplace practice, and professional regulation in an era of continuous change.

Problem Statement

Globally, professionalism in librarianship is increasingly defined by advanced competencies in digital technologies, innovation management, leadership, and organisational change. Although professional associations and library schools have introduced reforms to respond to these demands, a persistent gap remains between theoretical preparation and workplace realities. Empirical studies consistently report a misalignment between library school curricula and the evolving competency requirements of contemporary practice (Gorman, 2003; Hallam & Partridge, 2013; Ocholla & Shongwe, 2013). This disconnect weakens professional confidence, slows the adoption of innovation, and constrains the capacity of information professionals to manage change effectively. In Nigeria, this challenge is particularly pronounced. While the NLA has established frameworks for professional regulation and continuing education, many information professionals still face limited access to structured training in emerging technologies, weak mentoring systems, and insufficient institutional support for professional development (Nakaziba & Ngulube, 2025; Sulyman et al., 2023). At the same time, libraries are under growing pressure to implement innovative services without corresponding investment in human capacity development, resulting in persistent gaps in digital skills, innovation readiness, leadership, and change management capacity. The limited availability of systematic empirical evidence on the nature of these gaps, the extent of innovation adoption, and the effectiveness of existing professional support structures constrains informed policy and curriculum reform. This study, therefore, addresses the need to examine professional gaps and emerging innovations among information professionals and to analyse their implications for effective change management in librarianship within the Nigerian context.

Objectives of the Study

The broad objective of the study is to examine professional gaps and emerging innovations among information professionals in Nigeria and analyse their implications for effective change management in librarianship. The specific objectives are to:

1. identify the major professional skill and competency gaps among information professionals in contemporary librarianship;
2. examine the extent to which information professionals adopt emerging innovations in librarianship;
3. explore the alignment between library school training and the practical competency requirements of modern librarianship;
4. analyse the institutional, organisational, and professional factors influencing change management readiness in librarianship;
5. examine the extent of the role of the Nigerian Library Association in supporting professional development among its members; and
6. determine the implications of professional gaps for change management in librarianship.

Literature Review

Contemporary librarianship is undergoing a profound transformation, driven largely by rapid technological advancements and shifting user expectations. Against this backdrop, a growing body of empirical studies has drawn attention to persistent professional skill and competency gaps among information professionals. These gaps are

particularly evident in advanced digital literacy, data-driven services, and emerging technologies. Abdullahi et al. (2018) demonstrated that whilst librarians possess foundational information literacy skills, deficiencies in digital literacy, ethical information use, and ICT competence significantly constrain effective service delivery in the twenty-first-century library environment. Beyond the Nigerian context, similar patterns emerge internationally. Ali and Richardson (2018), in their study of university librarians in Karachi, Pakistan, found that although respondents showed competence in basic information searching, overall workplace information literacy remained low, with half of the assessed competencies scoring below average. These findings suggest that librarians' skill profiles often lag behind evolving professional expectations. Reinforcing this argument, Oladokun et al. (2025) identified substantial gaps among future academic librarians in Nigeria, particularly in artificial intelligence, data analytics, and digital resource management. The recent validation of AI competencies for academic library workers by the Association of College and Research Libraries (ACRL, 2025) further underscores the urgency of addressing these deficits systematically. Collectively, these studies indicate that professional competency gaps are systemic rather than incidental, forming a critical foundation for understanding subsequent challenges in innovation adoption and change management.

Building on the discussion of competency gaps, the literature further reveals that professional skills significantly shape librarians' capacity to adopt emerging innovations. Technologies such as artificial intelligence, data visualisation tools, and digital platforms have become central to modern library services, yet their uptake remains uneven across contexts. Harisanty et al. (2025), applying Rogers' Diffusion of Innovations theory, found that many Indonesian librarians operate at the “innovator” stage, actively experimenting with AI applications to enhance service efficiency and responsiveness. This evidence highlights the potential of librarians to act as technological change agents when adequate competencies and organisational support are present. However, contrasting evidence from developing contexts underscores structural constraints. Shahid and Siddiqui (2024) observed that librarians in private-sector university libraries in Sindh, Pakistan, possessed limited practical skills in data visualisation despite recognising its strategic value. Similarly, Shahzad et al. (2025), through a systematic literature review, identified skills deficits, financial limitations, and organisational resistance as major barriers to AI adoption in libraries globally. These findings suggest that innovation adoption in librarianship is inseparable from professional capacity development, thus drawing attention to the role of formal education and training systems.

As innovation adoption increasingly defines professional relevance, scholars have interrogated the extent to which library school training aligns with contemporary practice. Evidence consistently points to a disconnect between LIS curricula and the evolving competency requirements of modern librarianship. Moonasar (2025) found that even when academic libraries invest in Fourth Industrial Revolution (4IR)-aligned infrastructure, librarians often lack the requisite skills to effectively utilise such technologies, revealing a misalignment between education and practice. This misalignment is further substantiated by Bishop and Larsen (2025), whose validation of core competencies revealed a growing emphasis on service-oriented, data-intensive, and technology-mediated roles that are insufficiently reflected in many LIS programmes. On a global scale, Merga and Roni (2025) reported that outdated training pathways and inadequate professional preparation contribute to workforce instability and professional devaluation. In Nigeria, Oladokun et al. (2025) provided empirical confirmation that LIS curricula lag behind emerging demands in AI, digital ethics, and electronic resource management. These findings underscore the need to move beyond curriculum reform debates toward broader considerations of professional readiness for organisational change.

Transitioning from education–practice alignment to organisational realities, the literature increasingly emphasises change management readiness as a critical concern in librarianship. Change readiness is shaped not only by technical competence but also by leadership approaches, emotional intelligence, and institutional culture. Gray (2025) argued that change initiatives in libraries frequently fail due to neglect of emotional intelligence and trauma-informed practices, particularly within volatile and uncertain organisational environments. Empirical evidence from Africa further highlights structural barriers to readiness. Nakaziba and Ngulube (2025) found that limited investment in CPD, the absence of training policies, and the lack of protected learning time significantly undermine librarians' preparedness for digital transformation. Complementing these findings, Merga and Roni (2025) revealed that inadequate staffing, weak professional recognition, and low morale diminish librarians' willingness to embrace change. Together, these studies position change readiness as a multidimensional construct, thereby foregrounding the role of professional associations in strengthening adaptive capacity.

Against the backdrop of limited institutional support, professional associations emerge as critical platforms for capacity building and professional resilience. Although empirical studies focusing exclusively on the NLA are relatively scarce, insights from comparable contexts are instructive. Mubofu (2025) demonstrated that active membership in the Tanzania Library and Information Association significantly enhanced librarians' competencies, job performance, and professional confidence through structured training and networking initiatives. In the Nigerian context, Abdullahi et al. (2018) indirectly highlighted the consequences of weak professional development structures, including limited access to training opportunities. Nakaziba and Ngulube (2025) further argued that African professional associations possess untapped potential to institutionalise CPD, coordinate mentorship, and advocate for policy reforms. These findings suggest that the NLA is strategically positioned to bridge professional gaps, support innovation diffusion, and strengthen collective readiness for change. The NLA's 63rd Annual Conference in 2025, themed “The 5th Industrial Revolution

and the Future of Library and Information Service Delivery in a Changing World," reflects a growing institutional awareness of these imperatives (NLA, 2025).

Drawing together the reviewed literature, findings clearly demonstrate that professional skill gaps have far-reaching implications for change management in librarianship. Skills deficiencies are consistently linked to resistance to change, limited innovation uptake, and weakened service delivery. Shahzad et al. (2025) showed that inadequate competencies and organisational barriers significantly hinder AI adoption, whilst Oladokun et al. (2025) found that low confidence and preparedness among future librarians restrict their capacity to lead transformation initiatives. Moreover, Gray (2025) cautioned that poorly managed change processes exacerbate stress, mistrust, and disengagement, further entrenching resistance within library organisations. These dynamics indicate that professional gaps do not merely affect individual performance but undermine institutional adaptability and long-term sustainability. Consequently, addressing these gaps through curriculum reform, continuous professional development, and association-led interventions is essential for strengthening change management readiness and ensuring the continued relevance of librarianship in a rapidly evolving knowledge society.

Literature Gap

The reviewed literature reveals several important gaps. Although prior studies have documented the existence of professional skill and competency gaps among information professionals, these studies are largely fragmented and focus on isolated competencies such as information literacy, digital skills, or artificial intelligence. There is limited holistic evidence that systematically identifies and prioritises the major professional gaps shaping contemporary librarianship, particularly within the Nigerian context. Similarly, whilst emerging innovations are increasingly discussed in the literature, existing studies tend to describe adoption patterns or barriers in isolation. Little empirical attention has been given to assessing the actual extent of innovation adoption among information professionals or linking adoption levels directly to professional competencies and organisational realities. The literature also consistently points to a disconnect between library school training and workplace expectations; however, most studies address this misalignment either conceptually or from a single perspective. There remains insufficient context-specific evidence that empirically examines how library education aligns with the practical competency demands of modern librarianship.

With respect to change management readiness, existing studies acknowledge the influence of institutional, organisational, and professional factors but often examine these elements independently. Consequently, there is a limited integrated understanding of how these factors interact to shape librarians' readiness for change. Moreover, despite the recognised importance of professional associations, empirical evidence on the role and effectiveness of the NLA in supporting professional development remains sparse. Most insights are inferred from other national contexts rather than grounded in direct assessment. Finally, although professional gaps are widely linked to resistance to change and low innovation uptake, the literature rarely examines their direct implications for change management in an integrated manner. As a result, these gap highlighted the need for a comprehensive, context-sensitive study that simultaneously addresses professional skills, innovation adoption, educational alignment, institutional readiness, professional association support, and their combined implications for change management in contemporary librarianship.

Methodology

This study adopted a mixed-methods approach, employing a descriptive research design to examine professional gaps and emerging innovations among information professionals and to analyse their implications for change management in librarianship in Nigeria. The convergent parallel mixed-methods design was appropriate for capturing both the breadth of professional competencies (through quantitative measurement) and the depth of practitioners' experiences with innovation adoption and organisational change (through qualitative exploration). The study population comprised certified information professionals registered with the librarians Registration Council of Nigeria (LRCN) and practising in academic, public, and special libraries across Nigeria. According to the LRCN handbook (2025), the population consisted of approximately 5,900 certified professionals. A convenience sampling technique was employed due to the wide geographical distribution of the population and logistical constraints associated with nationwide fieldwork, enabling inclusion of respondents from all six geopolitical zones and both public and private sector institutions. Data were collected using a semi-structured online questionnaire developed with Google Forms. The instrument was designed to address the study's six objectives by eliciting information on respondents' demographic characteristics, professional training, digital and innovation-related competencies, experiences with emerging technologies, access to professional development opportunities, and perceptions of change management practices within their institutions. The questionnaire comprised both closed-ended and open-ended items. The closed-ended items were measured using a four-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1), while the open-ended items provided respondents with opportunities to elaborate on their experiences, perceptions, and suggestions regarding professional association challenges and innovation within the librarianship profession. The adoption of a four-point Likert scale was intentional. Unlike a five-point scale, which includes a neutral midpoint, the four-point scale required respondents to indicate either agreement or disagreement with each statement. This approach was employed to minimise central tendency bias and discourage respondents from selecting a neutral option when they possessed sufficient knowledge and experience to form an opinion on the issues under investigation (Garland, 1991; Kulas et al., 2008). Given that the respondents were professional librarians with relevant expertise and experience, the forced-choice format was considered appropriate for

eliciting clearer attitudinal positions and generating more discriminating data for analysis (Johns, 2010). The instrument was subjected to expert validation by a panel of three specialists in library and information science, information technology, and educational research. A pilot study was conducted with a group of 30 library information professionals outside the main sample to test reliability. Cronbach's alpha coefficients ranged from 0.78 to 0.91 across subscales, confirming acceptable internal consistency. Data collection was carried out over 16 weeks through official digital platforms of the NLA, including professional WhatsApp groups, mailing lists, and social media channels, as well as through LRCN institutional networks. At the end of the data collection period, 2,678 valid responses were obtained. Quantitative data were analysed using descriptive statistics specifically mean scores and standard deviations to summarise trends in professional competencies, innovation adoption, and access to professional development. A four-point Likert scale was adopted, and the following decision rule was applied throughout: a mean score of 2.50 and above indicated a High/Positive level (respondents Agreed or Strongly Agreed), whilst a mean below 2.50 indicated a Low/Negative level (respondents Disagreed or Strongly Disagreed). Qualitative data from open-ended items were analysed thematically following Braun and Clarke's (2006) six-phase thematic analysis framework, identifying recurrent patterns relating to professional gaps, barriers to innovation, change management challenges, and support mechanisms. Ethical approval was obtained from the appropriate institutional authority. Participation was voluntary, informed consent was obtained electronically, and confidentiality was assured by de-identifying all responses. The study adhered to established principles of research integrity, transparency, and responsible data management throughout.

Analysis and Presentation of Results

This section presents the findings of the study in response to each of the six research objectives. Quantitative data are presented through descriptive statistics tables showing mean scores, standard deviations, and remarks, guided by the stated decision rule. Qualitative findings from open-ended items are presented thematically after the quantitative tables for objectives where qualitative data were most substantive. A grand mean is computed for each table to provide an overall summary of findings per objective. **Decision Rule: Mean ≥ 2.50 = High (Positive Response); Mean < 2.50 = Low (Negative Response)** Scale: 4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree

Objective 1: Professional Skill and Competency Gaps among Library and Information Professionals

Table 1 presents the findings on the major professional skill and competency gaps identified among information professionals in Nigeria (n = 2,678).

Table 1: Professional Skill and Competency Gaps among Information Professionals in Nigeria (n = 2,678)

S/N	Item	Mean	SD	Remark
1	I possess adequate skills to deploy and manage artificial intelligence tools in library services.	1.87	0.74	Low
2	I am competent in research data management, including data curation, archiving, and sharing.	2.11	0.81	Low
3	I have sufficient knowledge of data analytics and data visualisation techniques.	1.93	0.79	Low
4	I am proficient in digital content creation and management for library platforms.	2.34	0.88	Low
5	I am confident in my ability to implement cybersecurity and data privacy protocols.	2.08	0.83	Low
6	My leadership and change management skills are adequate for my current professional role.	2.41	0.91	Low
7	I possess sufficient competence in scholarly communication support and open access advocacy.	2.29	0.87	Low
8	I am equipped with the skills required to support evidence-based decision-making in my library.	2.47	0.89	Low
9	I have adequate knowledge of emerging digital platforms (e.g., institutional repositories, cloud systems).	2.19	0.84	Low
10	I am regularly updated on innovation management practices applicable to library services.	2.03	0.80	Low
Grand Mean / Overall		2.17	0.84	Low

The results in Table 1 reveal a generally low level of professional skill and competency across all ten items assessed, with a grand mean of 2.17 (SD = 0.84), well below the decision rule threshold of 2.50. The highest-rated item was respondents' perceived adequacy for evidence-based decision-making (Mean = 2.47, SD = 0.89), which approached but did not reach the threshold for a high rating. The lowest-rated item was adequacy of artificial intelligence tool deployment skills (Mean = 1.87, SD = 0.74), signalling a critical gap in one of the most rapidly growing areas of contemporary librarianship. Skills in data analytics and visualisation (Mean = 1.93, SD = 0.79), innovation management

(Mean = 2.03, SD = 0.80), and cybersecurity (Mean = 2.08, SD = 0.83) were also rated poorly. These findings confirm that professional competency gaps are pervasive and multidimensional, spanning technical, analytical, and leadership domains. The results are consistent with findings by Oladokun et al. (2025) and Abdullahi et al. (2018), who similarly identified deficiencies in digital, AI, and innovation-related skills among Nigerian information professionals.

Qualitative Findings: Objective 1

Open-ended responses corroborated and enriched the quantitative patterns. Three dominant themes emerged from thematic analysis of 1,893 qualitative entries submitted for this objective.

Theme 1: Structural Absence of Advanced Skills Training

A large proportion of respondents described formal library training as theoretically rich but practically deficient. As one respondent stated: *"We were taught cataloguing and classification extensively, but nobody taught us how to use Python for data management or how to set up an institutional repository from scratch."* Participants repeatedly noted that emerging areas such as AI, research data management, and digital preservation received minimal or no coverage during their undergraduate and postgraduate training, leaving them dependent on self-directed learning. This finding aligns with Moonasar's (2025) observation that even infrastructure-rich libraries are underserved by inadequately prepared professionals.

Theme 2: Awareness-Application Gap

Several respondents acknowledged awareness of emerging tools and technologies but reported an inability to translate that awareness into practical application. One participant noted: *"I know what ChatGPT can do and I have read about AI in library services, but I would not know how to integrate it into our workflow or train users on it."* This pattern which may be described as an awareness–application gap, suggests that exposure to emerging concepts through conferences and publications has not been matched by the hands-on training needed to operationalise new competencies. This gap was particularly pronounced among librarians working in public and special library settings outside urban centres.

Theme 3: Differential Competency by Institutional Setting

Respondents from academic libraries, particularly those affiliated with research-intensive universities or benefiting from foreign donor programmes (such as the Carnegie CPD Fellowship), reported relatively stronger competency profiles. In contrast, those from public and special libraries described a stark absence of institutional support for professional skills development. As one respondent noted: *"In my state library, there has been no training in the past five years. We read about what other libraries are doing online, but we have no access to those opportunities ourselves."* This institutional differentiation suggests that professional competency gaps are not uniform but are stratified by sector, geography, and organisational resource levels.

Objective 2: Extent of Adoption of Emerging Innovations in Librarianship

Table 2 presents the extent to which library and information professionals in Nigeria have adopted emerging innovations in library practice.

Table 2: Extent of Adoption of Emerging Innovations in Librarianship (n = 2,678)

S/N	Item	Mean	SD	Remark
1	My library has implemented an institutional repository for managing research outputs.	2.51	0.90	High
2	My library uses electronic resource management systems for managing digital collections.	2.58	0.93	High
3	Virtual or online reference services are actively deployed in my library.	2.47	0.95	Low
4	My library has integrated AI-powered tools into any aspect of library operations.	1.76	0.72	Low
5	Data analytics tools are used to inform collection development or service improvement decisions.	1.89	0.77	Low
6	My library offers chatbot or automated information assistance services to users.	1.71	0.69	Low
7	Open access advocacy and management of open access resources are active functions in my library.	2.39	0.91	Low
8	My library uses social media platforms actively for information dissemination and user engagement.	2.73	0.98	High
9	Research support services (e.g., bibliometric analysis, systematic review support) are provided.	2.12	0.83	Low
10	My library has adopted cloud-based systems for any library function.	2.21	0.86	Low
Grand Mean / Overall		2.24	0.85	Low

The results in Table 2 reveal a low overall extent of innovation adoption among Nigerian information professionals, with a grand mean of 2.24 (SD = 0.85). Of the ten innovations assessed, only three received mean scores above the 2.50 threshold: electronic resource management systems (Mean = 2.58, SD = 0.93), institutional repositories (Mean = 2.51, SD = 0.90), and social media for information dissemination (Mean = 2.73, SD = 0.98). These represent relatively accessible and low-cost innovations that have benefited from donor support and national digitisation initiatives. In contrast, AI-powered tools (Mean = 1.76, SD = 0.72), chatbot services (Mean = 1.71, SD = 0.69), and data analytics (Mean = 1.89, SD = 0.77) were among the lowest-rated, confirming that cutting-edge innovations remain poorly adopted. Virtual reference services also fell just below the threshold (Mean = 2.47, SD = 0.95), suggesting nascent but incomplete adoption. These findings are consistent with Shahzad et al. (2025) and Harisanty et al. (2025), who identified structural and competency barriers as the primary constraints on innovation adoption in developing-country library systems.

Qualitative Findings - Objective 2

Qualitative data yielded two primary themes regarding innovation adoption patterns.

Theme 1: Infrastructure and Resource Constraints as Adoption Gatekeepers

The most frequently cited barrier to innovation adoption was inadequate infrastructure, particularly unreliable internet connectivity, irregular power supply, and obsolete hardware. As one respondent noted: *"We would love to use AI-assisted cataloguing, but our server infrastructure cannot support it and there is no budget to upgrade."* Respondents consistently described a cycle in which resource constraints prevent adoption, which in turn prevents the demonstration of value that might justify resource investment. This pattern echoes broader findings on library technology adoption in African contexts (Nakaziba & Ngulube, 2025).

Theme 2: Uneven Innovation Landscape Across Library Types

Respondents from academic libraries especially those in federal universities reported higher levels of innovation adoption compared to their counterparts in public and special libraries. Several participants noted that innovations such as institutional repositories had been adopted partly due to external mandates (e.g., National Universities Commission requirements) and donor-funded projects rather than organic institutional initiative. One respondent from a state public library summarised this asymmetry: *"Academic libraries in the big universities have institutional repositories and electronic databases because they have the funding. In public libraries, we are still doing everything manually."*

Objective 3: Alignment Between Library School Training and Practical Competency Requirements

Table 3 presents respondents' assessments of the alignment between their library school training and the practical competency requirements of modern librarianship.

Table 3: Alignment Between Library School Training and Practical Competency Requirements (n = 2,678)

S/N	Item	Mean	SD	Remark
1	My library school training adequately prepared me for the digital competency demands of my current role.	2.14	0.82	Low
2	LIS curricula in Nigeria incorporate sufficient coverage of artificial intelligence and emerging technologies.	1.81	0.73	Low
3	My professional training provided adequate grounding in research data management and digital curation.	2.03	0.78	Low
4	Library school courses were regularly updated to reflect contemporary industry practices during my training.	2.22	0.84	Low
5	Practical and experiential learning components (e.g., internships, field placements) were adequate.	2.38	0.88	Low
6	My library school equipped me with skills for managing electronic resources and digital collections.	2.31	0.86	Low
7	There was strong industry–academia collaboration to ensure curriculum relevance during my training.	1.94	0.76	Low
8	The communication and leadership skills taught in library school are relevant to my current practice.	2.61	0.92	High
9	My training adequately covered change management and organisational theory for library practice.	2.09	0.81	Low
10	My library school training adequately prepared me for innovation in contemporary librarianship.	2.17	0.83	Low
Grand Mean / Overall		2.17	0.82	Low

Table 3 reveals a persistent and broad misalignment between library school training and practical competency requirements, with a grand mean of 2.17 (SD = 0.82). Only one item communication and leadership skills received a

high rating (Mean = 2.61, SD = 0.92), suggesting that soft skills training has been more effectively delivered than technical preparation. The lowest-rated item was curriculum coverage of artificial intelligence and emerging technologies (Mean = 1.81, SD = 0.73), followed by industry–academia collaboration (Mean = 1.94, SD = 0.76) and research data management preparation (Mean = 2.03, SD = 0.78). These findings align closely with the observations of Bishop and Larsen (2025) and Merga and Roni (2025), who identified the growing gap between LIS programme content and the evolving demands of professional practice globally. The Nigerian evidence is particularly stark given that the rapid pace of digital transformation has exposed the limitations of traditionally oriented curricula without corresponding systematic review or reform.

Qualitative Findings - Objective 3

Thematic analysis of qualitative responses for Objective 3 produced two salient themes.

Theme 1: Curriculum Stagnation in the Face of Technological Acceleration

Respondents overwhelmingly described LIS curricula as static and resistant to change. Many indicated that the content they studied bore little relationship to the technologies and services they encountered upon entering the profession. One participant with 12 years of professional experience observed: *"What I studied in library school was good for the 1990s, perhaps. By the time I started work, there were already institutional repositories, digital databases, and federated search systems that none of my lecturers had taught me about."* Multiple respondents reported having had to engage in extensive self-directed learning, attend NLA workshops, or pursue further qualifications to bridge the competency gap left by initial training.

Theme 2: Disconnect Between LIS Educators and Professional Practice

Several respondents identified a perceived disconnect between LIS educators many of whom focus primarily on theoretical and historical dimensions of the field and the practical demands of contemporary librarianship. Participants noted that very few lecturers had recent practitioner experience, leading to a curriculum that reflected academic rather than professional priorities. As one respondent commented: *"Most of my lecturers had not worked in a library for many years. They were teaching us classification theory when the profession had moved on to semantic web and linked data."* Respondents expressed a strong desire for more industry-informed teaching, structured industry placements, and regular curriculum review processes.

Objective 4: Institutional, Organisational, and Professional Factors Influencing Change Management Readiness

Table 4 presents the analysis of factors influencing change management readiness among information professionals.

Table 4: Factors Influencing Change Management Readiness in Librarianship (n = 2,678)

S/N	Item	Mean	SD	Remark
1	My institution provides adequate financial support for the adoption of innovative library technologies.	1.93	0.77	Low
2	Senior library management actively champions change and innovation in my institution.	2.31	0.87	Low
3	My institution has a formal policy or strategic plan for library technology adoption.	2.08	0.81	Low
4	Access to regular training and professional development is supported by my employing institution.	2.19	0.83	Low
5	The organisational culture in my library is receptive to change and new ways of working.	2.44	0.90	Low
6	I feel personally motivated and ready to embrace change and emerging innovations in my work.	2.81	0.96	High
7	Interpersonal trust and collaboration among colleagues facilitate change initiatives in my library.	2.63	0.94	High
8	Resistance to change among staff is a significant barrier to innovation adoption in my library.	2.72	0.97	High
9	Poor communication during change processes undermines the success of innovation efforts in my library.	2.68	0.95	High
10	The absence of mentoring and professional support systems limits my readiness for change.	2.74	0.98	High
Grand Mean / Overall		2.45	0.90	Low

The grand mean for Table 4 stands at 2.45 (SD = 0.90), falling marginally below the 2.50 threshold and indicating a generally low approaching moderate level of change management readiness. Notably, the findings reveal a clear divergence between individual-level motivation and institutional-level enabling conditions. Respondents reported strong personal motivation to embrace change (Mean = 2.81, SD = 0.96) and acknowledged positive interpersonal trust and

collaboration among colleagues (Mean = 2.63, SD = 0.94). However, institutional financial support was among the lowest-rated factors (Mean = 1.93, SD = 0.77), alongside the absence of formal technology adoption policies (Mean = 2.08, SD = 0.81) and limited training access (Mean = 2.19, SD = 0.83). Significantly, resistance to change (Mean = 2.72, SD = 0.97), poor change communication (Mean = 2.68, SD = 0.95), and the absence of mentoring (Mean = 2.74, SD = 0.98) were rated high, suggesting that these are widely experienced barriers rather than isolated concerns. This pattern echoes the findings of Gray (2025) and Nakaziba and Ngulube (2025), who similarly identified institutional constraint and cultural resistance as core barriers to change management readiness in library organisations.

Objective 5: Role of the Nigerian Library Association in Supporting Professional Development

Table 5 presents respondents' assessments of the NLA's role in supporting their professional development.

Table 5: Role of the Nigerian Library Association in Supporting Professional Development (n = 2,678)

S/N	Item	Mean	SD	Remark
1	NLA conferences and annual meetings have contributed meaningfully to my professional development.	2.71	0.96	High
2	NLA workshops and training programmes have kept me updated on emerging innovations in librarianship.	2.43	0.89	Low
3	The NLA provides sufficient access to training in digital skills and emerging technologies.	1.98	0.78	Low
4	NLA publications (journals, newsletters) contribute to my professional knowledge and practice.	2.59	0.93	High
5	The NLA's professional certification processes have enhanced my professional identity.	2.52	0.91	High
6	The NLA provides adequate mentoring opportunities and career guidance for members.	2.01	0.79	Low
7	The NLA advocates effectively for improved working conditions and recognition of information professionals.	2.34	0.88	Low
8	The NLA liaises effectively with library schools to promote curriculum relevance and innovation.	1.89	0.75	Low
9	I receive adequate geographic access to NLA professional development activities in my region.	2.12	0.82	Low
10	Overall, the NLA's support for professional development is adequate for current professional challenges.	2.21	0.85	Low
Grand Mean / Overall		2.28	0.86	Low

Table 5 reveals an overall low level of satisfaction with the NLA's professional development support, with a grand mean of 2.28 (SD = 0.86). Three items received high ratings: NLA conferences (Mean = 2.71, SD = 0.96), NLA publications (Mean = 2.59, SD = 0.93), and professional certification (Mean = 2.52, SD = 0.91). These represent the association's most established and accessible service channels. However, the NLA's capacity to deliver digital skills training (Mean = 1.98, SD = 0.78), mentoring and career guidance (Mean = 2.01, SD = 0.79), and liaison with library schools (Mean = 1.89, SD = 0.75) received critically low ratings. Geographic access disparities were also widely noted (Mean = 2.12, SD = 0.82), suggesting that professional development opportunities remain concentrated in major urban centres. These findings highlight a significant implementation gap between the NLA's stated mission of advancing the profession and its practical reach and capacity to deliver inclusive, technology-focused development programmes. Mubofu (2025) and Sulyman et al. (2023) have similarly noted that African professional associations often struggle to translate their institutional mandates into systematic CPD delivery.

Qualitative Findings - Objective 5

Theme 1: Valued Networking, Limited Practical Training

Respondents expressed genuine appreciation for the NLA's role as a networking and advocacy platform. Many described the annual conference as one of few opportunities for professional contact and knowledge exchange with peers from across the country. However, there was widespread frustration with the absence of structured, skills-based training in emerging technologies. As one respondent noted: *"The NLA conference is good for networking and hearing about trends, but I cannot attend a workshop on AI or research data management through the NLA. I have to find those opportunities elsewhere, usually at my own expense."* This finding reflects a structural gap between the association's convening capacity and its training delivery infrastructure.

Theme 2: Geographically and Institutionally Unequal Access

Multiple respondents from northern and rural states highlighted the challenge of geographic exclusion from NLA activities. Several participants reported never having attended an NLA national conference due to travel costs and logistical difficulties, relying instead on state chapter activities that were described as sporadic and under-resourced. This geographic dimension of CPD inequality represents a critical challenge for an association with a mandate to serve members across Nigeria's 36 states and FCT. As one respondent from Kebbi State articulated: *"For us in this part of Nigeria, the NLA is mostly a name. The activities happen in Southern region and few Northern State, and we cannot afford to attend."*

Objective 6: Implications of Professional Gaps for Change Management in Librarianship

Table 6 presents respondents' perceptions of the implications of professional gaps for change management in Nigerian librarianship.

Table 6: Implications of Professional Gaps for Change Management in Librarianship (n = 2,678)

S/N	Item	Mean	SD	Remark
1	Professional skill gaps directly contribute to resistance to change among information professionals.	2.89	0.99	High
2	Limited digital competencies reduce my library's ability to implement innovative services effectively.	2.84	0.97	High
3	The absence of leadership development among librarians weakens institutional change initiatives.	2.79	0.96	High
4	Insufficient change management training leaves information professionals unprepared for organisational transformation.	2.91	1.01	High
5	Professional gaps undermine service delivery quality during periods of technological transition.	2.83	0.98	High
6	Limited innovation adoption capacity constrains libraries' ability to meet evolving user expectations.	2.87	0.99	High
7	Addressing professional gaps through CPD would significantly strengthen change management outcomes in libraries.	3.11	0.89	High
8	Curriculum reform in LIS education is essential for improving long-term change management readiness.	3.09	0.91	High
9	The NLA has a critical role to play in driving professional transformation to support change management.	3.04	0.94	High
10	Without targeted intervention in professional development, libraries in Nigeria will struggle to remain relevant.	3.07	0.93	High
Grand Mean / Overall		2.94	0.96	High

Table 6 presents the most consistent and emphatic findings of the study, with a grand mean of 2.94 (SD = 0.96) the only section to achieve a high overall rating. All ten items received high mean scores, demonstrating that respondents hold a strong and coherent understanding of the causal linkages between professional gaps and change management outcomes. The highest-rated item was the belief that CPD would significantly strengthen change management outcomes (Mean = 3.11, SD = 0.89), closely followed by the belief that curriculum reform is essential (Mean = 3.09, SD = 0.91) and that libraries face a risk of irrelevance without targeted professional development intervention (Mean = 3.07, SD = 0.93). These findings are particularly significant because they demonstrate not only awareness of the problem but strong consensus on the solutions, providing a compelling evidence base for targeted policy and institutional action. Insufficient change management training (Mean = 2.91, SD = 1.01) and professional skill gaps contributing to resistance to change (Mean = 2.89, SD = 0.99) were also rated high, confirming the direct relevance of the study's central argument. These findings are consistent with Shahzad et al. (2025), Gray (2025), and Oladokun et al. (2025).

Research Matrix

Table 7 below presents a summary of the study's objectives, methods of data collection and analysis, and the key findings associated with each objective.

Table 7: Research Matrix - Objectives, Data Collection, Analysis, and Findings

Obj.	Method of Data Collection	Research Objective	Method of Analysis	Summary of Key Finding

1	Online questionnaire (closed-ended Likert items + open-ended items)	To identify major professional skill and competency gaps	Mean, SD; thematic analysis	Low overall competency (Grand Mean = 2.17); critical gaps in AI, data analytics, and cybersecurity; qualitative themes: training deficits and awareness–application gap
2	Online questionnaire (closed-ended Likert items + open-ended items)	To examine the extent of adoption of emerging innovations	Mean, SD; thematic analysis	Low overall adoption (Grand Mean = 2.24); social media, ERM, and IRs relatively higher; AI, chatbots, and data analytics poorly adopted; infrastructure constraints dominant barrier
3	Online questionnaire (closed-ended Likert items + open-ended items)	To explore alignment between library school training and practice	Mean, SD; thematic analysis	Low alignment (Grand Mean = 2.17); AI curriculum coverage lowest rated; curriculum stagnation and educator–practice disconnect identified qualitatively
4	Online questionnaire (closed-ended Likert items + open-ended items)	To analyse factors influencing change management readiness	Mean, SD; thematic analysis	Near-low readiness (Grand Mean = 2.45); strong personal motivation but weak institutional support; resistance, poor communication, and absent mentoring as major barriers
5	Online questionnaire (closed-ended Likert items + open-ended items)	To examine the NLA's role in supporting professional development	Mean, SD; thematic analysis	Low satisfaction overall (Grand Mean = 2.28); conferences and publications rated high; digital skills training, mentoring, and geographic access critically low
6	Online questionnaire (closed-ended items)	To determine the implications of professional gaps for change management	Mean, SD	High consensus on implications (Grand Mean = 2.94); CPD, curriculum reform, and NLA leadership identified as critical to change management improvement

Discussion of Findings

The findings of this study present a comprehensive and sobering picture of the state of professional development and innovation adoption in Nigerian librarianship. Across the six objectives, a coherent narrative emerges: information professionals in Nigeria are aware of the demands of contemporary practice but are systematically under-resourced, under-trained, and under-supported in meeting those demands. The discussion that follows situates the key findings within the broader literature, drawing out their theoretical and practical significance.

The critically low grand mean on professional skill and competency gaps confirms that the knowledge economy has fundamentally outpaced the professional preparation of Nigerian information professionals. The severity of deficits in AI, data analytics, and cybersecurity is particularly alarming given that these competencies are now widely regarded as essential to modern library practice (ACRL, 2025; IFLA, 2016). These findings corroborate Oladokun et al. (2025), who found similar deficiencies among future academic librarians in Nigeria, and extend them to the practising professional population at large. The qualitative identification of an awareness–application gap is theoretically significant: it suggests that the challenge is not simply a lack of knowledge about emerging technologies but a structural absence of the training infrastructure, institutional support, and mentoring needed to translate awareness into practice. This distinction has important implications for how interventions are designed, pointing towards practice-based learning, mentoring programmes, and community of practice models rather than purely informational approaches.

The low overall adoption of emerging innovations, combined with the selective adoption of more established technologies (social media, ERM, IRs), reveals a bifurcated innovation landscape in Nigerian librarianship. This pattern reflects what Harisanty et al. (2025) describe as the differential conditions under which librarians function as innovation adopters versus laggards, shaped by institutional context, infrastructure, and professional capacity. The finding that chatbot services and AI-powered tools remain almost entirely unadopted is consistent with Shahzad et al. (2025), who identified skills deficits, financial limitations, and organisational resistance as the primary structural barriers to AI

adoption in libraries. The qualitative finding that innovation adoption has often been driven by external mandates (such as NUC requirements for IRs) rather than organic institutional initiative is particularly instructive, as it suggests that innovation adoption in Nigerian libraries may be more responsive to regulatory pressure and donor incentives than to internally generated strategic vision.

The misalignment between library school training and practical competency requirements confirms a long-standing tension in LIS education that this study grounds in contemporary Nigerian evidence. The finding that communication and leadership skills represented the only area of strong training adequacy whilst AI curriculum coverage scored lowest, this mirrors the broader global pattern documented by Bishop and Larsen (2025) and Merga and Roni (2025). The qualitative finding of curriculum stagnation articulated by respondents who described being taught for a profession that no longer existed as they had studied it reinforces Moonasar's (2025) argument that even infrastructure investments in 4IR-aligned technology are neutralised when the human capital is insufficiently prepared. The disconnect between LIS educators and professional practice, identified qualitatively, points to the need for structural industry–academia partnerships, not merely curricular updates, as drivers of meaningful professional preparation.

The finding that change management readiness hovers near the low threshold, this characterised by strong personal motivation but weak institutional enabling conditions, is theoretically significant. It affirms Gray's (2025) argument that change readiness in library organisations is a multilevel phenomenon that cannot be addressed solely at the individual practitioner level. The high ratings for resistance to change, poor change communication, and the absence of mentoring, suggest that organisational and relational conditions are more significant barriers to change management than individual attitudes or motivation. This nuance matters for intervention design: efforts to build personal motivation and skills will be insufficient unless accompanied by organisational culture change, leadership development, and more systematic mentoring infrastructure.

The low overall assessment of the NLA's professional development support, despite high ratings for conferences and publications highlights a critical implementation gap in the association's CPD mandate. The qualitative identification of geographic access inequality, with northern and rural librarians effectively excluded from the most substantive professional development activities, represents a particularly serious equity concern. These findings align with Mubofu (2025) and Nakaziba and Ngulube (2025), who similarly found that African professional associations tend to underperform in systematic CPD delivery despite their recognised potential. The finding that NLA–library school liaison scored the lowest of all items on this scale is especially significant, as it suggests that the most strategic lever for long-term professional transformation curriculum alignment is precisely the area where the association's influence is most limited.

Finally, the strong and consistent consensus that professional gaps have serious and direct implications for change management in librarianship provides both an empirical validation of the study's central argument and a compelling call to action. The high ratings for the potential of CPD, curriculum reform, and NLA leadership indicate that respondents not only understand the problem but have a sophisticated understanding of the systemic interventions required to address it. This level of professional self-awareness and solution-orientation is an important asset for reform efforts, suggesting that demand for change exists within the profession and that the primary challenge is to create institutional and structural conditions in which that demand can be met.

Conclusion

This study set out to examine professional gaps and emerging innovations among information professionals in Nigeria and to analyse their implications for effective change management in librarianship. The evidence is clear and consistent across all six objectives: Nigerian information professionals are confronting a severe and multi-dimensional professional gap spanning digital competencies, innovation management, change readiness, and leadership capacity that is significantly undermining their ability to adopt emerging innovations and manage organisational change effectively. The convergence of low innovation adoption, persistent curriculum misalignment, weak institutional enabling conditions, and constrained CPD infrastructure paints a picture of a profession at a critical crossroads, facing the demands of a rapidly accelerating knowledge environment with resources and capacities that have not kept pace. What distinguishes this study's findings is not merely the documentation of deficits which prior literature has addressed in fragmented ways but the demonstration that these deficits are systemic, interconnected, and mutually reinforcing. Weak library school curricula produce professionals with inadequate competencies; inadequate competencies limit innovation adoption; constrained innovation adoption reduces the visibility of libraries' value; reduced visibility constrains institutional investment; and limited institutional investment perpetuates the cycle by restricting access to CPD and mentoring. Breaking this cycle requires simultaneous intervention at multiple levels: curriculum, professional association capacity, institutional policy, and national regulatory frameworks. The Nigerian Library Association, the LRCN, library schools, and government agencies each have indispensable roles to play, and the evidence from this study provides a clear empirical foundation for coordinated action across all these institutional actors.

Recommendations

Based on the findings of this study, the following evidence-based recommendations are advanced for relevant stakeholders.

1. Library schools in Nigeria should undertake urgent and systematic curriculum reform to align LIS programmes with the competency demands of contemporary librarianship. Curricula should explicitly incorporate modules on artificial intelligence, research data management, data analytics, cybersecurity, digital curation, and change management. Curriculum review should be conducted in structured partnership with practising professionals and industry stakeholders, with mandated review cycles of no more than three years to ensure ongoing relevance in a rapidly changing technological environment.
2. The Nigerian Library Association should reconceptualise its CPD delivery model to prioritise digital skills training, mentoring, and geographic inclusion. This should include the development of online and hybrid CPD platforms capable of reaching members in all 36 states and the FCT, and the establishment of a national mentoring scheme pairing experienced digital practitioners with junior colleagues. The NLA should also develop formal linkages with library schools to facilitate curriculum advisory functions, co-delivery of CPD with library schools, and the mutual exchange of professional expertise.
3. Employing institutions including universities, government ministries, and research institutes should establish formal professional development policies that allocate dedicated time, funding, and resources for librarians' participation in CPD activities. Institutional technology adoption policies should also be developed that align library innovation investment with strategic professional capacity building, ensuring that technology adoption and human capital development proceed in tandem rather than in isolation.
4. The Library Registration Council of Nigeria (LRCN) should leverage its regulatory authority to mandate minimum CPD requirements for professional licence renewal, thereby creating a structural incentive for sustained engagement in professional development. The LRCN should also engage with NUC and library schools to establish minimum competency benchmarks for LIS graduates that align with emerging professional demands, providing the regulatory framework within which curriculum reform can be institutionalised.
5. Future research should employ longitudinal designs to track changes in professional competency and innovation adoption over time, following curriculum reforms or CPD interventions. Comparative studies examining competency levels and change management readiness across different library types and geopolitical zones would provide more granular insights to inform targeted policy responses. Qualitative and ethnographic studies embedded within specific library organisations would further illuminate the organisational dynamics of change management that this study has identified as critical but incompletely understood.

Limitations of the Study

Whilst this study makes a significant contribution to empirical understanding of professional gaps and change management in Nigerian librarianship, several limitations should be acknowledged when interpreting its findings. First, the study employed convenience sampling due to the logistical challenges of nationwide fieldwork, and the online distribution of the questionnaire through NLA and LRCN digital platforms may have introduced a self-selection bias. Respondents who are digitally engaged and professionally active in NLA networks may not fully represent the broader population of practising librarians, particularly those in more isolated or under-resourced settings. Second, the use of self-reported data means that findings reflect respondents' perceptions and assessments rather than objectively measured competency levels. The social desirability effect, whereby respondents may either overstate or understate their competencies depending on perceived professional expectations, cannot be entirely ruled out. Third, the cross-sectional nature of the design provides a snapshot rather than a longitudinal account of professional development and innovation adoption trajectories. Findings cannot therefore establish causal direction in the relationships observed between the study variables. Fourth, whilst the sample of 2,678 is substantial, the distribution of respondents across geopolitical zones and library types was not precisely controlled, and the relative representation of academic versus public and special library professionals may have influenced findings. Finally, the study did not assess the financial and budgetary dimensions of institutional support in detail, which future research should address to provide a more complete picture of the structural barriers to professional development.

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PERCEPTIONS OF ACADEMIC LIBRARIANS IN NIGERIA TOWARDS ARTIFICIAL INTELLIGENCE INTEGRATION IN LIBRARY SERVICES

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Abstract

The perceptions of academic librarians in Nigeria about the application of artificial intelligence (AI) to library services are examined in this paper. To investigate their perceptions on AI technology adoption in the library setting, 500 Academic librarians in Nigeria made up the study's population. The study used the social survey methodology. An approach known as random sampling was used to choose the librarians who participated in the survey. Simple percentages were used for the study's data in order to facilitate analysis and interpretation using the Statistical Package for the Social Sciences (SPSS) version 28.0 application software. The findings revealed that academic librarians in Nigeria are unaware that artificial intelligence is being used to improve library services. This is despite the fact that they are aware that the advancement of artificial intelligence increased visibility of their libraries around the world and improve library services. The study revealed that academic librarians encountered challenges towards the use of Artificial intelligence such as potential job loss, inadequate funding and epileptic among others. The study recommended library management should put in place training and professional development plans to increase librarians' AI literacy while promoting a balanced strategy that takes use of AI's potential to complement rather than replace conventional library services.

Keywords: Academic libraries; Artificial Intelligence; Nigeria; library service delivery, librarians' perception

Introduction

Academic libraries continue to experience substantial changes as digital technologies reshape the methods through which information resources are acquired, organized, preserved, and delivered to users across different educational institutions. Growing expectations from students, researchers, and academic staff have encouraged libraries to explore technological solutions capable of improving efficiency, strengthening service quality, and supporting faster access to information resources. Artificial intelligence has emerged as one of the technologies attracting considerable attention because of its ability to support automated processes, assist decision making, and improve interactions between information systems and library users. Interest in artificial intelligence within library operations is not merely associated with technological advancement, but also with the desire to improve service effectiveness and meet increasing user demands. Academic libraries therefore face growing pressure to examine how artificial intelligence can contribute to service improvement while ensuring that librarians remain actively involved in managing and guiding technological developments within their institutions.

Growing attention to artificial intelligence within library operations has generated discussions regarding its possible influence on traditional professional responsibilities and established patterns of service delivery. Many routine activities previously handled entirely through human effort can now be supported through intelligent systems capable of processing information quickly and performing repetitive tasks with greater consistency. Such developments have created opportunities for academic libraries to improve operational performance while simultaneously introducing concerns regarding professional adaptation and technological readiness. Library services are strongly dependent on human interaction, professional judgement, and user support, which makes the perception of librarians an important factor in determining whether artificial intelligence initiatives will succeed. Positive perceptions may encourage acceptance and experimentation with emerging technologies, whereas negative perceptions may limit implementation efforts regardless of available technological infrastructure. Understanding how librarians interpret these developments therefore becomes necessary for institutions seeking to introduce artificial intelligence into existing library operations and services.

Discussions concerning artificial intelligence in libraries have become more prominent because technological innovations continue to influence information management practices across different sectors of society. Academic libraries are increasingly expected to provide services that are responsive, accessible, and capable of meeting the changing information needs of diverse user communities. Artificial intelligence offers possibilities for enhancing information retrieval processes, improving user support systems, strengthening resource discovery mechanisms, and assisting libraries in managing growing volumes of digital information. Achugbue (2025) observed that interest in artificial intelligence within academic libraries continues to increase as librarians seek new approaches for improving service delivery and responding to technological changes affecting information environments. Such observations suggest that discussions about artificial intelligence are gradually moving beyond theoretical considerations toward practical questions concerning adoption, utilization, and professional preparedness. Greater attention must therefore be directed toward understanding how librarians themselves perceive these developments because their perceptions can influence institutional decisions and implementation outcomes.

Questions surrounding artificial intelligence adoption become more significant when viewed from the perspective of developing countries where technological advancement often occurs alongside infrastructural and resource-related

limitations. Academic libraries in Nigeria continue to pursue modernization efforts despite challenges associated with funding, technological facilities, internet connectivity, and professional training opportunities. Artificial intelligence may offer practical solutions for improving several aspects of library operations, yet successful adoption depends largely on the willingness and preparedness of librarians who are expected to work with such technologies. Existing discussions frequently emphasize the potential benefits of artificial intelligence while giving comparatively less attention to how librarians perceive its introduction into their professional environment. Such an imbalance creates uncertainty because technological success is rarely determined by technological availability alone. Institutional efforts aimed at introducing artificial intelligence are more likely to achieve desired outcomes when the views, expectations, concerns, and experiences of librarians are adequately understood and incorporated into planning processes.

Attention directed toward librarians' perceptions has become increasingly important because attitudes toward technology often influence acceptance, resistance, and long-term utilization of new systems within organizations. Perceptions can shape professional behaviour by affecting confidence levels, willingness to learn, readiness to adapt, and expectations regarding future workplace changes. Lulu-Pokubo and Okwu (2025) noted that awareness of artificial intelligence technologies among librarians remains an important consideration for achieving sustainable library services, suggesting that understanding professional viewpoints remains relevant as institutions pursue technological advancement. Similar concerns are reflected in discussions about readiness and technological competence, where librarians are expected to develop knowledge and skills capable of supporting effective use of emerging technologies. Academic libraries therefore require evidence regarding how librarians perceive artificial intelligence because such information can support informed decision making, guide professional development initiatives, and assist institutions in addressing concerns that may influence implementation efforts.

Growing recognition of these issues demonstrates the need for empirical investigation focused specifically on academic librarians and their views regarding artificial intelligence integration in library services within Nigeria. Ogunbodede and Ejitagha (2026) emphasized the relationship between technological readiness and digital competencies among librarians, highlighting the continuing importance of human factors in technological adoption. Despite increasing discussions surrounding artificial intelligence and library modernization, questions remain regarding the level of awareness among academic librarians, their perceptions of artificial intelligence applications, and the challenges they associate with its adoption in library services. Addressing these questions is important because successful technological integration requires an understanding of the people expected to utilize, manage, and support such innovations. This study therefore examines the perceptions of academic librarians in Nigeria towards artificial intelligence integration in library services with the aim of providing evidence capable of supporting policy formulation, professional development, and future implementation efforts.

Statement of the Problem

Artificial intelligence has increasingly attracted attention within the library profession because of its potential to improve service delivery, strengthen information access, support resource management, and enhance operational efficiency across academic libraries. Growing interest in this technology has encouraged researchers to examine different aspects of artificial intelligence adoption among librarians, including awareness, readiness, competencies, and technological skills required for successful implementation. Existing studies have provided useful insights into how libraries may benefit from artificial intelligence and the conditions necessary for its adoption within academic environments. Research conducted by Ajani, Tella, Salawu and Abdullahi (2022) demonstrated increasing awareness and readiness among librarians regarding artificial intelligence integration in Nigerian academic libraries, while more recent investigations have continued to examine librarians' competencies and preparedness for technological transformation. Despite these contributions, available evidence remains fragmented because many studies have concentrated on specific dimensions of artificial intelligence adoption rather than providing a broader understanding of how academic librarians perceive its integration into library services.

Growing scholarly attention to artificial intelligence has undoubtedly expanded knowledge regarding technological innovation within libraries, yet important questions remain unanswered regarding the perceptions of academic librarians who are expected to work directly with these technologies. Existing literature has frequently emphasized readiness, digital skills, competencies, adoption requirements, and service improvement opportunities, while comparatively less attention has been directed toward understanding the collective perceptions that shape acceptance or resistance toward artificial intelligence integration. Such a situation creates uncertainty because successful implementation of any technological initiative depends not only on the availability of infrastructure and technical resources but also on the attitudes and expectations of those responsible for its application. Achugbue (2025) observed increasing interest in artificial intelligence skills among librarians, suggesting that professional engagement with emerging technologies continues to grow across academic libraries. However, increasing interest in technological competence does not automatically provide sufficient understanding of how librarians perceive artificial intelligence, the concerns they may hold, or the challenges they associate with its integration into everyday library services.

Lack of sufficient evidence regarding academic librarians' perceptions presents a significant challenge for institutions seeking to introduce artificial intelligence into library operations because implementation decisions may be made without adequate understanding of the views of key stakeholders. Uncertainty regarding awareness levels, perceptions,

and perceived challenges may limit the effectiveness of policies, professional development programmes, and institutional investments designed to support artificial intelligence adoption within academic libraries. Such concerns become more important within Nigeria where libraries continue to pursue technological advancement while simultaneously addressing issues related to infrastructure, funding, and professional capacity development. Lulu-Pokubo and Okwu (2025) emphasized the importance of awareness regarding artificial intelligence technologies for supporting sustainable library services, indicating the continuing need to understand how librarians view these emerging technologies. This study therefore seeks to address this gap by examining the perceptions of academic librarians in Nigeria towards artificial intelligence integration in library services, with particular attention to awareness, perceptions, and challenges associated with its adoption and use.

Literature Review

Evolving Role of Academic Libraries in the Digital Era

Academic libraries have experienced substantial changes over the years as technological advancement continues to influence the methods through which information resources are acquired, organized, preserved, and delivered to users across higher education institutions. Traditional responsibilities that were once centered primarily on the management of printed collections have gradually expanded to include the provision of digital resources, electronic services, research support, and technology-driven information access systems designed to meet contemporary academic demands. Growing expectations from students, researchers, and lecturers have further encouraged academic libraries to explore innovative approaches capable of improving operational efficiency and strengthening service quality. Bell and Dalmau (2020) observed that technological developments continue to influence library operations and service delivery, creating opportunities for libraries to adopt new tools that support information management and user engagement. Such developments suggest that academic libraries are no longer viewed merely as repositories of information resources but increasingly as active partners in teaching, learning, research, and knowledge creation within modern academic environments.

Changing expectations within higher education have further encouraged academic libraries to reposition themselves as institutions capable of supporting increasingly complex information needs through the strategic use of emerging technologies and innovative service models. Growing volumes of digital information, increasing demand for remote access, and expanding research activities have created new responsibilities that require libraries to move beyond conventional service approaches and embrace more technology-oriented solutions. Such adjustments have encouraged libraries to invest in digital infrastructures, electronic collections, and intelligent systems that can improve access to information while supporting efficient service delivery. Ngulube and Mosha (2024) explained that libraries are increasingly examining technology-based solutions that can strengthen information services and improve user experiences while maintaining professional standards and institutional objectives. Although these developments demonstrate significant progress in library modernization, existing discussions remain largely focused on technological possibilities, creating the need for greater attention to how librarians perceive and respond to these continuing changes within academic library environments.

Attention to librarians' responses becomes increasingly important because successful technological transformation depends not only on technological availability but also on the willingness of professionals to understand, accept, and effectively utilize new systems within their daily responsibilities. Academic librarians remain central to the planning, implementation, management, and evaluation of library services, making their perceptions an important consideration whenever new technologies are introduced into library operations. Growing interest in artificial intelligence has therefore generated discussions regarding its potential contribution to information management, service improvement, and operational effectiveness within academic libraries. Oton and Kolawole (2025) noted that artificial intelligence is gradually becoming part of discussions surrounding library modernization and service innovation in Nigeria, reflecting increasing institutional interest in its application. Despite this growing attention, existing literature has concentrated more extensively on technological capabilities and implementation possibilities, leaving limited understanding regarding how academic librarians perceive these developments, thereby creating a need for further investigation into their views and experiences.

Emergence and Applications of AI in Libraries Globally

Growing technological advancement within academic libraries has naturally encouraged interest in artificial intelligence because institutions are increasingly seeking solutions capable of improving service quality, operational efficiency, and user satisfaction within rapidly changing information environments. Artificial intelligence has emerged as one of the most discussed technological innovations due to its ability to support automated processes, analyze large volumes of information, assist decision making, and improve interactions between users and information systems. Interest in artificial intelligence has expanded beyond commercial and industrial sectors and has become increasingly visible within library and information services because of its potential to strengthen information access and resource management. Ali, Naeem and Bhatti (2020) explained that artificial intelligence technologies are attracting growing attention among librarians because they offer opportunities for improving library operations and supporting users more effectively through intelligent systems. Such developments indicate that artificial intelligence is gradually moving from a

theoretical concept toward a practical tool that can support the changing responsibilities and expectations associated with modern library services.

Growing acceptance of artificial intelligence within libraries has encouraged institutions to explore different areas where intelligent systems can improve efficiency while reducing the burden associated with repetitive and time-consuming professional activities. Applications of artificial intelligence are increasingly being linked with information retrieval, resource discovery, user support services, data organization, digital collection management, and personalized information delivery systems designed to improve user experiences. Such applications are particularly attractive because academic libraries continue to manage expanding collections of digital information that require faster processing and more efficient methods of organization and access. Das and Islam (2021) observed that artificial intelligence and machine learning technologies provide libraries with opportunities to improve information management processes while supporting more responsive and user-centered services. Although these developments demonstrate considerable potential for service improvement, discussions surrounding implementation continue to raise questions regarding professional readiness, institutional preparedness, and the practical realities associated with introducing artificial intelligence into everyday library operations.

Attention to implementation issues has become increasingly important because the successful use of artificial intelligence depends not only on technological capabilities but also on the ability of institutions and professionals to utilize such technologies effectively and responsibly. Academic libraries are expected to balance innovation with professional values while ensuring that technological adoption contributes meaningfully to teaching, learning, research, and information access objectives. Hayani, Sari and Sukiman (2021) noted that artificial intelligence can support productivity, improve decision making, and assist libraries in handling complex tasks more efficiently when appropriate structures and competencies are available. Similar observations have encouraged many libraries across different countries to explore the possibilities associated with intelligent technologies while simultaneously examining the challenges that may affect successful adoption. Despite increasing evidence regarding the benefits and applications of artificial intelligence within libraries globally, existing discussions continue to focus primarily on technological opportunities, creating a need for greater understanding of how librarians perceive these technologies and how such perceptions may influence implementation outcomes.

Previous Studies on AI Integration in Academic Libraries Worldwide

The development of artificial intelligence (AI) can update, improve, and augment many digital applications, providing these technologies some autonomy without the need for human intervention. The requirement for awareness regarding AI cannot be overstated given the variety of needs of the current technological survey clientele (Oyekale & Zubairu, 2023).

Research on artificial intelligence integration in academic libraries has expanded considerably as scholars continue to examine how emerging technologies influence library operations, professional responsibilities, and service delivery across different institutional environments. Existing studies have investigated issues such as awareness, readiness, adoption, competencies, technological skills, and organizational preparedness, reflecting increasing scholarly interest in understanding the relationship between librarians and artificial intelligence technologies. Abayomi, Adenekan, Abayomi, Ajayi and Aderoke (2021) reported that academic librarians generally demonstrated awareness of artificial intelligence applications within university libraries, suggesting that knowledge of these technologies is becoming more widespread within the profession. Similar attention has been directed toward institutional readiness and the willingness of libraries to explore innovative technologies capable of improving service effectiveness and operational efficiency. Although these studies provide useful insights into the state of artificial intelligence within academic libraries, much of the discussion remains focused on awareness and preparedness, leaving questions regarding broader professional perceptions insufficiently addressed across different academic environments.

Attention has also been directed toward the competencies and professional capabilities required for successful artificial intelligence implementation because technological adoption depends significantly on the ability of librarians to understand and effectively utilize emerging systems. Achugbue (2025) examined artificial intelligence skills among librarians in academic libraries and emphasized the importance of professional capacity development in supporting technology-driven library services. Similar observations were presented by Ogunbodede and Ejitagha (2026), who highlighted the relationship between digital literacy and artificial intelligence readiness among librarians in Nigerian university libraries, suggesting that technological competence remains an important factor influencing adoption efforts. Related studies have further explored readiness, professional preparedness, and institutional requirements associated with artificial intelligence integration, indicating that successful implementation requires more than technological infrastructure alone. Despite these contributions, existing research has largely concentrated on competencies, readiness, and skills development, creating a noticeable gap regarding how academic librarians collectively perceive artificial intelligence and how such perceptions may influence acceptance, utilization, and long-term implementation efforts.

Questions concerning adoption, opportunities, and implementation challenges have also attracted scholarly attention because artificial intelligence integration continues to present both promising possibilities and practical concerns for academic libraries. Igbo, Imo, Jidere and Ugwu (2025) identified several requirements and challenges associated with adopting artificial intelligence in academic library services, while Atanda (2025) discussed both the prospects and

obstacles influencing artificial intelligence adoption within Nigerian academic libraries. Additional investigations have examined the influence of artificial intelligence on library service delivery, cataloguing processes, information access, and other operational functions, indicating that the technology possesses substantial potential for improving library performance and user experiences. Such findings collectively demonstrate increasing international and national interest in artificial intelligence integration within academic libraries. However, existing studies have predominantly examined adoption factors, competencies, opportunities, and implementation challenges, leaving limited empirical attention devoted specifically to understanding librarians' perceptions regarding artificial intelligence integration, thereby establishing a clear justification for further investigation in this area.

Identifying Gaps in the Literature Related to Nigeria and African Perspectives

Existing literature has made significant contributions to understanding artificial intelligence adoption within academic libraries, particularly through studies examining awareness, readiness, competencies, technological skills, implementation requirements, and service improvement opportunities across different institutional settings. Available evidence demonstrates that artificial intelligence is increasingly attracting attention among librarians because of its potential to improve information access, strengthen service delivery, and support efficient library operations. Several studies conducted within Nigeria have also provided useful insights into issues relating to professional preparedness, adoption requirements, technological competencies, and implementation challenges. Despite these contributions, available research remains largely concentrated on specific dimensions of artificial intelligence adoption rather than providing a comprehensive understanding of how academic librarians perceive the integration of artificial intelligence into library services. Such a situation creates an important knowledge gap because perceptions often influence acceptance, resistance, willingness to learn, and the extent to which technological innovations are successfully incorporated into professional practice within academic libraries.

Limited attention to librarians' perceptions becomes more apparent when existing studies are examined collectively because many investigations have focused primarily on technological readiness, digital competencies, awareness levels, implementation prospects, and organizational requirements. Studies conducted by Achugbue (2025), Ogunbodede and Ejitagha (2026), and Jatto and Tella (2024) have contributed valuable knowledge regarding librarians' skills, readiness, and professional preparedness for artificial intelligence adoption within academic libraries. Similar studies have also explored implementation challenges, service delivery opportunities, and technological requirements associated with artificial intelligence integration. While these investigations provide important foundations for understanding adoption-related issues, they offer comparatively less evidence regarding how academic librarians interpret artificial intelligence, what concerns they associate with its implementation, and how their perceptions may influence institutional efforts toward technological transformation. Absence of sufficient empirical evidence regarding these issues creates uncertainty because successful implementation depends not only on infrastructure and competencies but also on the attitudes and viewpoints of library professionals.

Recognition of this gap provides a strong justification for further investigation because academic librarians remain central actors in the adoption, management, and utilization of artificial intelligence within library environments. Nigerian academic libraries continue to pursue modernization initiatives intended to improve service quality and respond to changing user expectations, yet limited evidence exists regarding how librarians perceive these developments within their professional settings. Existing studies have provided important information concerning adoption factors, awareness levels, competencies, and implementation challenges, but a comprehensive assessment of librarians' perceptions remains insufficiently addressed within the Nigerian and broader African literature. Such a gap is particularly important because perceptions can influence policy implementation, professional development efforts, resource allocation decisions, and the success of technological innovations introduced into academic libraries. This study therefore addresses this identified gap by examining the perceptions of academic librarians in Nigeria towards artificial intelligence integration in library services, thereby contributing evidence capable of supporting future research, policy development, and institutional decision making.

Methodology

This study was conducted using a social survey methodology. In this study, the questionnaire served as the research tool. It was divided into two sections: the first was intended to gather demographic and personal data from respondents, and the second was created to gather data on how Academic librarians in Nigeria felt about the usage of artificial intelligence in delivering library services. 500 Academic librarians from different libraries and institutions in Nigeria participated in the survey. The instrument was sent to three professionals whose areas of competence include artificial intelligence and information technology for review and expertise evaluation. The test retests technique was used to assess the instrument's performance, and the result was a reliability rating of 0.85. The academic librarians who took part in the survey were chosen using a random sample method. 500 surveys were distributed to academic librarians in total; 394 of those surveys were completed and returned, representing a 78.8% response rate. Simple percentages were chosen for the study's data collection in order to facilitate analysis and interpretation. The study was conducted using the Statistical Package for the Social Sciences (SPSS) application software version 28.

Results and Discussion

Out of 500 copies of the questionnaire administered, 394 (78.8%) were completed and returned. Data were presented for analysis using descriptive statistics which include; frequency count and percentages. The second part of the questionnaire was administered to collect information on the awareness, and perception of academic librarians towards the use of Artificial Intelligence in library service delivery as well as recommendations was made to enhance the efficiency and effective implementation of Artificial Intelligence in Nigerian libraries.

Table 1. Distribution of respondents by gender

Gender	Frequency	Percentage
Male	128	32.5%
Female	266	67.5%
Total	394	100%

Source: *Researcher field survey, 2026*

Table 1 reveals that 128 (32.5%) were male while 266 (67.5%) were female. This shows that there are more female academic librarians in Nigerian libraries than males

Table 2. Distribution of respondents by working experiences

Working Experiences	Frequency	Percentage
0-5 Years	134	34.1%
6-10 Years	103	26.1%
11-15 Years	77	19.5%
16 – 20 Years	64	16.2%
20 Years and Above	16	4.1%
Total	394	100%

Source: *Researcher field survey, 2026*

Table 2 shows the working experiences of the respondents involved in the survey. 134 (34.1%) were between 0- 5 years of experience while 103 (26.1%) were between 6 – 10 years of experience whereas 77 (19.5%) were between 11-15 years of experience while 64 (16.2%) were between 16-20 years experiences and 16(4.1%) had 20 years or more experience.

Table 3. Distribution of academic qualifications of respondents

Level of Education	Frequency	Percentage
BLIS	185	47%
PGDL	38	9.6%
MLIS	159	40.4%
PHD	12	3.0%
Total	394	100%

Source: *Researcher field survey, 2026*

Table 3 shows the academic qualifications of the respondents. 185 (47%) had bachelor's degrees in library science while 38 (9.6%) had postgraduate diplomas in library whereas 159 (40.4%) had masters in library and information science and 12(3.0%) had doctorate degrees.

Objective 1: To find out the level of awareness of Artificial Intelligence by academic librarians in Nigeria

Table 4. Level of awareness of Artificial Intelligence

Level of Awareness	Frequency	Percentage
High level of awareness	73	18.5%
Average level of awareness	116	29.4%
Low level of awareness	205	52.1%

Source: *Researcher field survey, 2026*

Table 4 shows the level of awareness of Artificial Intelligence among Academic Librarians in Nigerian. The majority of respondents, 205 (52.1%), reported having a low level of awareness, 116 (29.4%), an average level of awareness, and 73 (18.5%), a high level of awareness. The majority of responses, which indicates the low level of AI awareness in Nigerian libraries, may be due to the poll involving a sizable proportion of academic librarians.

Objective 2: To ascertain academic librarians' perception towards the use of Artificial Intelligence for library services in Nigeria

S/N	Perception of AI Usage	SA	A	SD	D
1	Job loss	305(77.4%)	70(17.8%)	4(1%)	15(3.8%)
2	Difficult to use	212(53.8%)	34(8.6%)	60(15.2%)	88(22.4%)
3	Increase global Recognition	253(64.3%)	92(23.4%)	17(4.3%)	32(8%)
4	Improve library service delivery	326(82.7%)	63(16%)	1(0.3%)	4(1%)
5	Privacy issues	229(58.2%)	58(14.8%)	63(16%)	41(11%)

Source: *Researcher field survey, 2026*

Table 5 shows the perception of academic librarians towards the use of Artificial Intelligence in Nigerian libraries. Out of the total 394 respondents, the majority 375 (95.2%) believes that Artificial intelligence can cause job loss, 246 (62.4%) believes that Artificial Intelligences are difficult to use, 345 (87.7%) believes that Artificial Intelligences will increase global recognition of academic libraries, 389 (98.7%) believes that Artificial Intelligences will improve library service delivery and 287 (70%) believe that Artificial Intelligence has privacy issues.

Objective 3: To identify the challenges that can hinder the use of Artificial Intelligence for library services in Nigeria.

Table 6: Challenges associated with the adoption of Artificial Intelligence in academic libraries

Challenges	SA	A	SD	D
Lack of fund	319 (81%)	70(17.8%)		5(1.2%)
Epileptic Electricity	234(59.4%)	157(39.9%)		3(0.7%)
Inadequate ICT Facilities	289(73.4%)	102(25.8%)	1(0.3%)	2(0.5%)
Insufficient Internet service Provider	332(84.3%)	54(13.8%)	3(0.7%)	5(1.2%)
Insufficient AI Equipment	198(50.3%)	188(47.7%)	8(2%)	
Mechanical Problems	341(86.5%)	52(13.2%)	1(0.3%)	
High risk of Maintenance	264(67%)	129(32.7%)		1(0.3%)
Lack of expertise to operate it	349(88.6%)	41(10.4%)	4(1%)	
Potential job Loss	231(58.7%)	160(40.6%)	3(0.7%)	

Source: *Researcher field survey, 2026*

Table 6 shows potential challenges that libraries may face in the integration of Artificial Intelligence to library services in academic libraries in Nigeria. These include lack of fund 389 (98.8%), Epileptic electricity 391(99.3%), Inadequate ICT facilities 391(99.3%), Insufficient Internet service provider 386(98.1%), Insufficient AI equipment 386(98%), Mechanical problems 393(99.7%), High risk of maintenance 393(99.7%), Lack of expertise to operate it 390(99%) and Potential job loss 391(99.3%)

Discussion of findings

The findings of the study discovered that the majority of academic librarians in Nigeria are not aware of the use of Artificial Intelligence in libraries. This study is in line with the findings of Sambo & Oyovwe-Tinuoye (2023) who indicate in their study that the majority of respondents were averagely aware of artificially intelligent technologies in library operations.

The results further revealed the perception of academic librarians towards the use of Artificial Intelligence in Nigerian libraries. Whereas, participants affirmed believes that Artificial intelligence can cause job loss, can be difficult to use, has privacy issues and also believed that Artificial Intelligence can increase global recognition of academic libraries and improve library service delivery. This agrees with the findings of Massis (2018) which revealed that many academic librarians perceive the adoption of Artificial Intelligence as a danger since they think it will execute the tasks that should be carried out by them. It should be noted, nonetheless, that the adoption and application of AI in libraries will improve the quality of the services offered by libraries

The results further show that Academic librarians may face diverse challenges in the use of Artificial Intelligence in carrying our library services in Nigeria such as lack of fund, Epileptic electricity, Inadequate ICT facilities, Insufficient Internet service provider, Insufficient AI equipment, Mechanical problems, High risk of maintenance, Lack of expertise to operate it and Potential job loss. The outcome of this conforms to that of Okoro and Ukwoma (2020) whisch Findings from the study revealed that some of the identified challenges of AI implementation in libraries include: high implementation costs, insufficient technical expertise, and concerns about privacy. On the same hand, Anunobi and Ejezie (2021) study also highlights the challenges of AI implementation in libraries, such as insufficient technical expertise, high implementation costs, and privacy concerns. Likewise, Sambo, Imran and Akanbi (2022) in their study enumerated various obstacles faced by librarians in Nigeria libraries such as power failure most time, lack of digital equipment, workload quite overwhelming/ cost of digital skills training, lack of basic digital literacy skills, I am not computer literate, I had limited time in my offices due to other official assignments.

Conclusion

This study addressed the limited empirical evidence regarding the perceptions of academic librarians towards artificial intelligence integration in library services within the Nigerian academic library environment. Findings revealed that although academic librarians recognize the potential of artificial intelligence to improve service delivery, information access, and operational efficiency, concerns relating to job displacement, inadequate funding, unstable electricity supply, poor information and communication technology infrastructure, insufficient technical expertise, high maintenance demands, and limited availability of supporting facilities continue to influence their perceptions and willingness to embrace the technology. Evidence from the study further showed that awareness and practical utilization of artificial intelligence remain below expected levels despite increasing attention given to artificial intelligence within library and information services. These findings contribute to existing knowledge by providing a clearer understanding of how academic librarians perceive artificial intelligence beyond issues of readiness, competencies, and adoption requirements that have dominated previous studies. The study therefore concludes that successful integration of artificial intelligence in Nigerian academic libraries will depend not only on technological investments but also on addressing librarians' concerns, strengthening professional capacity, and creating supportive institutional conditions that encourage acceptance and effective utilization of artificial intelligence technologies.

Recommendations

- Library management should let librarians know that not all staff layoffs are caused by the deployment of artificial intelligence in libraries. The study of artificial intelligence should be taught in schools at all levels so that graduates can work in all spheres of the economy and apply their knowledge of the field to the advancement of the country.
- The management of libraries should put more effort into making sure that these aspiring researchers and librarians have the right training, and they should retrain all of their staff on how to handle and apply artificial intelligence in a library setting. All libraries, regardless of kind, should get familiar with artificial intelligence to facilitate effective and quicker library operation and service delivery in the contemporary Information and Communication Technology (ICT) era.
- Library administration should increase access to high-speed internet in order to effectively use artificial intelligence in libraries.
- The library management should make sure that funds granted to the libraries are used wisely in order to prevent budgetary allocations from being misappropriated.

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Readiness for ICT-Driven Health Record Management in University of Maiduguri Teaching Hospital, Nigeria

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Abstract

This study investigated the readiness for adoption of ICT for on health record management in university of Maiduguri teaching hospital, Borno state, Nigeria. The use of technology in health records has enhanced cost savings in the healthcare system by lowering the need for paper records and the related expenses of storage and retrieval, in addition to increasing patient care and efficiency. The recent increase on the cost of health care is one of the primary contemporary issues affecting the health care industry in several nations of the world. The main objectives of the study were to access the types of ICT facilities available for health records management, to evaluate the types ICTs facilities used for effective and efficient management of health record and to access the utilization of ICT facilities for health record management. Quantitative research method and survey research design was adopted for the study. The population of the study was 120 staff of the medical Centre. Total enumeration was used to determined sample size. Questionnaire was used as the instrument for data collection. The data collected was analyzed and interpreted using frequency, tables and simple percentage. The study further showed that easier EHR systems installed and implemented was the strategy with the highest frequency which was recorded in the response rate of 102 (92.6%). The study recommended that management of UMTH should strategize their implementation through testing of the software before utilizing the Online Database for effective and efficient management of health record and there should be constant electricity supply for digitization project.

KEY WORDS: Electronic Health Record, ICT, Online data base, Health Information and Information Technology

Introduction

In recent years, technology has assumed a greater significance in the healthcare sector, and the use of technology in health records is no exception. Patients and healthcare practitioners alike have benefited from the digitization of health records in a variety of ways, including better patient care, enhanced productivity, and lower costs. The electronic health record (EHR) system has been one of the most important technologies utilized to enhance patient care. The paper-based medical records that have historically been utilized in healthcare have been replaced with electronic health records (EHRs). They enable the storage and exchange of patient data between various healthcare providers, which may enhance patients' continuity of care. Patients with chronic diseases who may see several doctors and experts should pay extra attention to this. EHRs also makes it simple for medical professionals to access a patient's whole medical background, which can aid in diagnosis and treatment.

Patient information was recorded on paper forms which were then filed in physical folders or files. Healthcare professionals would manually record patient data, including medical history, test results, and treatment plans. Data was entered into paper-based records which was prone to errors, inconsistencies, and inaccuracies. Physical records took up significant storage space, making it challenging to manage large volumes of data. Each healthcare facility or institution had its own manual record-keeping system leading to variations in data formats and structures. (Adedeji, et-al 2018)

Information and Communication Technology (ICT) refer to an umbrella term that encompasses all technologies used to handle telecommunications, broadcast media, intelligent building management systems, audio-visual processing and transmission systems, and information technology (IT) systems. This includes both the internet and wireless networks along with the devices and applications that utilize these technologies. (Rodrigues, 2018)

Effective health record management is crucial for improving the quality of patient care, ensuring compliance with healthcare regulations and facilitating health information exchange among healthcare providers. The manual management of health records had several implications for the health sector this includes; inaccurate and incomplete data, manual data entry errors, omissions, and inconsistencies, compromising the accuracy and completeness of patient records. Manual record-keeping made it challenging to analyze and interpret patient data limiting the ability to make informed decisions about patient care, delayed access to patient information. (*Walker, 2024)*). Manual record-keeping

often requires physical presence at the healthcare facility delaying access to patient information, hinders timely decision-making. It makes it difficult to standardize data formats and structures limiting interoperability between healthcare facilities and organizations. (*Aguirre, 2019)* The adoption of Information Communication Technology (ICT) among general practitioners is to provide access to the health services for the citizens (Ammen, 2020). ICT resources have improved level of patients' safety and outcome. Furthermore, the use of sophisticated equipment has improved the update on patient's medical status (Guah, 2019). The recent increase on the cost of health care is one of the primary contemporary issues affecting the health care industry in several nations of the world. Through the application of ICT resources in the healthcare sectors hospitals have been able to reduce their operational and other associated costs (Geneva, 2019)

In today's digital age, the concept of readiness is more crucial than ever. It refers to the ability to adapt, adopt, and thrive in an ever-changing environment where technological advancements, globalization, and rapid innovation are the norm. (Dash, 2019). The digital era has brought about significant advancements in health records management enabling electronic Health Records (EHRs), digital storage, access to patient records, reducing paperwork and improving data accuracy. It has equally helped in seamless exchange of information between different systems, organizations, and healthcare providers, enhancing patient care coordination and continuity, artificial Intelligence (AI) and Machine Learning (ML).

Research conducted in University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu State, Nigeria, discovered that the hospital faced several challenges while utilizing manual health record management system which has led to difficulties in maintaining accurate and up-to-date patient records. (Page, 2020). The study emphasizes the need for hospitals to adopt electronic health record systems to improve patient care and reduces errors. The research was conducted to determine whether University of Maiduguri teaching hospital Borno state Nigeria, is prepared to embrace ICT for effective health management.

Statement of the Problem

The manual method of maintaining health records involved paper-based systems, handwritten entries, and physical file storage. However, this method was prone to errors and had limitations in data retrieval and integrity (Dash, 2019). Over the last decade, the inclusion of Information and Communication Technology (ICT) has helped develop new ways of providing efficient and secure healthcare. The shift to digital health records has revolutionized patient data management, offering electronic health records (EHRs), digital data entry, cloud storage, search and retrieval and data integrity. This has resulted in a rapid increase in the utilization of ICT application in the health sector. Health Information dissemination has been very scanty due to low level of ICT in the delivery of health services in the Government hospital. Sustainable health service delivery in Nigeria has the potential to benefit not only the masses but all citizenry regardless of their socio-political status. Digital health records also enable accessibility, interoperability, and real-time access to patient information. The benefits of digital health records include improved accuracy, enhanced patient care, increased efficiency, better data analysis, and improved patient engagement. Overall, the transition from manual to digital health records has improved the quality of care and patient outcomes. (Juhn, 2020). Electronic health records (EHR) systems have enabled the digital storage of patient data, doing away with the need for paper records and the costs involved in maintaining them.

Despite the many advantages of technology in health records, several issues still need to be resolved. Keeping patient information secure and private is one of the major problems. By eliminating the need for transcription services, which may be costly and time-consuming, digital operation notes help boost cost reductions. Another affordable option is telemedicine, which enables remote consultations and eliminates the need for patients to travel to a healthcare facility, relieving pressure on the healthcare system and improving patient convenience. EHRs can also aid in preventing pharmaceutical mistakes and lowering the frequency of pointless procedures and testing, which can eventually save healthcare expenses. Overall, the use of technology in health records has resulted in more effective workflow, more care coordination, and better patient outcomes, all while lowering healthcare costs. It is however worrisome that hardly could one find a public hospital in all the 36 states of Nigeria where the health information management is fully computerized. Failure to adopt ICT in health record management can adversely affect patient safety, quality of care, healthcare efficiency, and overall compliance, ultimately leading to detrimental outcomes for both healthcare organizations and patients. Embracing ICT is essential for modernizing health record management and advancing healthcare delivery. This study aims to bridge this gap by investigating how adoption of ICT could assist in effective and efficient health management in university of Maiduguri teaching hospital Borno state, Nigeria

Objectives of the study:

1. To assess the types of ICT facilities available for health records management in UMTH, Maiduguri, Borno state?
2. To evaluate the types of ICT facilities used for effective management of health record in UMTH, Maiduguri, Borno state?
3. To access the utilization of ICTs facilities for health record management in UMTH, Maiduguri, Borno state?

Literature Review

Information and Communication Technologies (ICTs) have become a critical success factor needed for accomplishment of set goals and tasks in every organization and human endeavors The multifarious technological tools and resources both old and new are used to acquire, process, store, edit, retrieve, transfer, and disseminate information and knowledge of various formats. The technological tools and resources consist of telephony, cable, satellite, television, radio, computer-mediated conferencing, video conferencing; digital technologies, information networks, Internet, World Wide Web, intranets and extranets and software applications (Hussien,2019). These diverse ICT tools mentioned have had much impact on work performance of individuals in organizational growth. Teaching hospitals are established with the intent to facilitate the provision of qualitative healthcare to general populace. EHR has been considered as an instrument or a key factor for improving healthcare quality and safety. Using EHR has been observed by Health, (2019) that it has eliminated the tons of paper records and x-ray films. It could also reduce the in-person visits, paper use, transportation, water consumption and some toxic chemicals. In the study of Cowie*, (2017)* who assessed the emerging ICT use patterns for health service delivery in Africa, found out that capability to use ICT among care providers would subsequently influence how the majority of participants use ICT to maintain family and social connections and access information on health and routine activities. (Heart, 2017);

Gai (2015), presents a result from a study on the use of information and communication technologies (ICT) in Mozambique with a focus on the health sector. They found out that the development of ICT capacity and information systems at district and provincial levels in Mozambique needs to be an integrated effort across sectors since the level of ICT use among the workforce was somewhat low. Readings had shown that recent innovations in ICT have led to a new era in health care delivery and medical data management especially regarding the security of sensitive medical information (*Molone*, 2023). Several benefits of ICT had been well documented in many clinical studies (Jamal et al., 2021). To achieve an optimal coordination and effective healthcare service delivery in teaching hospitals and to expand in the healthcare industry, Swinkels (2024), stated that new digital technologies are always developed to support the clinical practice that will bring many advantages into the healthcare sector. ICT use for health record management includes computer system, Application software's, Internet, CD ROM, internet and printers and software applications. One of these digital technologies is the electronic health records (EHR) which is used interchangeably as electronic health records (EHR) system, telemedicine and electronic medical records (EMR). Solomon (2016), describe electronic health records (EHR) as a computerized health information system that provides detailed information such as patient demographics, encounter summaries, medical history, allergies, intolerances, and lab test histories. EHR system is a digital version of a patient's paper chart it gathers, creates and stores the health record electronically with facilities for tracking patient demographics, medical histories, medications, test results and other types of patients- specific clinical information, as well as the costs associated with the services provided.

Desai (2021*),* in their studies also observed that the use of EHR is quite low in the teaching and tertiary hospitals. According to *Jayaraman, Prem Prakash*), the low use of the EHR system is attributed to increase in time medical doctors are required to spend in dealing with patients' cases. Jayaraman (2020) pointed out that financial barrier is viewed as having the greatest impact on decisions about the adoption (use) of electronic health records. Nerves (2020) noted the issue of system failures which created safety issues and frustrations. EHR has been considered as an instrumental or a key factor for improving healthcare quality and safety. Using EHR as observed by Torfi (2020) has helped in the elimination of tons of paper records and also x-ray films. It could also reduce the in-person visits, reduce paper use, transportation, water consumption and also some toxic chemicals, which could in turn help in reducing the environmental footprint. Telemedicine is another piece of technology that is being utilized to enhance patient care. Patients can communicate with medical professionals via video conferencing, phone calls, or texting through telemedicine. Patients who live in remote locations or have mobility challenges may find this to be very helpful. Since patients may be seen remotely rather than going to a doctor's office or hospital, telemedicine can also aid in reducing the transmission of contagious illnesses.

In addition, a study conducted by Sabastian (2021), found that 5% more consultations per hour were seen by doctors in the EMR period compared to the paper medical record period. It was also revealed that doctors and nurses preferred the EMR system. Kukafka (2021) noted that electronic health record (EHR) system is created with the goals of improving patient care through improving the availability of information at the point of need, improving the efficiency and effectiveness of health and health care service, improving billing procedures, reducing the frequency of lost records or data, and minimizing medication errors. Experts in the health sector depend primarily on patient health records to discharge their duties efficiently. Patients' health records represent the central slate upon which clinical investigations are recorded and preserved for planning, research, monitoring, and policymaking purposes (Shah, 2020). Furthermore, in the study of Dymek (2021*)* who assessed the emerging ICT use patterns for health service delivery in Africa, found out that capability to use ICT among care providers would subsequently influence how the majority of participants used ICT to maintain family and social connections and how they accessed information on health and routine activities.

The multifaceted benefits of health information system and associated information technologies in public healthcare delivery cannot be overemphasized. Management Information Systems are essential tools in public healthcare institutions deployed to aid in monitoring and combating the outbreak of diseases. (Aguirre, 2019) also remarked that there are various types of damage that could affect paper documents. Additionally, the author posited that preservation and conservation of archives and records is not without some constraints especially in developing countries like Africa where information and communication technology is gradually being incorporated into every sphere of information science operation. Some of these constraints according to him were; changes in software and hardware, inadequate funding, inadequate technology infrastructures and lack of legislation/policy

Methodology

The study adopted quantitative research method. The population of the study was the hospital management staffs with twenty (25) doctors, fifty - six (56) nurses, fifteen (15) laboratory technologist, nine (9) pharmacist, five (5) Health Management Information System (HMIS)and ten (10) others. Survey research design was used. Complete enumeration also known as census was used to determine the sample size, questionnaire was used as the instrument for data collection, the researcher was assisted by two trained research assistants in the distribution and retrieval of the questionnaires which lasted for a period of two (2) weeks. The data was collected and analyzed using descriptive statistics

Findings and Discussions

Table 4.1 ICTs facilities available for health records management

Types of ICTs Facilities For HR	ailable and accessible	available and Accessible
Computers	92 (83.6)	10(9.1)
CD ROM	11(10)	56(50.9)
Printer	88(80)	75(68.2)
Network cable	79(71.8)	15 (13.6)
Scanner	18(16.4)	75(68.2)
Internet	97(88.2)	5(4.5)
Software applications	88(80)	12(10.9)
Digital camera	12(10.9)	90(81.8)

Table 4.1 above shows the types of ICTs facilities available for health records management in UMTH, Maiduguri, Borno state. From the table above, it could be seen that quite a number of respondents are aware of the availability of internet with the frequency and percentage of 97(88.2%), Computers 92 (83.6%), Printer and Software applications 88(80%) while CD ROM was the least with the frequency and percentage of 11(10%). This finding is in line with the findings of (Vroman, 2015) who examined that ‘‘who over 65 is online?’’, their study showed that the majority of participants used ICT to maintain family and social connections and to access information on health and routine activities.

Consequently, from the table, there were respondents that were not aware of the availability of the ICTs for health records management in UMTH, Maiduguri, Borno state. The respondents that were not aware were Internet 5(4.5), Computers 10(9.1), Digital camera 90(81.8) and Printer 75(68.2), software applications with 12(10.9) and CD ROM with 56(50.9) respectively. The implication of this finding was that while the types of ICTs facilities that were not available and accessible for health records management in UMTH could affect the readiness for adoption of ICT on health records management.

Table 4.2 The extent of usage of ICT facilities for health records management

Types of ICT	Very High	High	Low	Very Low
Printer	75(61.1)	66(60.0)	13(11.8)	3(2.7)
Computer (Desktop/Laptop)	99(90.0)	88(80.0)	10(9.1)	0(0.0)
Email	43(39.1)	39(35.4)	32(29.1)	2(1.8)
Internet	99(90.0)	85(77.3)	0(0.0)	0(0.0)
CD ROM	7(6.4)	7(6.4)	0(0.0)	0(0.0)
Online Database	56(50.9)	67(60.9)	16(14.5)	0(0.0)
Software application	88(80.0)	91(82.7)	44(40.0)	1(0.9)
Telemedicine Platform	-	-	-	-

Table 4.2. above shows the extent of usage of ICTs facilities for effective and efficient management of health record in UMTH, Maiduguri, Borno State. From the table above it was discovered that from the seven (7) types of ICTs, Computer (Desktop/Laptop) and Internet were the most highly degree of usage of ICTs facilities with the highest frequency and percentage of 99(90.0). Furthermore, Computer (Desktop/Laptop) has a frequency and percentage of 88(80.0), software application 44(40.0) while Printer with the frequency and percentage of 3(2.7) was rarely used. This finding corresponded with that of Barrow (2017), who stated that new digital technologies are always developed so as to support the clinical practice that would bring many advantages into the healthcare sector. One of these digital technologies was the electronic health records (EHR) which was used interchangeably as electronic health records (EHR) system and electronic medical records (EMR).

Consequently, the implication was that Computer (Desktop/Laptop) and Internet with the highest frequency and percentage were the most extent of usage of ICT facilities for the management of health record in UMTH Maiduguri, Borno State.

Table 4.3. Utilization of ICTs facilities for Health Record Management

Utilization of ICT in health records	SA	A	D	SD
It is used to improve the performance of health professionals	15(13.6)	30(27.2)	42(38.2)	78(70.9)
It is utilized for reducing operation/administrative costs and enhance patient safety	77(70.0)	51(46.4)	52(47.3)	37(33.6)

It is used to improve efficiencies and accuracy of health records	100(90.0)	87(79.1)	16(14.5)	7(6.4)
ICTs helps the clinical work processes to be re-engineered to make the work process more effective	91(91.8)	77(70.0)	9(8.2)	0(0.0)
It is utilized to lower medical errors and reduces the cost of healthcare.	78(70.9)	50(45.8)	10(9.1)	7(6.4)
EHR's are used for the elimination of duplicate testing and examinations done on patients	88(80.0)	61(55.4)	3(2.7)	0(0.0)

From the table 4.3 above, it was discovered that 15 (13.6) respondents strongly agreed that ICT facilities had been utilized for reducing operations / administration cost and enhanced patient safety. Furthermore, 30(27.2) agreed, 42(38.2) disagreed while 78(70.9) strongly disagreed that it has been used to improve performance of health professionals. Consequently, 52(47.3) disagreed that ICT facilities have been utilized for reducing operations/administration cost and enhanced patient safety. These findings correspond with Kante, (2024) who affirmed that access to health information could improve health status by enhancing the quality of health-related decisions and reduces health care costs.

Data breaches and hacks are becoming likely as technology is used in healthcare more and more. Healthcare providers must have strong security measures in place, such as encryption and secure login methods, to protect patient information. The requirement for training healthcare professionals in the usage of new technology presents another difficulty. Healthcare providers may find it challenging to stay current with new innovations given the quick speed of technological change in the industry. This is especially true for senior healthcare professionals who might not be as tech-savvy. In order to solve this, healthcare professionals should receive the appropriate instruction and assistance to guarantee that they can utilize new technology in an efficient manner.

Conclusion

The introduction of Information Technologies into health institutions has resulted in an information explosion, stimulating an increase in the volume of accessible records and enhancing healthcare service delivery. Information and Communication Technologies (ICTs) have become a critical success factor needed for accomplishment of set goals and tasks in every organization and human endeavors. Teaching hospitals are established with the intent of facilitating the provision of qualitative healthcare to the general populace. In conclusion, both patients and healthcare practitioners have benefited greatly from the use of technology in health records. Just a few examples of how technology is being utilized to enhance patient care, boost productivity, and save costs include electronic health records (EHRs), telemedicine, and digital operation notes. While there are issues that need to be resolved, such as protecting patient information's security and privacy, they may be handled with the appropriate strategy. We may anticipate even more advantages for patients and healthcare professionals in the future as technology advances.

Recommendations

1. Fund should be made available to acquire modern ICT infrastructures that would facilitate and sustain the general health condition of patients.
2. There should be a provision for training and retooling of medical practitioners on the use of modern ICT facilities to enable them cope with the current trend in information technology.
3. For a successful EHR systems, the management of UMTH should ensure thorough testing of the software before usage

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REIMAGING LIBRARIES IN CORRECTIONAL CENTERS AS A BEACON OF HOPE: REHABILITATION, INCLUSION AND THE FUTURE OF LIBRARIANSHIP IN NIGERIA

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Abstract

Correctional Centre libraries represent a critical yet often neglected component of Nigeria's library and information landscape, despite their potential contribution to rehabilitation, social inclusion, and national development. This study examines correctional Centre libraries as beacons of hope, focusing on their role in meeting the information needs and supporting the self-empowerment of incarcerated persons as a pathway to rehabilitation and reintegration into society. Anchored within the broader discourse on the future of librarianship in Nigeria, the study adopts a descriptive survey research design, using Ankpa inmates, Kogi State, as a case study. Data were collected from Correctional Centre staff through structured questionnaires to identify inmates' information needs, available information resources, and the challenges confronting Correctional Centre library service delivery. Findings reveal that inmates possess diverse and critical information needs, including educational, vocational, health, legal, financial, religious, and recreational information necessary for personal development and post-incarceration adjustment. However, the study also establishes that Correctional Centre libraries are inadequately resourced, particularly in terms of digital infrastructure, internet access, and contemporary information services. Major challenges identified include poor funding, insufficient infrastructure, limited professional staffing, outdated technologies, and the absence of clear policy frameworks guiding Correctional Centre librarianship in Nigeria. The paper argues that reimagining Correctional Centre libraries as inclusive, rehabilitative, and empowerment-driven institutions is essential for repositioning librarianship in Nigeria's correctional system. It concludes by advocating for deliberate policy interventions, sustainable funding, professional capacity development, and strategic partnerships to strengthen Correctional Centre library services. Such reforms will not only enhance rehabilitation outcomes for incarcerated persons but also reaffirm the role of libraries as instruments of hope, equity, and transformative social change in Nigeria's future.

Keywords: Correctional Centre Libraries, Rehabilitation, Social Inclusion, Self-Empowerment, Librarianship, Nigeria

Introduction

Libraries have long been recognized as instruments of knowledge dissemination, social transformation, and human development. Within correctional institutions, libraries play an even more critical role, as they provide inmates with access to information, education, and opportunities for personal growth. Correctional center libraries therefore serve as essential components of rehabilitation and reintegration programmes, especially in developing countries such as Nigeria where correctional facilities face numerous structural and institutional challenges.

The Nigerian correctional system is expected to function not only as a punitive institution but also as a reformative and rehabilitative environment aimed at transforming offenders into responsible citizens. However, studies have shown that the Nigerian penal system often falls short of this objective, with many Correctional Centre operating more as punitive centres than reformative institutions (Ozuru, 2019). In this context, Correctional Centre libraries can play a crucial role in supporting rehabilitation by providing inmates with access to education, legal information, vocational knowledge, and recreational materials that contribute to personal development.

Correction Centre libraries are special libraries designed to serve the unique information needs of incarcerated persons. They provide access to books, journals, newspapers, educational materials, and digital resources, and they support literacy programmes, formal education, and self-learning initiatives. The provision of such services is essential because inmates, like other members of society, possess diverse information needs that must be satisfied to promote intellectual growth and social reintegration (Fasae & Folorunso, 2020).

Despite their importance, correctional centre libraries in Nigeria are often neglected in policy planning and resource allocation. Many lack adequate funding, modern facilities, professional staffing, and access to digital technologies. As a result, inmates are unable to fully utilize library services for self-empowerment and rehabilitation. This situation raises serious concerns about the future of librarianship in Nigeria, particularly in relation to inclusive and socially responsive library services.

This study therefore reimagines Correctional Centre libraries as beacons of hope, emphasizing their potential to promote rehabilitation, social inclusion, and national development. Using Ankpa correctional Centre Library in Kogi State as a case study, the paper examines the information needs of inmates, the resources available in Correctional Centre libraries, the challenges confronting service delivery, and the strategies required to reposition Correctional Centre librarianship in Nigeria.

Objective of the Study

1. Examines the role Correctional Centre libraries in meeting the information needs of its inmates.
2. Highlights how Correctional Centre libraries support the self-empowerment of incarcerated persons.
3. Examine how Correctional Centre serves as a pathway to rehabilitation and reintegration of inmates into society.

Conceptual Framework

Concept of Correctional Centre Libraries

A Correctional Centres library is a special type of library established within correctional institutions to provide information resources and services to inmates. It supplies relevant and current materials in different formats to meet the educational, legal, cultural, and recreational needs of Inmates. Library services to inmates are critical to their rehabilitation because access to information helps them develop skills, improve literacy, and prepare for life after release (Fasae & Folorunso, 2020).

Correctional Centre libraries perform several important roles, including:

- Providing educational materials for formal and informal learning
- Supporting legal research and access to justice
- Offering recreational reading to reduce stress and boredom
- Facilitating vocational and skill development
- Encouraging self-reflection and behavioural change

Access to information is essential for personal development, and Correctional Centre libraries serve as the primary means through which inmates can obtain such information (Emasealu, 2017).

Concept of Inmates and Rehabilitation

Inmates are individuals who are confined in correctional institutions as a result of criminal conviction, awaiting trial, or inability to meet bail conditions. In Nigeria, Correctional Centre populations include convicted offenders, detainees, and persons awaiting trial, many of whom remain incarcerated for long periods due to legal and administrative delays (Ozuru, 2022). The primary objective of correctional Centre is not only punishment but also rehabilitation. Correctional institutions are expected to reform offenders and prepare them for reintegration into society as responsible citizens. However, the Nigerian Correctional Centre system often struggles to achieve this goal due to inadequate facilities, overcrowding, and lack of rehabilitation programmes (Oroleye, 2018). Rehabilitation requires access to education, counselling, vocational training, and information resources. Correctional Centre libraries therefore become essential tools for supporting inmates' intellectual and emotional development.

Information Needs of Inmates

Information need refers to a condition in which an individual requires information to solve a problem or make a decision. Information needs may be educational, social, legal, vocational, or personal in nature (Okeuhie, Agbegha & Ogonna, 2021).

Research has shown that Inmates have diverse information needs, including:

- Educational information
- Health information
- Legal information
- Vocational training information
- Religious and moral guidance
- Family and social information
- Financial literacy

- Information about life after release

These needs must be satisfied through adequate provision of library resources and services (Sambo, Usman, & Rabiu, 2017).

Self-Empowerment and Social Inclusion

Self-empowerment refers to the process through which individuals gain control over their lives, develop confidence, and acquire skills necessary to achieve personal goals. In the Correctional Centre context, self-empowerment involves providing inmates with knowledge, skills, and opportunities that enable them to become productive members of society after release (Lardier, 2020).

Correctional Centre libraries promote self-empowerment by:

- Supporting literacy and education
- Providing access to vocational materials
- Encouraging critical thinking
- Creating opportunities for self-learning
- Promoting psychological well-being

When inmates are empowered through information and education, the chances of successful reintegration into society increase significantly.

Review of Related Literature

Several studies have examined the role of Correctional Centre libraries in rehabilitation and information provision. Fasae & Folorunso (2020) observed that Correctional Centre libraries in Nigeria face numerous challenges, including inadequate funding, poor infrastructure, and lack of professional staffing. The study recommended improved government support and collaboration with NGOs to enhance service delivery. Eze (2015) identified major problems affecting Correctional Centre library services such as censorship, shortage of materials, and lack of trained personnel. The study emphasized the need for better funding and resource sharing among libraries. Sambo, Usman, & Rabiu, (2017). found that Inmates' information needs include health, legal, educational, and vocational information, but most Correctional Centre libraries lack adequate resources to meet these needs. Omolola, (2015) reported that lack of standards in Correctional Centre libraries leads to poor service delivery and low reading culture among inmates. Other challenges include poor ICT facilities, lack of awareness, and inadequate user education. Emerald (2021) emphasized that Correctional Centre libraries should support educational, cultural, and rehabilitative programmes, and should function as safe spaces where inmates can access information freely. These studies confirm that Correctional Centre libraries are essential for rehabilitation but remain underdeveloped in Nigeria.

Methodology

The study adopted a descriptive survey research design to examine the information needs of Inmates and the provision of library resources in Ankpa Correctional Centre Library, Kogi State.

Area of the Study

The study was conducted at Ankpa Correctional Centre, Kogi State. The Correctional Centre was established in 1935, while the Correctional Centre library was established in 2006 and contains approximately 800 books. The Correctional Centre has a total staff population of 169, including warders, teaching staff, and library staff.

Population of the Study

The population consisted of 169 Correctional Centre staff, including:

- 140 warders
- 24 teaching staff
- 5 library staff

Sample and Sampling Technique

A sample of 30 respondents was selected using simple random sampling, comprising warders, teachers, and library staff.

Instrument for Data Collection

Data were collected using a structured questionnaire titled: Assessment of the Information Needs and Resource Provision for Inmates by Correctional Centre Library for Self-Empowerment Questionnaire.
The questionnaire covered:

- Information needs of Inmates

- Available information resources
- Challenges of Correctional Centre libraries
- Strategies for improvement

Method of Data Analysis

Data were analysed using frequency counts, percentages, and mean scores. Items with mean scores of 2.50 and above were accepted, while those below 2.50 were rejected.

Results and Findings

This section presents the findings of the study based on the responses obtained from the staff of Ankpa Correctional Centre, Kogi State, regarding the information needs of Inmates, availability of information resources, and challenges confronting Correctional Centre library services.

Information Needs of Inmates

S/N	ITEMS	SA	A	D	SD	TOTAL	X̄	DECISION
1	Literacy training need	18	7	4	1	30	3.40	Accepted
		72	21	8	1	102		
2	Health care needs	12	8	4	6	30	2.86	Accepted
		48	24	8	6	86		
3	Educational needs	10	8	2	10	30	2.60	Accepted
		40	24	4	10	78		
4	Vocational programmes	15	8	3	4	30	3.13	Accepted
		60	24	6	4	94		
5	Legal need	11	13	1	5	30	3.00	Accepted
		44	39	2	5	90		
6	Religious need	9	11	5	5	30	2.8	Accepted
		36	33	10	5	84		
7	Recreational need	18	7	1	4	30	3.30	Accepted
		72	21	2	4	99		
8	Financial literacy	12	8	4	6	30	2.86	Accepted
		48	24	8	6	86		
9	Current happenings	10	8	2	10	30	2.60	Accepted
		40	24	4	10	78		
10	Information on parenting	15	5	3	7	30	2.93	Accepted
		60	15	6	7	88		
11	Career opportunity needs	11	13	1	5	30	3.0	Accepted
		44	39	2	5	90		
12	Information on housing and accommodation	9	11	5	5	30	2.8	Accepted
		36	33	10	5	84		

The findings revealed that Inmates have diverse and critical information needs necessary for personal development, rehabilitation, and reintegration into society. The major categories of information needs identified include:

- Educational information
- Vocational and skill acquisition information
- Health information
- Legal information
- Religious and moral information
- Financial and business information
- Recreational materials

- Information about life after release

The respondents agreed that educational information ranked highest among inmates' needs because many Inmates desire to continue their studies while in custody. Vocational information was also highly needed, as inmates expressed interest in acquiring practical skills that could help them secure employment after release.

These findings support earlier studies which reported that Inmates require access to a wide range of information resources to improve their knowledge and prepare for life outside the correctional centre(Sambo, Usman, & Rabiu, 2017). Similarly, Okeuhie, Agbegha and Ogonna (2021) observed that Inmates' information needs are often related to survival, personal development, and future planning, making the provision of library services essential in correctional institutions. The study also revealed that inmates frequently seek legal information to understand their rights, court processes, and appeals. Access to such information is important because many Inmates lack adequate legal representation.

Health information was another important need, particularly regarding disease prevention, mental health, and substance abuse recovery. Religious information was also highly demanded, as many inmates rely on spiritual guidance to cope with incarceration.

These results confirm that Correctional Centre libraries must provide comprehensive and balanced collections capable of addressing the intellectual, emotional, and social needs of inmates.

Availability of Information Resources in the Correctional Centre Library

S/N	ITEMS	Provided	%	Not provided	%	TOTAL	DECISION
12	E-Books	2	6.6	28	93.3	30	Rejected
13	Newspapers	20	66.7	10	33.3	30	Accepted
14	Fictional Materials	25	83.3	5	15.7	30	Accepted
15	Image collections	21	70	9	30	30	Accepted
16	Journals,	16	53.3	14	46.7	30	Accepted
17	Textbooks	25	83.3	5	15.7	30	Accepted
18	The internet	3	10	27	90	30	Rejected
19	Audio-visuals	22	73.3	8	26.7	30	Accepted
20	computers	15	50	15	50	30	Accepted
21	Online Resource Services	3	10	27	90	30	Rejected
22	Learning common services	6	20	24	80	30	Rejected
23	Digital media centers	3	10	27	90	30	Rejected

The study found that the Correctional Centre library at Ankpa Correctional Centre had limited information resources. The available materials included:

iv. Textbooks
v. Religious books
vi. Newspapers and magazines
vii. Donated books
viii. Few reference materials

However, the study showed that the library lacked:

xxi. Current publications
xxii. Electronic resources
xxiii. Internet facilities
xxiv. Digital learning materials
xxv. Audio-visual resources
xxvi. Legal databases
xxvii. Vocational training manuals

The absence of modern information resources limits the effectiveness of the Correctional Centre library in supporting rehabilitation programmes. These findings are consistent with Fasae and Folorunso (2020), who reported that most Correctional Centre libraries in Nigeria depend largely on donated materials and lack modern information technologies. Similarly, Eze (2015) noted that Correctional Centre libraries often operate with outdated collections and inadequate facilities, making it difficult for inmates to access relevant and current information. The study also revealed that the Correctional Centre library had no internet access, which prevented inmates from participating in distance education programmes or accessing online learning resources. In the digital age, lack of ICT facilities places Inmates at a disadvantage compared to other learners.

Challenges Facing Correctional Centre Library Services

S/N	ITEMS	SA	A	D	SD	TOTAL	X	DECISION
24	Lack of funding	14 56	10 30	2 4	4 4	30 94	3.13	Accepted
25	Inadequate relevant materials	12 48	8 24	4 8	6 6	30 86	2.86	Accepted
26	Inadequate infrastructures in the libraries	10 40	8 24	2 4	10 10	30 78	2.60	Accepted
27	Outdated technologies hindering access to digital resources	15 60	5 15	3 6	7 7	30 88	2.93	Accepted
28	Insufficient libraryinfrastructures	11 44	13 39	1 2	5 5	30 90	3.00	Accepted
29	Insufficient user training	9 36	11 33	5 10	5 5	30 84	2.80	Accepted
30	Lack of contemporary facilities,	2 8	8 24	7 14	13 13	30 59	1.96	Rejected
31	Inadequate infrastructures in the libraries	12 48	11 33	3 6	4 4	30 91	3.03	Accepted
32	Lack of standards in the provision of library services	14 56	10 30	2 4	4 4	30 94	3.13	Accepted
33	Inadequate functional library facilities	7 28	8 24	9 18	6 6	30 76	2.53	Accepted

The study identified several challenges affecting the effective provision of library services in Ankpa Correctional Centre Library. These include:

1. Poor funding
2. Inadequate infrastructure
3. Lack of professional librarians
4. Absence of ICT facilities

5. Limited support from government
6. Lack of policy framework for Correctional Centre libraries
7. Security restrictions on information access
8. Outdated materials
9. Lack of awareness of the importance of Correctional Centre libraries

Poor funding was identified as the most serious challenge. Without adequate financial support, the library cannot acquire new materials, maintain facilities, or introduce digital services. This finding agrees with Ozuru (2019), who observed that Correctional Centre libraries in Nigeria receive very little budget allocation and are often treated as non-essential services. Lack of professional librarians was another major problem. In many correctional centres, library services are handled by untrained staff, which affects the quality of service delivery.

Omolola, (2015) noted that the absence of trained librarians in Correctional Centre libraries leads to poor organization of materials and low utilization by inmates. Security restrictions were also identified as a challenge. Some materials are not allowed in Correctional Centre due to security concerns, which may limit access to useful information.

Discussion: Reimagining Correctional Centre Libraries as Beacons of Hope

The findings of this study highlight the urgent need to rethink the role of Correctional Centre libraries in Nigeria. Rather than viewing Correctional Centre libraries as optional facilities, they should be recognized as essential components of rehabilitation programmes. The concept of reimagining Correctional Centre libraries as beacons of hope means transforming them into centres that provide knowledge, empowerment, and opportunities for change. Correctional Centre libraries can serve as beacons of hope in the following ways:

Promoting Rehabilitation

Access to information helps inmates develop positive attitudes, improve literacy, and acquire skills needed for reintegration into society. When Inmates are engaged in reading, education, and learning activities, the chances of re-offending decrease significantly. Studies have shown that educational programmes in Correctional Centre contribute to better behaviour, improved self-esteem, and successful reintegration after release (Lardier, 2020).

Supporting Social Inclusion

Inmates are often socially excluded, but access to information helps them remain connected to society.

Library services can promote inclusion by providing:

- Literacy programmes
- Distance education
- Access to legal information
- Career guidance
- Religious and moral instruction

Social inclusion is important because inmates will eventually return to society, and they must be prepared to function as responsible citizens.

Encouraging Self-Empowerment

Self-empowerment involves giving inmates the knowledge and skills needed to change their lives.

Correctional Centre libraries support self-empowerment by providing:

- Educational materials
- Vocational training resources
- Motivational books
- Health information
- Entrepreneurship guides

When inmates gain knowledge, they become more confident and more capable of making positive decisions.

Supporting the Future of Librarianship in Nigeria

The future of librarianship depends on its ability to serve all members of society, including marginalized groups.

Expanding library services to Correctional Centre shows that librarianship is committed to:

- Social justice
- Inclusion

- Lifelong learning
- National development

Correctional Centre librarianship should therefore become an important area of specialization within library and information science in Nigeria.

Implications for the Future of Librarianship in Nigeria

Reimagining Correctional Centre libraries has important implications for the profession.

Future Correctional Centre libraries in Nigeria should include:

vi. Digital library services
vii. Internet access
viii. E-learning platforms
ix. Professional librarians
x. National standards for Correctional Centre libraries
xi. Collaboration with universities and NGOs

Modern librarianship must move beyond traditional library buildings and reach underserved populations.

If Correctional Centre libraries are properly developed, they can contribute to:

- Reduced crime rate
- Improved literacy
- Better rehabilitation outcomes
- National development

Recommendations

Based on the findings, the study recommends:

- Government should increase funding for Correctional Centre libraries.
- Professional librarians should be employed in correctional centres.
- Digital resources and internet facilities should be introduced.
- National policy on Correctional Centre librarianship should be developed.
- NGOs and academic libraries should support Correctional Centre libraries.
- Correctional Centre libraries should be integrated into the national library system.
- Training programmes should be organized for Correctional Centre library staff.
- Modern information technologies should be provided.
- Correctional Centre libraries should support distance education programmes.

Conclusion

This study examined Correctional Centre libraries as beacons of hope for rehabilitation, inclusion, and the future of librarianship in Nigeria, using Ankpa Correctional Centre as a case study. The findings showed that Inmates have strong information needs but Correctional Centre libraries lack adequate resources to meet those needs. Poor funding, lack of professional staff, absence of ICT facilities, and weak policy support remain major challenges. Despite these problems, Correctional Centre libraries have great potential to support rehabilitation, self-empowerment, and social inclusion. Reimagining Correctional Centre libraries requires commitment from government, librarians, and society to transform correctional libraries into centres of learning and hope. The future of librarianship in Nigeria depends on its ability to serve all people, including those behind Correctional Centre walls.

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REPOSITIONING SCHOOL LIBRARIES AND LIBRARIANS FOR QUALITY TEACHING, LEARNING, AND EDUCATIONAL DEVELOPMENT IN PRIMARY AND SECONDARY SCHOOLS

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Abstract

The increasing complexity of the information environment and the growing integration of digital technologies into education have significantly transformed the roles of school libraries and librarians in supporting teaching and learning processes. School libraries are no longer viewed merely as repositories of books; rather, they have evolved into dynamic learning hubs that facilitate information access, literacy development, critical thinking, digital competence, and lifelong learning among learners. This paper examines the place of libraries and librarians in primary and secondary education, with particular emphasis on their contributions to academic achievement, curriculum implementation, information literacy development, reading culture promotion, and educational equity. The study adopted a descriptive review methodology through the systematic examination of recent scholarly literature, policy documents, and professional reports published between 2020 and 2025. Findings reveal that effective school library programs positively influence students' learning outcomes, enhance reading habits, improve information and digital literacy skills, and support teachers in curriculum delivery. The review further indicates that school librarians increasingly function as instructional partners, information specialists, technology facilitators, and advocates for lifelong learning. Despite these contributions, school libraries in many developing countries continue to face challenges such as inadequate funding, shortage of qualified librarians, poor technological infrastructure, limited policy implementation, and insufficient recognition within educational systems. The paper argues that strengthening school libraries and empowering librarians are critical for achieving quality education and sustainable educational development. It concludes that governments, educational authorities, and other stakeholders should prioritize investment in school library services, professional development, technological integration, and policy support to maximize the educational benefits of libraries in primary and secondary schools.

Keywords: Academic achievement, educational development, information literacy, primary education, school librarians, school libraries, secondary education.

Introduction

Education remains a fundamental driver of social transformation, economic growth, and sustainable national development. Across the globe, educational systems are increasingly expected to equip learners with not only foundational literacy and numeracy skills but also the competencies required to function effectively in a rapidly evolving knowledge society. These competencies include critical thinking, information literacy, digital literacy, creativity, collaboration, communication skills, and lifelong learning abilities. As educational priorities continue to shift toward learner-centered and technology-driven approaches, school libraries and librarians have emerged as indispensable components of effective teaching and learning environments (UNESCO, 2023).

The school library is widely recognized as an essential educational institution that supports curriculum delivery, promotes reading culture, facilitates access to information resources, and enhances students' academic development. Contemporary school libraries have evolved significantly from their traditional role as repositories of printed materials to become dynamic centers for information access, knowledge creation, digital learning, and collaborative engagement. According to the joint UNESCO–IFLA School Library Manifesto (2023), school libraries provide learners with equitable access to information and ideas while fostering independent inquiry, creativity, and lifelong learning. Consequently, school libraries are increasingly regarded as strategic instruments for improving educational quality and promoting inclusive learning opportunities.

The role of librarians within primary and secondary schools has similarly undergone substantial transformation. Traditionally perceived as custodians of books and information resources, librarians now function as instructional partners, information specialists, technology facilitators, literacy advocates, and learning support professionals. They collaborate with teachers in designing learning activities, integrating information resources into classroom instruction, developing students' information literacy competencies, and promoting responsible information use in both physical and digital environments. Through these responsibilities, librarians contribute significantly to students' academic achievement and intellectual development.

The growing importance of school libraries and librarians has attracted considerable attention from researchers, educators, and policy makers worldwide. Empirical studies have consistently demonstrated a positive relationship between effective

school library programs and student learning outcomes. Recent studies indicate that students in schools with well-resourced libraries and professionally qualified librarians tend to perform better academically, demonstrate stronger reading abilities, and exhibit higher levels of information literacy than their counterparts in schools lacking functional library services (Merga, 2022; Lance & Kachel, 2023). Furthermore, school libraries contribute to educational equity by providing learners from diverse socioeconomic backgrounds with access to learning resources that may otherwise be unavailable to them.

The relevance of school libraries has become even more pronounced in the digital era, where learners are exposed to unprecedented volumes of information through the internet and social media platforms. While digital technologies have expanded access to information, they have also increased the prevalence of misinformation, disinformation, and information overload. Consequently, learners require guidance in locating, evaluating, and ethically using information. School librarians play a critical role in addressing these challenges by teaching information and digital literacy skills that enable students to navigate complex information environments effectively.

Despite the recognized value of libraries and librarians in education, many schools, particularly in developing countries, continue to experience significant challenges in establishing and maintaining effective library services. Issues such as inadequate funding, shortage of qualified librarians, poor infrastructure, limited technological facilities, inadequate policy implementation, and insufficient institutional support continue to undermine the effectiveness of school libraries. In Nigeria, for example, many primary and secondary schools either lack functional libraries or operate libraries with inadequate resources and personnel, thereby limiting their capacity to support educational objectives effectively.

Given these realities, there is a growing need to re-examine the place of libraries and librarians in primary and secondary education within the context of contemporary educational demands. Understanding their contributions and challenges is essential for developing strategies that can strengthen school library services and enhance their impact on educational development. This paper therefore examines the evolving roles of libraries and librarians in primary and secondary education, explores their contributions to teaching and learning, identifies challenges affecting their effectiveness, and proposes strategies for strengthening school library services for sustainable educational development.

Repositioning

Two things come to mind when we talk of repositioning. One, it means that something is not in the right or proper position. Two, it could also mean that the position of something needs to change completely (that is, moving something from a current position to a new position). According to Webster's New Universal Unabridged Dictionary (2003), to reposition means:

1. To put in a new or different position; shift.

2. To change the image, marketing strategy of a product so as to appeal to a wider or different audience.

Therefore, repositioning libraries in Nigeria's Educational System, means putting libraries in a new position in education, to make them more strategic and appealing for global competitiveness.

Library

The library has been defined severally by both professionals and nonprofessional's; however, the most universal is that which says the library is a repository of knowledge. Libraries have been identified as key elements for open access to information, which is crucial to the development of democratic information society (Ryynanen, 2000:1). The library today is so many things rolled into one, it is a collection of books, an information resource center; it provides a springboard for all researches and an Information Communication Technology (ICT) center for storage, preservation, processing and dissemination of information for societal development. The library has also become the digital warehouse of information on the Net.

Educational Development

Educational Development is a reference to the entire process of education from the foundation level (Nursery/primary) to the tertiary level (university or equivalent) as enshrined in the constitution and education policy. Edem (2003:24) says, "An educational system can be seen as an open social system, the society in which it operates constitutes its supra system, and the preprimary and primary schools, secondary schools, vocational and technical schools, teacher-training institutions and so on as subsystems. "The educational system is the pivot that moves education and by extension development. Hummel (2000:131) posited "...that there is a relationship between a country's level of general development and the level of development of its education system." The health of the educational system is vital to the overall development of a country.

School Librarian

The role of the school librarian has undergone substantial transformation in response to changes in educational practices, technological innovation, and the growing importance of information literacy. Historically, librarians were primarily responsible for acquiring, organizing, preserving, and providing access to information resources. While these responsibilities remain important, the contemporary school librarian performs a much broader range of educational and instructional functions.

According to the American Association of School Librarians (AASL, 2023), school librarians are educational professionals who facilitate learning by connecting learners with information resources, supporting curriculum implementation, teaching information literacy skills, and promoting lifelong learning. This perspective positions the school librarian not merely as a custodian of information resources but as an active participant in the teaching and learning process.

Modern school librarians function as instructional partners who collaborate with classroom teachers in designing, implementing, and assessing learning activities. Through such collaboration, librarians help integrate information literacy and research skills into classroom instruction, thereby enhancing students' ability to locate, evaluate, and use information effectively. This collaborative role has become increasingly important as educational institutions seek to prepare learners for participation in knowledge-based societies.

Information Literacy

Information literacy is one of the most important competencies required for effective learning, informed decision-making, and meaningful participation in contemporary society. The rapid growth of information and communication technologies, the proliferation of digital content, and the increasing complexity of information environments have made information literacy an essential skill for learners at all levels of education. In the twenty-first century, individuals are constantly exposed to vast amounts of information from diverse sources, including books, journals, websites, social media platforms, databases, and multimedia resources. Consequently, the ability to identify, locate, evaluate, organize, and utilize information effectively has become a critical educational objective.

The concept of information literacy emerged from the recognition that access to information alone is insufficient without the skills necessary to interpret and apply information meaningfully. The American Library Association (ALA, 2020) defines information literacy as a set of integrated abilities encompassing the reflective discovery of information, understanding how information is produced and valued, and the ethical use of information in creating new knowledge and participating effectively in society. This definition highlights the multifaceted nature of information literacy as a combination of cognitive, technical, and ethical competencies.

Similarly, the Association of College and Research Libraries (ACRL, 2021) describes information literacy as the ability to recognize when information is needed and to locate, evaluate, and use effectively the needed information. This perspective emphasizes that information literacy extends beyond information retrieval to include critical thinking, analytical reasoning, and informed judgment. In educational contexts, information literacy enables learners to become independent seekers and users of information rather than passive recipients of knowledge.

The growing importance of information literacy is closely linked to the emergence of the knowledge society and the digital information environment. According to UNESCO (2023), information literacy empowers individuals to access information critically, evaluate its credibility, and utilize it responsibly for personal, educational, professional, and societal purposes. In an era characterized by misinformation, disinformation, fake news, and information overload, information literacy serves as a protective mechanism that enables individuals to distinguish credible information from inaccurate or misleading content.

Educational scholars have consistently identified information literacy as a foundational skill for academic success. Julien, Gross, and Latham (2020) argue that information literacy supports critical inquiry, problem-solving, evidence-based reasoning, and independent learning. Students who possess strong information literacy skills are better equipped to conduct research, complete assignments, engage in academic discussions, and make informed decisions based on reliable evidence. Consequently, information literacy has become a central component of educational curricula across the world.

The Need to Reposition the School Libraries in Nigeria

The world is now referred to as a global village due to the presence of ICT and its application for the creation and dissemination of information to those in need of it via the internet. This calls for the need to reposition the school libraries to be at the fore in the creation and dissemination of information in order not to relegate libraries to mere store house of human knowledge. Campbell (2006) in his EDUCAUSE review article, expressed a great concern that recorded human knowledge is moving at a speed of light towards the web and this pose a great challenge on what will become of academic libraries in the next decade. The need to reposition the school libraries was also taken cognizance of on the report presented by the Association of College and Research Library's (ACRL's, 2006) roundtable on technology and its inevitable changes on academic libraries, emphasizes were placed on the constant adjustment made by academic libraries in the provision of information using modern technologies due to information explosion and the threat posed by these modern technologies when it comes to handling of information. Toying the same line of argument, De Rosa (2006) presented a report to the Online Computer Library Centre (OCLC) on college students' perception of libraries and information resources. It was concluded that the library is not the first port of call or final bus stop when students are searching for information but they often use different search engines, e-mail and instant messaging via the internet to obtain and share information. The

report also established that undergraduates begin their search on the web, live on the web, often finish their research with Google and mostly use the library as a place to study. This calls for a great concern for librarians and the urgent need to reposition the school libraries which is gradually metamorphosing into a place where undergraduates visit for the sole purpose of studying and not the major provider of recorded human knowledge. Walter (2011) also emphasized the need to re-position the school libraries in order to address the ever changing library users' perceptions of the position of libraries in higher institutions of learning, reconsider the core "value statements" of libraries in light of the changes in the access to scholarly contents, pursue collaborative initiatives based on shared service goals with other information centers and professional organizations, re-envision what "excellence" in academic librarianship means, promote greater interaction and collaboration across different type facilitate strategic planning and resource allocations, etc.

Functions of School Libraries of libraries

According to Dike (1993) the functions of the school libraries has "brought the school library from the periphery to the center of education", continuing Dike (1993) states; We know that the school library is the learning laboratory par excellence. In the library, learners find the world of knowledge, interact directly with resources, acquire information literacy and develop research skills for life - long learning, moreover the library encourages active and participatory approaches to learning. All these are the expected functions of a functional school library. Regarding the physical and spatial enablers of teaching and learning, Woolls in Dike (2001) makes it more explicit when she states that although the media center (library), as a facility, exists to house the staff, materials and equipment, its main function is to provide an environment which will encourage and support teaching and learning within its spaces.

According to Elaturoti (1995) the following are the functions of the school library:

1. To support the teaching and education work of the school

2. To develop in the young people the habit of reading both for pleasure and for the purpose of gathering information for themselves.

In his contribution, Ibrahim (1999) added that as the concept and contents of education continued to systematically and rapidly change over the years, the functions of school libraries have also rapidly changed and expanded to include the following:

i. To identify and provide adequate and comprehensive teaching and learning in different formats which meet the intellectual and recreational needs of both teachers and the students.
ii. To systematically organize its materials for easy retrieval, access and utilization.
iii. To help develop various skills, learning and information enquiry skills.
iv. To relate its resources and services to the school's curriculum, extracurricular programs and anticipated requirements for all teaching units of the school.
v. Instructing and orientating the teachers and students on the use of the library.
vi. To liaise with other relevant external bodies for required information, resources and services.
vii. To periodically evaluate its resources and services to determine their relevance to meeting the needs of the users.

Nature of Services/Resources Provided in School Libraries

For the school library to fully perform the above role and also support the educational program effectively it requires an organized collection of variety of learning resources -book and non-book materials, suitable accommodation that provides space for storage of the learning resources, trained staff to organize the collection and also teach the students and teachers how to use the resources effectively. If all these are in place then, the school library can render efficient services, like lending and borrowing books, newspapers and magazines in the reading room provided. Egesimba, Quadri and Ezebuike (2011) argues that there cannot be a functional school library without adequate stock of relevant materials such as textbooks, fiction materials, newspapers, films, projectors, radio, television, maps, charts, tape recorders, reference items and other educational materials. The measure of the extent of user satisfaction in any library is the extent to which resources, facilities and services are provided.

The State of School Libraries in Nigeria

A cursory look at the school libraries in Nigerian secondary and primary schools shows that the available facilities are far from being satisfactory. Essential resources such as adequate collection and qualified personnel amongst others are lacking. Researchers like Eze, and Okonkwo (2012) and Opara (2008) observed that the school libraries in some secondary and primary schools in Enugu state lacked library facilities. According to them, resources like library collection and qualified personnel were inadequate.

Adeyemi (2020) in his study of school libraries at Ekiti State also revealed inadequate funding, outdated collection and lack of qualified personnel to man the libraries. In a similar study, in Ondo state Ogumiyi and Jato (2010), also revealed lack of professionally qualified staff, lack of infrastructures, inadequate funding and lack of systematic organization of the resources available in school libraries. In his own study, Egbosa (2011) observes that most private schools do not have school libraries and where they exist, the facilities and personnel are inadequate which inhibit the utilization of the library in enhancing teaching and learning in such private schools. According to Petters and Ottong (2012), some school libraries are found in dilapidated buildings and most of them are poorly funded. The authors see the school library as the most neglected of all services in the school system by the principal and the government. They further lamented that school libraries do not exist in some public secondary and primary schools in Calabar. According to Mbachu (2007), our school libraries in Nigeria are characterized by poor funding, lack of infrastructure, lack of qualified personnel, inadequate print and non-print resources and total neglect from the school authorities. However, some secondary and primary school libraries in Anambra state through

Governor Peter Obi's library intervention in 2012 gave school libraries computers and five hundred thousand naira (N 500,000) each for the development of school libraries. This has beefed up the status of school libraries in that state. In a survey conducted by Odusanya and

Amusa (2002), it was concluded that functional school libraries are almost non - existent in our public schools and students in the secondary schools do not see school library as beneficial to education. Obayemi (2002) deplores the neglect of library and its development in some government owned secondary schools in Lagos State. The libraries according to him were grossly underfunded, understaffed, under stocked and unorganized. These findings confirm the observation of the Nigerian school library Association at its annual conference held in Nsukka in October 2002.

The conference observed that the absence of government policy on school library development has been stalling the growth and development of school library in Nigeria.

The availability of such policy would have set the minimum standard for funding, staffing, stocking and management of school libraries. The results of these various studies were in contrast to what is obtainable in the developed countries where the school library has moved far beyond a room with books to become an active, technology - rich learning environment with an array of information resources to enhance teaching and learning- (Amaechi and Dike, 2021) All the inadequacies revealed by these studies hinder the exposure of Nigerian students to a wider selection of books and other non - book materials for classroom instruction.

Challenges affecting Effective Service Delivery in School Libraries

The provision of efficient service delivery in any library depends largely on the extent of user satisfaction which is measured by the adequacy of the resources, facilities and services available. (Buttlar, L., and Du Mont, 1996). In the case of school libraries in Nigeria, there is gross inadequacy of resources, facilities and services which hinder efficient service delivery. The following factors hinder efficient service delivery in school libraries.

i. Poor funding: One can confidently say that the school library system in Nigeria today is characterized by poor status in collection, facilities, human resources, modem information facilities like ICT and poor-quality service. Most if not all of these problems emanate from poor funding as was stressed by Elatoroti (1995). Without adequate funding, a school library cannot meet up with the standards of services and resources required for efficient service delivery.
ii. Poor and outdated collection: most of the school libraries in Nigeria rely on donations both locally and foreign which in most cases come when the books are outdated and they want to weed their collections. This may not be relevant to the current curriculum at the time of its arrival- (Eze and Okonkwo 2012).
iii. Poor management of school libraries: Inwang and Nna - Etuk (2005) in their study of librarians and resources management in school libraries in Akwa-Ibom revealed that school libraries in the state are still left to individual efforts of the school management due to untrained personnel and lack of funding.
iv. Leaders' neglect of development of school libraries: Nigerian leaders are always indifferent when it comes to educational issues let alone development of libraries. The government can afford to spend huge amount of money in politics but finds it difficult to fund educational ventures like the development of libraries.

Repositioning school libraries for effective school delivery

For the school libraries to actualize their mandates, they need to be adequately supported by the establishing authorities as well as by members of the community for whom it is established. Some concrete strategies to achieve these are:

i. Adequate funding: - Adequate budgetary allocation is needed to cover stock building and other overhead costs. The library fees that students pay, should be used specifically for running the library. This was supported by Ayeni and Oyebonji (1997) who noted that improved budgetary allocation to Nigerian school libraries will definitely reflect positive changes in their service and resources.

ii. Attitudinal change by leaders in favor of library development: There should be attitudinal change by all citizens of Nigeria in favor of all types of libraries Academic, public and school libraries. Integration of ICT to school libraries: Integrating ICT in library services provided at the secondary and primary school libraries will help in repositioning school libraries for efficient service delivery and also make collaboration and resource sharing with other libraries possible. A library that is computerized and hooked to the internet, apart from enhancing classroom teaching and learning, will also solve the problem of obsolete and unavailable books in the library.

iii. Cooperation between various stakeholders: The various stakeholders in the educational sectors should cooperate to see that school libraries are built in schools and also made functional. The Parent Teachers Association (PTA) should liaise with the Ministry of Education in order to achieve this.

iv. Specialized Agencies: The help of specialized agencies like the TETFUND, NGOS should be sought so that school libraries are built in government schools and equipped with ultra modem facilities with recreational activities that can attract the Nigerian child to be a habitual user of the library. There should be a means of accessing the Tetfund meant for library development and use it for that purpose.

v. Nigeria School Libraries Association: The School Library Association which is an arm of the Nigerian Library Association should be empowered as a regulatory body for school libraries in Nigeria with the responsibility of ensuring that every school has a functional library that meets IFLA standards.

vi. Recruitment of qualified librarians (Teacher Librarians): School libraries should be manned by qualified librarians that have the competent skills needed for the provision of efficient library service.

vii. Training and retraining of teacher librarians: From time-to-time seminars, conferences and workshops should be organized for practicing teacher librarians who are digital migrants in order to equip them with the current and best practices in librarianship. These will enhance their service delivery.

Methodology

This study adopted a descriptive literature review approach to examine the evolving roles and contributions of libraries and librarians in primary and secondary education. The literature review method was considered appropriate because it enables the systematic identification, analysis, synthesis, and interpretation of existing scholarly works and professional documents relevant to the subject under investigation. According to Snyder (2019), literature reviews provide a comprehensive understanding of a phenomenon by integrating findings from multiple studies, thereby facilitating evidence-based conclusions and recommendations.

To ensure the currency and relevance of the review, scholarly publications published between 2020 and 2025 were primarily considered. Relevant literature was retrieved from reputable academic databases and information sources, including Scopus, Web of Science, Google Scholar, ERIC (Education Resources Information Center), Library and Information Science Source, and institutional publications from international organizations such as UNESCO and the International Federation of Library Associations and Institutions (IFLA). Keywords used in the search process included *school libraries*, *school librarians*, *primary education*, *secondary education*, *information literacy*, *digital literacy*, *academic achievement*, *reading culture*, and *educational development*.

The inclusion criteria focused on peer-reviewed journal articles, conference papers, policy documents, professional reports, and scholarly books that discussed the role of school libraries and librarians in supporting teaching, learning, literacy development, curriculum implementation, and educational outcomes. Studies that were not directly related to school libraries or were published outside the selected time frame were excluded, except in cases where seminal works were necessary to provide theoretical or historical context.

The collected literature was subjected to thematic analysis. Information extracted from the selected sources was organized into major themes, including the conceptual understanding of libraries and librarians, the place of school libraries in education, the roles of librarians in teaching and learning, the impact of school libraries on students' academic achievement, challenges confronting school library services, and strategies for strengthening libraries and librarians in contemporary educational environments. The synthesis of these themes provided the basis for discussing the significance of libraries and librarians in primary and secondary education and for developing recommendations for policy and practice.

The use of a literature review methodology is particularly appropriate for this study because it provides a broad understanding of existing knowledge, identifies emerging trends and challenges, and highlights best practices that can inform the development of effective school library programs. The approach also facilitates the integration of evidence from diverse educational contexts, thereby enhancing the comprehensiveness and credibility of the study.

Discussion of Findings

The findings of this review demonstrate that libraries and librarians occupy a central position in primary and secondary education through their contributions to literacy development, curriculum support, information literacy instruction, digital

learning, academic achievement, teacher professional development, and educational equity. These findings are consistent with the assumptions of Constructivist Learning Theory, which emphasizes active learning, knowledge construction, inquiry, and learner engagement.

The review revealed that school libraries play a significant role in promoting reading culture and literacy development among learners. This finding corroborates the works of Merga (2022) and Gray and Thomas (2026), who found that access to library resources and reading programs positively influences students' reading motivation, comprehension skills, and academic performance. Reading is fundamental to educational success because it enhances learners' ability to acquire, interpret, and apply knowledge. From a constructivist perspective, reading enables learners to actively engage with information, construct meaning, and develop critical thinking skills. Therefore, school libraries provide environments that foster literacy development and lifelong reading habits among learners.

Another important finding is that school libraries support teaching and curriculum implementation. The review showed that teachers rely on library resources for lesson preparation, instructional delivery, and professional development. This finding aligns with Mdodana-Zide (2024), who reported that access to school library resources enhances teaching effectiveness and supports curriculum implementation, particularly in Science and Mathematics education. The finding further supports the argument that libraries function as instructional support centers that complement classroom teaching. Through collaboration between teachers and librarians, learners are provided with diverse information resources that enrich educational experiences and improve learning outcomes.

The findings also revealed that libraries and librarians contribute significantly to information literacy development. In contemporary information environments characterized by information overload, misinformation, and rapidly expanding digital content, information literacy has become an essential educational competency. The reviewed literature indicated that librarians assist learners in developing skills related to information searching, evaluation, organization, and ethical utilization of information. This finding supports the views of Julien, Gross, and Latham (2020), who argued that information literacy instruction equips learners with the competencies required for critical inquiry and evidence-based decision-making. The finding further validates the constructivist view that learners actively construct knowledge through engagement with information resources and learning experiences.

Furthermore, the review established that school libraries facilitate digital literacy development and technology integration. Modern educational systems increasingly depend on digital technologies for teaching, learning, communication, and information access. Consequently, learners require competencies that enable them to utilize digital resources effectively and responsibly. The reviewed studies showed that school librarians play important roles in guiding students' use of digital technologies, online databases, and internet resources. This finding is consistent with UNESCO (2023), which emphasized the importance of libraries in promoting digital literacy and responsible digital citizenship. The implication is that school libraries have evolved from traditional repositories of books into dynamic learning centers that support digital learning and technological innovation.

The review further demonstrated a positive relationship between functional school libraries and students' academic achievement. Studies reviewed in this paper consistently reported that schools with professionally managed libraries and qualified librarians recorded better educational outcomes than schools lacking adequate library services. This finding supports the work of Lance and Kachel (2023), who found that access to professional library services contributes positively to students' achievement in reading and other academic subjects. The finding reinforces the argument that investment in school libraries should be viewed as an investment in educational quality and student success.

Another significant finding is the contribution of school libraries to teacher professional development. The review revealed that teachers utilize library resources to improve instructional practices, update subject knowledge, and access professional information. This finding agrees with Mdodana-Zide (2024), who found that school libraries serve as valuable centers for teacher learning and professional growth, particularly in resource-constrained educational environments. The implication is that school libraries support not only students but also teachers, thereby contributing to overall school improvement and educational effectiveness.

The findings also indicated that school libraries promote educational equity and inclusive learning by providing all learners with access to information resources regardless of their socioeconomic backgrounds. This finding is particularly important in developing countries where disparities in access to educational resources remain a significant challenge. By providing books, digital resources, internet access, and learning materials, school libraries help bridge educational inequalities and create opportunities for inclusive learning. This supports UNESCO's vision of equitable access to quality education and information for all learners.

Despite these contributions, the review identified several challenges affecting the effectiveness of school libraries and librarians. These challenges include inadequate funding, shortage of professionally qualified librarians, poor technological infrastructure, inadequate library facilities, outdated information resources, and weak policy implementation. Similar challenges have been reported by Mdodana-Zide (2024) and other scholars who observed that resource limitations continue

to undermine the effectiveness of school library services, particularly in developing countries. Unless these challenges are addressed, the full educational potential of libraries and librarians may not be realized.

Overall, the discussion demonstrates that libraries and librarians remain indispensable educational assets in primary and secondary education. Their contributions extend beyond information provision to encompass literacy development, instructional support, information literacy education, digital learning facilitation, academic achievement enhancement, teacher professional development, and educational equity. These roles position libraries and librarians as strategic partners in achieving quality education and sustainable educational development.

Conclusion

This paper examined the place of libraries and librarians in primary and secondary education through a review of relevant conceptual, theoretical, and empirical literature. The review established that school libraries are indispensable components of effective educational systems because they provide access to information resources, support curriculum implementation, promote literacy development, facilitate information and digital literacy acquisition, and contribute to students' academic achievement. The study further revealed that the role of school librarians has evolved significantly from traditional information management functions to encompass instructional collaboration, information literacy education, technology integration, reading promotion, and professional support for teachers.

The findings of the review demonstrated that functional school libraries positively influence educational outcomes by creating enabling environments for teaching, learning, inquiry, creativity, and independent knowledge acquisition. Through the provision of diverse print and digital resources, school libraries support the development of critical thinking, problem-solving abilities, research competencies, and lifelong learning habits among learners. Similarly, school librarians serve as educational partners who guide learners in navigating complex information environments and developing the competencies required for success in contemporary knowledge societies.

Despite these contributions, the review identified several challenges confronting school libraries, particularly in developing countries. These challenges include inadequate funding, shortage of qualified librarians, insufficient technological infrastructure, outdated collections, poor policy implementation, and inadequate recognition of libraries as essential educational institutions. Such constraints limit the ability of libraries and librarians to maximize their contributions to educational development and learning outcomes.

The paper therefore concludes that libraries and librarians remain fundamental to the achievement of quality primary and secondary education. As educational systems continue to evolve in response to technological advancements and changing learning needs, greater investment in school library development, professional librarianship, digital infrastructure, and supportive educational policies will be essential. Strengthening school libraries will not only improve educational quality but also contribute significantly to literacy development, information empowerment, educational equity, and sustainable national development.

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Role of libraries in climate change awareness and security for sustainable development in Nigeria

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Abstract

Climate change poses escalating socio-ecological threats to Nigeria, necessitating decentralised, community-centred adaptation strategies. This qualitative study examines how Nigerian libraries mediate climate change awareness and safeguard information security to advance sustainable development. Employing a multiple-case study design across six urban and peri-urban sites, the research interrogates how information professionals translate scientific and indigenous climate knowledge into actionable literacy initiatives while confronting infrastructural vulnerabilities, funding deficits, and epistemic marginalisation. Guided by two research questions, thematic analysis reveals that libraries function as socio-technical translators, green literacy hubs, and disaster response anchors, yet their impact is systematically undermined by fragmented policy frameworks, inadequate climate-resilient infrastructure, and the devaluation of indigenous knowledge systems. The study concludes that strengthening the role of Nigerian libraries through institutional reforms, climate-responsive policies, enhanced infrastructure, professional capacity development, can significantly improve their contribution to climate resilience and sustainable development. With actionable recommendations for institutional reform, cross-sector partnerships, and policy integration to position Nigerian libraries as central nodes in national climate adaptation and sustainable development agendas.

Keywords: *Climate change awareness, climate resilience, green libraries, information security, Nigerian libraries, indigenous knowledge and sustainable development,*

Introduction

Nigeria is increasingly facing climate-related challenges such as flooding, desertification, extreme heat, and disruptions to agricultural activities. These environmental changes have significant effects on people's livelihoods, health, and overall well-being, making communities more vulnerable to climate risks and development challenges (Adetunji & Daly, 2024; Ajani et al., 2024). In response to these challenges, libraries are no longer viewed merely as places for storing information. They are increasingly recognized as important community centres that can promote climate literacy, encourage environmental responsibility, and preserve valuable information resources during climate-related disasters (Ajani et al., 2024; De Brün, 2025). Across the world, libraries have played important roles in combating misinformation, supporting public education, and providing access to reliable climate information. However, many libraries in Nigeria currently lack the institutional capacity and resources needed to fully perform these roles (Kolawole & Oladokun, 2025).

Although there is growing scholarly interest in green libraries, climate communication, and disaster preparedness, many Nigerian libraries continue to operate under challenging conditions characterized by inadequate funding, poor infrastructure, and weak policy support for climate-related initiatives (Ajani et al., 2024; Ajani et al., 2026). Furthermore, indigenous environmental knowledge is often excluded from formal climate action plans, while weak collaboration among communities, libraries, and local government agencies limits the effectiveness of climate awareness programmes and the long-term preservation of climate information resources (Ajani et al., 2024). As a result, a significant gap exists between the potential role of libraries in promoting climate resilience and their actual capacity to do so. Despite possessing the trust, community reach, and information management expertise needed to support climate adaptation efforts, libraries face several systemic barriers that prevent them from serving as strategic partners in climate resilience. Addressing these challenges is essential as Nigeria strives to achieve the Sustainable Development Goals, particularly SDG 13 (Climate Action) and SDG 4 (Quality Education). Libraries can make a unique contribution to these goals by providing accessible, culturally relevant, and secure information that supports climate awareness, education, and community adaptation efforts (De Brün, 2025).

Research Questions

1. How do Nigerian libraries mediate climate change awareness and integrate indigenous and scientific knowledge to foster community resilience?
2. What challenges compromise the security of climate information resources in Nigerian libraries?

Literature Review

Libraries as Climate Mediators and Awareness Hubs

Modern research is putting libraries in the role of mediators in climate communication, beyond traditional custodianship to support the socio-technical translation and community engagement. The librarians in Nigerian contexts play the role of a boundary spanner who translates the complex scientific data and indigenous ecological observations to accessible and

locally relevant climate advisories (Ajani et al., 2024; Ajani et al., 2026). This mediation is not just informative, it is highly relational and it needs trust-building, participatory documentation and culturally responsive programming. Research shows that libraries that combine their validation schemes with satellite meteorological data and traditional weather metrics are more likely to increase the level of trust and community acceptance of climate adaptation strategies (Ajani et al, 2024). In the same vein, the green shelves conceptualisation helps to explain how Nigerian libraries can establish special collections of books and online resources on environmental science, sustainable agriculture, and climate policy, as well as integrate eco-literacy workshops, seed libraries, and community gardens into service provision (Nwafor and Abubakar, 2023).

This trend is supported by evidence around the world. The IFLA Evidence Briefing (De Brún, 2025) is a synthesis of 112 articles that libraries are the main nodes in climate literacy, disaster education, and managing infodemics, especially in low-resource environments where misinformation is widespread. Librarians also become the information first responders, and they offer a validated source of information about evacuation, heatwave safety, and post-disaster recovery (Stricker, 2019; Mohammed et al., 2026). In Nigeria, the awareness programs are however disjointed. Although certain academic and public libraries have experimented with climate campaigns, tree planting, and sustainability exhibitions that are supported by CSR, they do not meet the criteria of standardisation, longitudinal assessment, and institutional support (Oladokun et al., 2025). The literature emphasizes the idea that climate awareness mediation cannot be done merely by resource curation; it involves participatory co-design, multilingual outreach, and strategic upliftment of ecological knowledge held by communities as legitimate data (Anyim, 2021). In the absence of systematic systems to authenticate and disseminate indigenous knowledge, libraries face the threat of continuing to reproduce epistemic imbalances favouring Western paradigms of scientific understanding over contextually tested adaptation practices.

Information Security, Disaster Preparedness and Resource Resilience

Climate change has direct physical and digital threats to library collections, requiring a strong disaster preparedness and information security infrastructure. The Nigerian libraries are especially susceptible to hazards caused by climate, such as flooding, temperature extremes, humidity bursts, and power outages, which only contribute to the deterioration of materials, the growth of moulds, and the loss of digital information (Adetunji and Daly, 2024; Ajani et al., 2024). Empirical surveys indicate that although most libraries in Nigeria have simple preservation policies, such as off-site backup, temperature regulation, and emergency response planning, not many have detailed, climate-specific disaster management policies (Ajani et al., 2024; Ajani et al., 2026). The proportion of reported climate action plans among surveyed practitioners is low (only 40.5%), and infrastructure resilience is critically low (only 30% of libraries are located in buildings that are designed to resist extreme weather) (Ajani et al., 2024).

The literature highlights that information security during the climate era is not limited to physical protection, but it also includes digital sovereignty, redundancy of data backup, as well as ownership of community knowledge. Participatory archives and community-based climate documentation initiatives prove to be effective solutions to indigenous knowledge erasure by institutions or climate-driven loss (Ajani et al, 2024; Dada, 2021). Nevertheless, technology gaps are obstacles to implementation: lack of reliable internet access, lack of cloud storage space, and outdated digital infrastructure restrain remote access and real-time disaster response. Moreover, small amounts of libraries in Nigeria do not have energy-resistant to the climate, which means that digital collections will be susceptible to power outages during the extended periods of extreme weather (Dada, 2021; Adeyemi et al., 2024). International case studies also emphasize the effectiveness of the frameworks of building back better, which introduce the risk assessment, staff training, climate-stable storage, and the introduction of renewable energy sources to the work of libraries (Pierard et al., 2016; Stricker, 2019). However, the Nigerian libraries are only responsive but not proactive in protecting the information resources unless specific funding, building the technical capacity, and policy requirements are in place. The overlap of information security and climate awareness, therefore, necessitates a comprehensive approach to planning that considers community knowledge and institutional collections as mutually reinforcing resilience resources.

Policy gaps, Epistemic Authority and institutional Constraints.

One common thread that runs throughout the literature is the misalignment of library potential and institutional support mechanisms. The policy frameworks of Nigerian libraries, such as the Nigerian Library Association (NLA) and the National Library of Nigeria (NLN) have not formalised climate resilience, green operations, or integration of indigenous knowledge as an operational mandate (Adeyemi et al, 2024; Kolawole and Oladokun, 2025). This policy gap continues to lead to funding instability, with libraries unable to find grants to fund sustainability efforts or disaster preparedness or climate literacy programs (Usang et al., 2024). Adding to this is the deep-rooted epistemic hierarchies that sidelight indigenous knowledge on the formal climate planning. Community-based ecological observations are often disregarded by municipal actors and institutional gatekeepers as anecdotal or unproven, and require statistical confirmation before being integrated into policy systems (Ajani et al, 2024; Usang et al., 2024). This epistemic privilege does not just weaken the trust of the community, but also deprives libraries of their possibility as fair knowledge intermediaries.

The literature also denotes institutional silos as a pivotal impediment. Libraries, environmental agencies, municipal planners, and community organisations work in disconnected eco-systems with little data-sharing guidelines or shared accountability frameworks (Ajani et al, 2024). Network analyses of stakeholders show asymmetric information flows: libraries are always willing to pass indigenous knowledge upwards to municipal players, whereas technical climate data are rarely sent in the opposite direction (Ajani et al, 2024; Usang et al., 2024). Such extractive dynamism compromises the sustainability of resilience and goes against the tenets of knowledge sovereignty and benefit-sharing. Moreover, there are also gaps in librarian capacity; the number of professionals who are specially trained in terms of climate science communication, disaster risk reduction, or sustainable library management remains low (Anyim, 2021; Adebowale-Adewojo et al., 2026). Awareness campaigns and information protection efforts will only be ad hoc and unsustainable without specific professional development, cross-sector relationships, and legal acknowledgment of libraries as climate governance participants. There is a common message in the literature: to convert Nigerian libraries into climate resilience centres, there is a need to undertake a purposeful policy change, balance funding, inclusion of epistemic, and institutionalised cross-sector partnership.

Theoretical Framing

This paper has used a socio-technical systems model (Geels, 2002) and political ecology model (Robbins, 2012) to examine how institutional hierarchies, technological infrastructures and power relations mediate climate knowledge practices. The theory of epistemic authority, as proposed by Bourdieu (1991), was used to understand the process of legitimization of some types of knowledge especially scientific knowledge in federal research institutes of agriculture. In order to balance these structural views, the research employed Indigenous epistemological views (Kovach, 2009) in order to prefigure relational, community-based knowledge as well as to critically analyse the marginalisation of local and experiential knowledge in climate information systems. This integrated framework allowed focusing on both the dynamics of institutional power and the tensions in knowledge between formal scientific knowledge and community-based knowledge practices in the environment of environmental vulnerability.

Methodology

Research Design

The study adopted a qualitative multiple-case study design based on semi-structured interviews to examine how Nigerian libraries can mediate climate change awareness and ensure information resources to support sustainable development. The interview approach was chosen as the main data collection design because it allows exploring the lived experience, interpretative frameworks and institutional decision-making processes of participants in the context of climate knowledge governance, information preservation, and community engagement in detail. The design enables the comparative study by framing the study on three limited cases (Lagos, Kano, and Rivers) on how socio-technical systems, bureaucratic structures, and epistemic negotiations influence library-based climate adaptation in different ecological and institutional settings.

Case Selection Criteria

The states were chosen purposely based on three criteria that fit into the focus of the study on climate vulnerability, institutional capacity, and community-library interface:

1. Exposure to climate threats: Reported, frequent climate risks (coastal flooding and urban heat in Lagos, drought and heat stress in Kano, riverine erosion and seasonal flooding in Rivers).
2. Institutional climate requirement: Public, academic, or special libraries that have recorded climate literacy efforts, green library projects, community outreach programmes, or official collaborations with environmental agencies.
3. Community-knowledge interface: Proximity to active knowledge networks of indigenous knowledge (farmers cooperatives, elders councils, youth climate advocates) and signs of participatory documentation or co-created climate advisories.

Participants and Sampling

The study population comprised key stakeholders involved in climate information management, library services, environmental education, and community-based climate initiatives in Nigeria. Participants included librarians, library administrators, environmental information specialists, policymakers, community leaders, climate advocates, and other professionals with relevant expertise in climate information dissemination and resilience-building activities. Their inclusion ensured that the study captured diverse perspectives on the role of libraries in promoting climate awareness, environmental sustainability, and community resilience.

Using purposive sampling, 24 participants were selected based on their knowledge, experience, and involvement in climate-related information activities. Maximum variation sampling was adopted to ensure diversity in professional roles, gender, cultural background, seniority, and engagement with library climate initiatives. The sample size of 24 was considered adequate because thematic saturation was reached, meaning that additional interviews no longer produced new insights or

themes. To maintain confidentiality and support effective data management, all participants were assigned unique identification codes throughout the data collection and analysis process. (Table 1). To ensure anonymity and ease qualitative data management, all participant identifiers were coded in a systematic framework (Table 2).

Table 1: Participant Distribution and Selection Rationale

Participant Category	Role/Description	Sample Size	Selection Rationale
Information Professionals	Librarians, climate literacy coordinators, digital curators, outreach officers	12	Direct responsibility for climate resource curation, awareness programming, and information security practices
Community Knowledge Holders	Elders, traditional weather interpreters, smallholder farmers, youth climate advocates	8	Custodians of indigenous ecological knowledge; primary users and co-creators of climate advisories
Municipal & Planning Officers	Disaster management coordinators, urban resilience planners	4	Gatekeepers of municipal climate data, funding allocation, and institutional validation processes

Table 2: Participant Coding Structure and Assignment Rationale

Code Component	Format	Description	Example	Rationale
Participant Category Prefix	2-4 letter abbreviation	Identifies the stakeholder group to which the participant belongs	IP = Information Professional CKH = Community Knowledge Holder MPO = Municipal/Planning Officer NGO = NGO/Extension Partner	Enables quick identification of participant role during analysis while maintaining anonymity; aligns with thematic coding framework
Geographic Identifier	3-letter city code	Indicates the study site where the participant was recruited	LAG = Lagos KAN = Kano PHC = Port Harcourt (Rivers State)	Facilitates cross-case comparative analysis; preserves contextual specificity without revealing exact institutional affiliation
Sequential Number	Two-digit numeral	Unique identifier assigned chronologically within each category-city combination	01, 02, 03… 12	Ensures each participant has a distinct code; supports audit trail and data management
Optional Role Descriptor	Parenthetical note (internal use only)	Brief, non-identifying note on specific function (stored separately from transcripts)	(digital curator), (elder weather interpreter)	Aids analytic memo writing and reflexive journaling; excluded from published outputs to protect confidentiality

Sample: IP-LAG-05 = Information Professional, Lagos location, fifth respondent in this group.

The selection of participants was confirmed by the community gatekeepers (council of elders, cooperative leadership, library management) to give local consent protocols. All participants gave informed consent and had the interviews scheduled.

Interview Protocol and Administration

The only primary method of data collection was semi-structured interviews (60-90 minutes). The information professionals, community knowledge holders and municipal officers were given separate interview guides that were based on the theoretical framework of the study and two research questions. The main areas of the interview were: (a) the methods of climate awareness distribution and knowledge verification; (b) the methods of ensuring physical and digital information security against climate risks; (c) the experience of institutional gatekeeping, funding limitations, and policy gaps; and (d) the methods of building trust, data sovereignty, and community owning. The use of probing questions prompted concrete illustrations, institutional stories, and retrospective explanations of power relations during the knowledge exchange process. The interviews took place between January and March 2025 in English, Yoruba, Hausa, Igbo or Nigerian Pidgin, at the discretion of the participants. Semantic fidelity in translation was guaranteed by the use of trained interpreters. All audio-taped interviews were transcribed word-for-word and anonymised through the use of coded identifiers (P3-Librarian-Lagos, CKH2-Elder-Kano). An initial pilot test involving three subjects optimized question sequencing and probe depth and cultural sensitivity prior to full implementation.

Data Analytic Approach

Reflexive thematic analysis was used to analyse the interview transcripts based on a six-phase methodology of Braun and Clarke (2006): familiarisation, initial coding, theme development, review, definition, and reporting. The analysis was done in an iterative inductive-deductive manner. Emergent patterns (filtering of bureaucratic data, hybrid validation, community-owned archives, funding instability) were captured by open coding and relationships between institutional power and technological constraints and knowledge sovereignty were mapped by axial coding. Selective coding was used to condense categories into core themes which directly answered the research questions.

Cross-case synthesis looked at stories from the three states to identify common patterns, differences based on context, and evidence that goes against the findings. The documentation of the theoretical framework in the analytic memos reflected the interpretation of the theoretical framework in the decision-making process, especially where epistemic authority contest and socio-technical translation practices were concerned. Code organisation, retrieval and generating audit trails was supported using qualitative data management software.

Trustworthiness and Ethical Considerations

Participants were validated in member validation sessions to interpretations of power relations and sovereignty negotiations, peer debriefing of the interpretations with Nigerian environmental governance academics served to critique analytical biases. Transferability was ensured by thick description of contextual factors. An ethnographic journal became a self-reflexive field journal that traced the influence of researcher identity (as an outsider scholar) on relationships with knowledge holders in the community, especially concerning assumptions about scientific legitimacy. The ethical procedures followed the Nigerian National Health Research Ethics Committee (NHREC) provisions of minimal-risk social science research. Free, prior and informed consent was acquired by community-based methods, such as verbal consent in local languages among oral knowledge holders. Identities were safeguarded by anonymisation protocols (especially municipal officers and members of the community who were addressing institutional limitations). More importantly, the concept of knowledge sovereignty has been operationalised by the data-use agreements that would ensure the participants have their rights to access and withdraw or limit the use of the indigenous climate observations. All electronic records and notes were stored on coded offline servers, and the physical notes were put in climate-controlled storage to avoid environmental deterioration.

Results

The qualitative analysis produced key themes that directly address the two research questions guiding this study. To ensure clarity and alignment with the research objectives, the findings are presented separately below according to each research question.

Findings Related to Research Question 1: Mediation of Climate Change Awareness and Integration of Knowledge

The findings reveal that Nigerian librarians function as proactive socio-technical translators, bridging the gap between abstract meteorological data and local ecological realities. Participants emphasized that effective climate awareness requires translating scientific forecasts into culturally relevant, actionable guidance. For instance, a community library organizer in Lagos explained how climate literacy trainings are adapted to the local context:

"We do not simply issue IPCC reports; we sit with market women and farmers, plot flood history with local landmarks, and integrate the same with rainfall forecasts with NiMet. When we demonstrate how their water generally gets to the old mango tree, they do believe the advisory." (P5-Librarian-Lagos)

Similarly, in Kano, drought-adaptation knowledge was integrated into agricultural literacy programs. A community knowledge holder noted:

"The soil-moisture indicators would be checked by our elders according to the librarian and then translated into Hausa pamphlets with the seasonal forecasts attached to them, which are now used by our cooperatives to decide when to plant. It is not just information, but survival knowledge." (CKH3-Farmer-Kano)

However, the integration of indigenous knowledge is not without friction. While some libraries successfully established data sovereignty protocols, such as a Kano librarian who noted, *"We signed a memorandum with the council of elders: they own oral prediction, we are in charge of the digital archive... this prevents extractive documentation and ensures that communities are not passive spectators"* (P8-Librarian-Kano), others struggle with capacity gaps. Municipal officers acknowledged the value of library-mediated awareness but highlighted training deficits, with a Rivers State disaster management coordinator stating:

"Places we do not visit are accessed by libraries, but their staff are not trained to be climate risk modellers, so sometimes they will give a less precise set of advice, and we need to train them together to allow them to compromise between science and local context without dilution." (MO2-Planner-Rivers)

Findings Related to Research Question 2: Challenges Compromising the Security of Climate Information Resources

The study identified compound vulnerabilities that threaten both physical collections and digital climate knowledge in Nigerian libraries. These challenges are broadly categorized into infrastructural insecurity, institutional barriers, and policy gaps.

Infrastructural Insecurity: Interviewees detailed how climate information services are frequently disrupted by power instability, humidity, and flooding. A digital curator in Lagos documented:

"Our climate portal takes two hours to go down every rainy season. UPS takes two hours and we are offline. Farmers who rely on SMS notifications are missing planting windows. We have backups, but those are stored on the same server rack. A single surge, and we go down." (P9-Curator-Lagos)

Environmental factors also directly endanger physical collections. In Rivers State, a librarian reported:

"Our archive on the ground floor has been flooded twice last year. Rare climate records and community flood maps were damaged by water and we moved them up to the second floor but the ceiling leaks when it rains. There is no budget to provide climate-controlled storage." (P11-Librarian-Rivers)

Community knowledge holders also expressed deep concerns over the security of indigenous records, with one elder in Kano stating:

"When we hand our drought calendars to the library, we have no idea where they will be stored or accessed by anyone. In the event that they are deposited on a faulty computer or eaten up by moulds, our knowledge is lost. We must be assured that our records are securely stored and belong to us rather than them." (CKH6-Elder-Kano)

Institutional and Policy Barriers: Beyond physical threats, systematic institutional impediments hinder information security and preservation. Institutional gatekeeping was characterized by bureaucratic clearance processes that delay access to crucial meteorological data. A municipal officer in Lagos admitted:

"NiMet data needs to be cleared. By the time libraries get them, it is no longer useful in community planning, we have the data, and it has to pass through three approval layers to distribute." (MO1-Officer-Lagos)

Furthermore, epistemic hierarchies marginalize indigenous knowledge in formal planning, as a Rivers State planner noted:

"Municipal committees demand peer-reviewed data. When librarians bring community flood maps or oral histories, they're labelled 'anecdotal.' Until we change how we define 'evidence,' indigenous knowledge will stay on the sidelines." (MO4-Planner-Rivers)

Discussion

The discussion of the findings is structured according to the two research questions that guided this study, ensuring a direct and logical interpretation of the results.

Discussion on Research Question 1: How do Nigerian libraries mediate climate change awareness and integrate indigenous and scientific knowledge to foster community resilience?

The results indicate that Nigerian librarians act as vital socio-technical translators, synthesizing meteorological information with local ecological cues to develop actionable climate awareness. The strategy of co-creating multilingual advisories in collaboration with elders and farmers was repeatedly highlighted by respondents as a method that fosters community trust and policy relatability. This aligns with the IFLA evidence briefing (De Brún, 2025), which positions libraries at the core of climate literacy and infodemic management in low-resource settings. Similarly, Ajani et al. (2024) report on the transformation of oral flood histories in Nigerian libraries into geospatial risk maps, demonstrating that traditional knowledge can be translated into actionable data.

However, this study extends the existing literature by establishing that the mediation of awareness is inherently relational. Trust is easily undermined when libraries extract indigenous knowledge without providing feedback or transparent validation measures. This finding supports Adebowale- Adewojo et al.'s (2026) assertion that environmental literacy initiatives must focus on community co-design rather than top-down dissemination. When librarians are empowered as boundary spanners rather than mere curators, they can effectively bridge epistemic gaps and coordinate grassroots adaptation with SDG 13 targets. Consequently, for climate awareness to be truly effective, it requires the institutionalization of participatory documentation and the legitimization of indigenous knowledge as being equal in value to scientific forecasting. Without such relational safeguards, awareness campaigns risk reproducing the very epistemic hierarchies they aim to dismantle.

Discussion on Research Question 2: What challenges compromise the security of climate information resources in Nigerian libraries?

The findings demonstrate that infrastructural vulnerability, bureaucratic inertia, and policy gaps are the primary pillars undermining climate information security in Nigerian libraries. Respondents consistently reported the detrimental impacts of frequent power outages, flooding, and humidity on both physical archives and online repositories, compounded by subpar cloud backup systems that leave climate warnings vulnerable during extreme weather events. This mirrors the survey conducted by Ajani et al. (2024), which found that only 40.5% of Nigerian libraries have documented climate action plans, indicating that infrastructure resilience is at a critical level.

Furthermore, institutional silos severely limit access to validated meteorological data, forcing librarians to rely on outdated or heavily filtered information. Kolawole and Oladokun (2025) similarly identify chronic underfunding and outdated building designs as major obstacles to green library implementation. This paper contributes to the discourse by highlighting that information security in this context is not merely a technical issue, but a political one. Without legal mandates for climate-resilient infrastructure or formal data sovereignty treaties, libraries remain ill-equipped to protect community knowledge resources. While scholars like Pierard et al. (2016) and Ajani et al. (2024) advocate for "building back better" frameworks, Nigerian libraries currently lack the policy and financial support required to translate these concepts into reality. Until climate adaptation funding is institutionalized and disaster preparedness is mandated as a core requirement for libraries, information security efforts will remain reactive, thereby compromising broader sustainable development objectives.

Conclusion

The study concluded that Nigerian libraries are increasingly contributing to climate change awareness and the preservation of climate-related information, their efforts remain insufficient to fully address the growing climate challenges facing the country. Libraries have demonstrated considerable potential as centres for climate literacy, community engagement, and knowledge preservation; however, challenges such as inadequate infrastructure, limited funding, weak policy support, and poor integration of indigenous knowledge continue to hinder their effectiveness. Consequently, the study concludes that there is a significant deficiency in the current climate resilience capacity of Nigerian libraries. Addressing these gaps through targeted institutional reforms, enhanced investment, and stronger policy frameworks is essential for libraries to effectively support sustainable development and climate adaptation initiatives in Nigeria.

Recommendations

1. Federal Ministry of Environment and the Nigerian Library Association are to establish a National Library Climate Action Framework and involve libraries in disaster management and climate adaptation committees.
2. Provide a Green Library Resilience Fund to fund climate-controlled storage, solar power, flood protection, and digital backup, which should be prioritized in high-risk areas.
3. LIS institutions and LRCN ought to incorporate climate literacy, disaster risk reduction and community engagement into their curricula and professional training.
4. Libraries are empowered to implement data covenants that guarantee community ownership and consent-based access and benefit-sharing of indigenous climate knowledge.
5. Work with telecom companies, higher education institutions, and nongovernmental organizations to create climate portals that are mobile-friendly, USSD, and multilingual repositories.

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Role of School Libraries and Librarians in Enhancing Teaching and Learning in Secondary Schools in Aba North LGA, Abia State

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Abstract

This study examined the role of school libraries and librarians in enhancing teaching and learning in secondary schools in Aba North Local Government Area of Abia State, Nigeria. School libraries are essential to promoting resource-based learning, independent study, and academic achievement; however, their effectiveness depends largely on the availability of resources and the contributions of professional librarians. A quantitative survey research design was adopted. The population comprised teachers and registered student library users from selected public and private secondary schools. Using a multi-stage sampling technique, six schools were selected, and a total of 180 respondents participated in the study. Data were collected using a structured questionnaire and analyzed using descriptive statistics such as frequencies and mean scores. The findings revealed that while traditional library resources such as textbooks and curriculum-related materials are relatively adequate, digital and audio-visual resources are insufficient. Librarians were found to play important roles in user education, research support, and facilitating access to information, although their collaboration with teachers remains limited. The study also identified major challenges, including inadequate funding, shortage of qualified staff, poor infrastructure, lack of ICT facilities, and limited institutional support. The study concludes that school libraries and librarians have significant potential to enhance teaching and learning, but their effectiveness is constrained by resource and systemic limitations. It recommends increased funding, provision of ICT facilities, employment of qualified librarians, and stronger collaboration between teachers and librarians.

Keywords: *School libraries, librarians, teaching and learning, secondary education, Nigeria*

Introduction

School libraries around the world are known as important learning centers that connect classroom education with self-directed research, information literacy and lifelong learning. In Nigeria, the National Policy on Education specifically identifies libraries as key educational services, which are obligated to develop literacy, critical thinking and academic excellence. Nevertheless, the practice of most secondary schools is far apart the policy ideals. Although secondary education in the area focuses on exam scores and the content covered in the curriculum, library-mediated learning is still a marginal concept (Nadal, 2021). Students are not taught how to retrieve information, research, and study independently, and teachers often use traditional pedagogical approaches (Challa et al., 2021).

Therefore, the opportunities of school libraries to make the teaching process more effective and capture the interest of students in studying are significantly underused. According to McLaughlin and Resta (2021), who claimed that the issue is made more complex by systemic issues such as insufficient funding, outdated print collections, lack of digital resources, and qualified Librarians. Moreover, educational stakeholders often undermine the pedagogical role of librarians, diminishing them to administrative guardians instead of teaching allies (Baer, 2021). This disconnection has the effect of undercutting curriculum implementation, restricting the exposure of students to a variety of learning resources and up-to-date materials, and stifling the process of developing information literacy skills required in higher education and the knowledge economy of the 21st century. It is not possible to identify specific interventions without empirical evidence of the current state of libraries and librarians in this area, in terms of how they can assist teaching and learning. This research, thus, examines how far school libraries and librarians can go in providing academic instruction and learning to students in Aba North secondary schools, and aim at producing action research information to education policy-makers, school administrators and library professionals.

Research Questions

- To what extent are school library resources adequate for supporting teaching and learning in secondary schools in Aba North Local Government Area, Abia State?

- What roles do school librarians play in enhancing instructional delivery and students' learning outcomes in secondary schools in Aba North Local Government Area?
- What systemic challenges hinder effective utilization of school libraries and librarian services in enhancing teaching and learning in secondary schools in Aba North Local Government Area?

Literature Review

The Pedagogical Imperative of School Libraries in Nigerian Secondary Education

The school library has transformed into a dormant store of print resources to an active learning common that provides active assistance in curriculum, pedagogical innovation, and student-centred learning. The International Federation of Library Associations and Institutions (IFLA, 2015) claims that a modern school library is a physical and digital learning environment in which reading, inquiry, research, thinking, imagination, and creativity play a central role in the information-to-knowledge process and personal, social, and cultural development of students. This paradigm shift highlights the significance of the library as an inseparable supplement of classroom teaching. The school library in the Nigerian setting is anticipated to offer equal access to curriculum-related materials, promote the reading culture, and as a self-directed learning laboratory (Oyetola and Adio, 2020; Ige, Odu and Abiodun, 2025). Libraries improve lesson planning; supplementary resources used to reinforce the concepts and give the students the chance to learn more than what is available in the textbooks when they are properly staffed and are incorporated into the school schedule (Israel and Lash 2020).

Empirical evidence has had a consistent confirmation that the existence of functional and adequately staffed libraries in schools leads to greater student involvement and better academic achievements. Amaniampong and Hartmann (2023), discovered that academic information, classroom tasks, examination preparation, and career advice were the main reasons why secondary school students in Nigeria use school libraries as they are directly correlated with the requirements of the curriculum. Equally, it has been shown that reading scores and academic performance are much better in institutions that focus on developing library programs than those with little to no library services (Oyetola and Adio, 2020). Regardless of this fact, the Nigerian education system has traditionally not paid much attention to the development of libraries, and many state-owned schools have been built without a library room or a system of organizing collections (Ogude and Mushonga, 2022). Lack of a national system of standardization of school libraries has led to disjointed service delivery, with the quality and availability of libraries differing radically among the states and local government regions. In Aba North, just as in most schools in Nigeria, the lack of alignment between policy wishes and the reality on the ground remains a push to the peripherality of the library as an instructional resource, with context-specific research into its actual role in instruction and learning being essential.

The Librarian as an Instructional Partner and Learning Facilitator

The effectiveness of a school library is indisputably connected with professionalism, pedagogical skill, and active involvement of a librarian. Modern education models have placed the teacher-librarian not as a book custodian, but as a teaching partner, curriculum partner, and information literacy coach. A trained school librarian has specialized training in educational psychology, lesson design, managing digital resources and research pedagogy and can co-plan with subject teachers, create resource-based learning modules, and teach students about critical information evaluation (Hata et al., 2021). Nigerian School Library Association has reiterated a number of times that the above functions of the library cannot be attained without effective, qualified, and trained library personnel (Oyetola and Adio, 2020). Active involvement of teacher-librarians in the teaching process complements the work of subject teachers by selecting and organizing multidisciplinary materials, creating research projects, and organizing information literacy workshops based on the national curriculum standards.

Moreover, the librarian is very instrumental in the development of reading culture and the development of independent learning habits. Librarians can arouse intellectual curiosity and support voluntary reading of diverse texts among students through well-organized readers advisory services, book talks, reading contests, and the formation of literary clubs (Appleton, 2020). In the environment where the overall intrinsic motivation towards reading among students is low, the skill of the librarian to select age-related, culturally oriented, and digitally available resources will come in handy in turning around the aliteracy trends. Hanum et al. (2025) noted that secondary school students tend to spend free time on non-academic activities because of the low level of exposure to interesting library materials, family encouragement, peers, course and department environment, availability of facilities and insufficient supervision of library staff. On the other hand, the proactive outreach approaches of librarians like working with teachers to incorporate library research into assignment rubrics, arranging author visits and multimedia resource integration transforms the library into an active academic ecosystem (Bolin, 2022). The perception of the teaching value of the librarian, though, depends on institutional support, professional autonomy, and the awareness of the stakeholders. In most Nigerian secondary schools, the librarian is yet to be taken as an educational professional, but as a clerical employee, which restrains his or her ability to impact the pedagogical process and student learning outcomes in a meaningful way.

Systemic Constraints to Library-Mediated Teaching and Learning

Although the advantages of school libraries have been documented, the capacity of school libraries in secondary education in Nigeria remains highly limited by multidimensional barriers of the system. Chronic underfunding is chief among them and is reflected in the lack of sufficient acquisition budgets, outdated collections, and decaying physical infrastructure. Ndagi, Maifata and Mohammed (2021) cited inadequate funding, lack of reading materials, and inadequate library time as bottlenecks to the fulfillment of information requirements of students in Kaduna State. Likewise, Okwu, and Opurum (2021) have indicated that most of the private secondary schools do not have libraries at all, or the libraries are outdated and are not able to meet the requirements of 21 st century learning. These issues are further aggravated in public schools in Aba North by the inadequate budgetary distributions, use of donated or old textbooks, and lack of systematic collection assessment and deaccessioning procedures.

Another major barrier is the integration of technological. The contemporary education sector requires digital literacy, online research skills, and access to e-resources, and many Nigerian school libraries do not have computers networked, sound Internet connectivity, and digital subscription databases. Amaniampong and Hartmann (2023), discovered that lack of technological infrastructure, high cost of the internet coupled with low bandwidth, unstable power supply, lack of administrative support, curriculum overload, and lack of in-service training. This technology gap effectively restricts access to up-to-date academic data, and also discriminates against the digital-native generation of students who require an interactive and multimedia experience of learning. Also, gaps in service delivery are worsened by shortage of qualified teacher-librarians. Akparobore et al., (2020) found out that most of the employees in libraries in Nigerian schools do not have professional training in libraries and therefore their cataloguing is poor, giving poor reference service and little in terms of instructional collaboration. In the absence of professional personnel, libraries will be unable to manage resources, introduce information literacy programs, or align the services with curriculum goals. All these systemic constraints lower student confidence in the library services and lessen patronage as well as the capacity of the library to act as a driver of teaching and learning improvement.

Theoretical Framework

Resource-Based Learning Theory

Resource-Based Learning Theory is a teaching methodology that focuses on utilizing various learning materials to facilitate active learning and independent learning (Susilawati and Herman, 2025). Resource-based learning (RBL) is an educational theory where students take active responsibility for their education by exploring diverse resources like books, digital databases, and the internet. Under this model, the school library acts as the central hub, and librarians serve as critical guides who teach information literacy and critical thinking. The premise of the theory is that students are able to learn better when they engage with multiple sources of information including textbooks, reference sources, multimedia and digital tools as opposed to when they are taught by the teacher alone. It promotes the incorporation of multiple learning materials into the curricular delivery and advocates autonomy among learners. The strategy engages students, teachers and information providers actively in the learning process and encourages flexibility to adapt to various learning styles and abilities. Learners can build up knowledge, inquire, and learn by thinking critically through exposure to diverse resources.

In addition, Resource-Based Learning Theory places teachers and librarians in a position of facilitator that helps students in choosing and using the right resources to develop their understanding. The theory also focuses on the fact that effective learning is based on the availability of various and relevant instructional resources including books, journals, multimedia resources, and ICT tools. With such materials at their disposal, students are able to engage in analysing, evaluating and synthesising information on more than one source and thus develop deeper meaning. Yet, in the case of insufficient resources, learning is constrained and teacher-centered, which lessens the chances of exploring, on their own (Lakibul and Amilhamja, 2026). This underscores the significance of having well stocked school libraries and professionally trained information specialists in promoting the results of education.

The resource-based learning theory offers a powerful conceptual basis on which the research on the importance of school libraries and librarians in improving teaching and learning is based (Simba, 2021). The paper highlights the value of school libraries as resource bases that avail textbooks, reference sources and digital sources to students and teachers, which is in line with the foundational assumptions of the theory. The theoretical assertion that proper learning is based on access to a wide range of instructional resources is corroborated by the results that indicated insufficient library resources. Also, the functions of the librarians in helping students, aiding research and teaching the use of library can be taken as the reflection of the role of the librarians as the facilitators of the learning process. The problems listed, such as poor funding, absence of ICT facilities and staffing shortage, also give a further reason as to why libraries that are under-resourced inhibit teaching and learning. Therefore, the theory highlights the importance of sufficient resources, teamwork, and professional assistance to enhance academic performance.

Methodology

The research design was quantitative survey research design to investigate the functions of school libraries and librarians in improving the teaching and learning of secondary schools in Aba North Local Government Area, Abia State. The methodology allowed objective measurement of the perceptions of the stakeholders, adequacy of resources and the patterns of library service usage in terms of standardized tools and statistical analysis. The target population selected teachers of secondary schools and registered users of secondary school's student libraries of selected public and private secondary schools. Multi-stage sampling approach was utilized where schools that lacked working library spaces, user identification systems, and adequate registered users were left out. Out of the eligible schools, six secondary schools were selected randomly and among these schools, 15 teachers and 15 students were selected randomly thus making the total amount to 180 respondents. The face and content validity were determined to ensure credibility of the tool by having three experts in Library and Information Science and Educational Administration to revise it. Their recommendations enhanced the clarity and relatability of the questionnaire items.

The data collection was preceded by ethical approval by the Abia State Ministry of Education and school principals of each school. The questionnaires were distributed under the supervision of the professional help of trained research assistants such as the school librarians and senior academic staff who assisted the respondents and made sure that the questionnaires were completed correctly. The respondents were assured anonymity, and voluntary participation, and questionnaires were collected instantly to be coded and analysed, which led to 100 per cent response. IBM SPSS Statistics Version 26 was used to analyze data, with descriptive statistics, including frequencies, percentages, means, and standard deviations. The results on agreement were considered as 2.50 and above, whereas the results of disagreement were defined as below 2.50, and the results were compared between the teachers and the students through cross-tabulations.

Results

Table 1: Extent of school library resources adequacy for supporting teaching and learning in secondary schools in Aba North Local Government Area, Abia State

S/N	Items	SA	A	D	SD	Mean	Decision
1	The school library has adequate textbooks for different subjects.	52	68	34	26	2.81	Agree
2	The library contains up-to-date reference materials.	41	59	45	35	2.59	Agree
3	Digital resources are available in the library.	30	46	54	50	2.31	Disagree
4	The seating capacity of the library is adequate.	38	64	40	38	2.57	Agree
5	Library materials are relevant to the curriculum.	55	70	32	23	2.87	Agree
6	Audio-visual learning materials are available.	28	42	60	50	2.27	Disagree
7	The library is open frequently enough.	48	62	39	31	2.71	Agree
8	Students can easily access materials.	50	66	36	28	2.77	Agree

The results presented in Table 1 indicate that several aspects of school library resources are considered adequate for supporting teaching and learning. Respondents agreed that textbooks for different subjects are sufficiently available (Mean = 2.81), reference materials are fairly up-to-date (Mean = 2.59), and library materials are relevant to the curriculum (Mean = 2.87). In addition, the seating capacity (Mean = 2.57), frequency of library opening (Mean = 2.71), and accessibility of materials (Mean = 2.77) were all perceived as satisfactory. However, the findings also reveal notable gaps in certain areas. Digital resources such as computers and internet facilities (Mean = 2.31), as well as audio-visual materials (Mean = 2.27), were perceived as inadequate. The results further suggest that while traditional library resources and basic services are fairly adequate, modern instructional resources are lacking, which may limit the effectiveness of libraries in supporting contemporary teaching and learning.

Table 2: Roles school librarians play in enhancing instructional delivery and students' learning outcomes in secondary schools

S/N	Items	SA	A	D	SD	Mean	Decision
9	Librarian assists teachers in sourcing materials.	62	71	27	20	2.97	Agree
10	Librarian teaches students library use.	68	74	22	16	3.08	Agree
11	Librarians organize reading programmes.	58	69	31	22	2.91	Agree
12	Librarian supports research activities.	70	66	25	19	3.04	Agree
13	Librarians collaborate with teachers.	52	63	36	29	2.77	Agree
14	Librarian provides orientation.	65	72	24	19	3.02	Agree

15	Librarians improve reading habits.	60	70	28	22	2.93	Agree
16	Librarian assists in locating materials.	72	68	23	17	3.08	Agree

The findings in Table 2 show that school librarians play important roles in enhancing instructional delivery and improving students' learning outcomes. Respondents agreed that librarians assist teachers in sourcing instructional materials (Mean = 2.97), teach students how to use library resources (Mean = 3.08), organize reading programmes (Mean = 2.91), and support students' research activities (Mean = 3.04). Furthermore, librarians were recognized for providing orientation services (Mean = 3.02), helping students locate materials (Mean = 3.08), improving reading habits (Mean = 2.93), and collaborating with teachers (Mean = 2.77). These results indicate that librarians are actively involved in supporting both teaching and learning processes, particularly in areas related to information access, user education, and academic support. Their contributions are therefore essential to the overall effectiveness of the school library system.

Table 3: Challenges that hinder effective utilization of school libraries and librarian services in enhancing teaching and learning

S/N	Items	SA	A	D	SD	Mean	Decision
17	Inadequate funding affects library services.	85	70	15	10	3.28	Agree
18	Insufficient library staff.	78	68	20	14	3.17	Agree
19	Lack of modern ICT facilities.	82	72	14	12	3.24	Agree
20	Students not encouraged by teachers.	66	71	23	20	3.02	Agree
21	Poor library accommodation.	74	69	21	16	3.12	Agree
22	Outdated materials reduce interest.	80	70	16	14	3.20	Agree
23	Lack of power supply.	77	72	18	13	3.18	Agree
24	Limited library periods.	69	75	20	16	3.09	Agree

The results in Table 3 reveal several challenges affecting the effective utilization of school libraries and librarian services. Respondents agreed that inadequate funding (Mean = 3.28), insufficient library staff (Mean = 3.17), and lack of modern ICT facilities (Mean = 3.24) are major issues limiting library operations. Other identified challenges include poor library accommodation (Mean = 3.12), outdated materials (Mean = 3.20), unreliable power supply (Mean = 3.18), and limited time allocated for library use within the school schedule (Mean = 3.09). In addition, inadequate encouragement from teachers (Mean = 3.02) was also identified as a factor affecting students' use of the library. Overall, the findings show that multiple systemic and infrastructural challenges significantly hinder the optimal use of school libraries, thereby reducing their potential to effectively support teaching and learning.

Discussion

The findings of this study provide important insights into the role of school libraries and librarians in enhancing teaching and learning in secondary schools in Abia North Local Government Area of Abia State in Nigeria. Findings relating to the adequacy of school library resources reveal that, although basic and traditional resources such as textbooks and curriculum-relevant materials are relatively available, there are notable deficiencies in digital and audio-visual resources. This suggests that while libraries may still support conventional teaching approaches, they are less equipped to facilitate modern, technology-driven learning. This finding aligns with the assertions of Amaniampong and Hartmann (2023), who identified lack of technological infrastructure, high cost of the internet coupled with low bandwidth, unstable power supply, lack of administrative support, curriculum overload, and lack of in-service training as major constraints limiting students' effective use of school libraries. Similarly, Ndiga, Maifata and Mohammed (2021) emphasized that inadequate funding often results in poor acquisition of up-to-date and diverse learning materials, thereby restricting the ability of libraries to meet students' information needs. However, the present finding partially contrasts with the ideal perspective presented by the International Federation of Library Associations and Institutions (IFLA, 2015), which advocates for school libraries as hybrid learning environments integrating both print and digital resources. The observed inadequacy of digital infrastructure in this study indicates a gap between this ideal and the practical realities in many Nigerian secondary schools.

With regard to the roles of school librarians, the findings demonstrate that librarians contribute meaningfully to instructional delivery and student learning through activities such as user education, research support, and facilitating access to information. These roles underscore the evolving position of librarians as instructional partners rather than mere custodians of books. This finding is consistent with the position of Hata et al. (2021), who argued that modern librarians function as co-educators, supporting curriculum delivery and fostering information literacy among students. In the same vein, Appleton (2020) highlighted the role of librarians in promoting student engagement and independent learning through structured

library programmes. The findings also support Oyetola and Adio's (2020) view that effective library services depend significantly on the presence of qualified and proactive librarians. However, despite these contributions, the study suggests that the full potential of librarians is not being realized, particularly in terms of collaboration with teachers and deeper involvement in instructional planning. This observation reflects Baer's (2021) argument that librarians are often undervalued within educational systems and are not fully integrated into pedagogical processes.

Furthermore, the findings on the challenges affecting the effective utilization of school libraries reveal that systemic issues such as inadequate funding, insufficient staffing, lack of modern ICT facilities, poor infrastructure, and limited institutional support significantly constrain library operations. These challenges collectively hinder the ability of school libraries to function as effective learning support systems. This finding is in strong agreement with Akparobore et al. (2020), who reported that many school libraries in Nigeria suffer from a lack of professionally trained personnel, resulting in poor service delivery. It also corroborates the findings of Okwu and Opurum (2021), who noted that many schools either lack functional libraries or operate with outdated facilities that cannot meet contemporary educational demands. Additionally, the issue of limited teacher encouragement observed in this study aligns with Bolin (2022), who emphasized that the effectiveness of library services is closely tied to the level of collaboration between teachers and librarians. The persistence of these barriers further supports the argument by McLaughlin and Resta (2020) that systemic inequalities, including inadequate technological infrastructure, continue to limit access to quality educational resources. Theoretically, the findings of this study reinforce the central tenets of Resource-Based Learning Theory, which emphasizes the importance of diverse and accessible learning resources, as well as the facilitative roles of educators and information professionals in promoting meaningful learning experiences (Susilawati and Herman, 2025). While the study confirms that school libraries and librarians have the potential to enhance teaching and learning, it also highlights significant gaps in resource provision, professional integration, and institutional support. These gaps must be addressed to enable school libraries to function effectively as dynamic centers for learning in the contemporary educational environment.

Conclusion

This study examined the role of school libraries and librarians in enhancing teaching and learning in secondary schools in Aba North Local Government Area of Abia State. The findings revealed that school libraries remain relevant to the educational process, particularly in supporting access to instructional materials and facilitating independent learning. Traditional library resources such as textbooks and curriculum-related materials were found to be relatively available and useful for academic activities. However, the study also established that modern learning resources, especially digital and audio-visual facilities, are insufficient, thereby limiting the ability of school libraries to meet the demands of contemporary teaching and learning. The study further showed that school librarians play significant roles in supporting instructional delivery through user education, research assistance, and facilitating access to information resources. These contributions highlight the importance of librarians as key stakeholders in the educational process. Nevertheless, their full potential is not maximized due to limited collaboration with teachers and insufficient institutional recognition of their pedagogical roles.

In addition, the study identified several systemic challenges hindering the effective utilization of school libraries. These include inadequate funding, a shortage of qualified personnel, a lack of modern ICT facilities, poor infrastructure, and weak institutional support. These constraints collectively reduce the effectiveness of school libraries as centers for teaching and learning. The study concludes that while school libraries and librarians have the capacity to significantly enhance teaching and learning, their impact is constrained by inadequate resources, limited professional integration, and persistent systemic challenges. Addressing these issues is essential for improving the quality of education and promoting effective learning outcomes in secondary schools. Based on the findings of this study, the following recommendations are made:

- Government and school authorities should allocate adequate funds to school libraries to enable the acquisition of up-to-date textbooks, reference materials, and modern instructional resources.
- School libraries should be equipped with modern ICT facilities such as computers, Internet connectivity, and access to digital databases to support 21st-century learning.
- Schools should employ professionally trained librarians who possess both library and pedagogical skills to effectively support teaching and learning activities. In addition, schools should allocate specific periods for library use within the timetable to promote regular utilization by students.
- Librarians should be provided with opportunities for training and professional development, particularly in ICT skills and modern library practices. In addition, librarians, in collaboration with teachers, should organize reading programmes, book clubs, and other literacy activities to enhance students' reading habits and engagement with library resources.

Limitations of the Study and Suggestions for Further Studies

This study is not without limitations. The use of a quantitative survey design relied on self-reported data, which could not fully capture participants' in-depth experiences. The study was also restricted to selected secondary schools in Aba North Local Government Area, limiting the generalizability of the findings to other contexts. In addition, only teachers and student library users were included, excluding other key stakeholders such as school administrators and policymakers. Furthermore, the study did not examine the direct relationship between library use and students' academic performance. Based on these limitations, further studies are recommended. Future research should adopt mixed-methods approaches to provide deeper insights into the role of school libraries. Expanding the study to other regions and including a broader range of stakeholders would enhance the robustness of findings. Additionally, studies that investigate the direct impact of library use on students' academic achievement, as well as the role of digital library services in learning, would be valuable.

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REPOSITIONING LIBRARIANSHIP THROUGH VIRTUAL PROFESSIONAL DEVELOPMENT IN NIGERIA: A CASE STUDY OF NIGERIAN LIBRARY ASSOCIATION WEBINAR SERIES

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Abstract

This study evaluated the impact of the Nigerian Library Association (NLA) webinar series on librarians' professional development and its contribution to repositioning librarianship in Nigeria. Four (4) objectives guided the study. A cross-sectional descriptive survey design was adopted. Data were collected through a structured questionnaire administered electronically to librarians who had participated in at least one NLA webinar. Using purposive and convenience sampling techniques, 103 valid responses were obtained and analysed using frequencies, percentages, means, and standard deviations. The findings revealed a moderate level of participation in the webinar series but a high perception of its effectiveness for professional development. Participation significantly enhanced librarians' professional competencies, strengthened knowledge sharing and collaboration, and contributed to the repositioning of librarianship by promoting technology adoption, innovation, and professional readiness. However, participation was constrained by infrastructural and economic challenges, particularly poor internet connectivity, high internet data costs, and unstable electricity supply. The study concludes that the NLA webinar series has become an effective and sustainable platform for continuous professional development and for strengthening librarianship in Nigeria. It recommends that the NLA sustain and expand interactive, needs-based webinar programmes, while library management, government, and other stakeholders invest in reliable digital infrastructure, affordable internet access, and institutional support to enhance equitable participation and maximise the benefits of virtual professional development.

Keywords: Nigerian Library Association, webinar series, continuous professional development, librarians' competencies, repositioning of librarianship.

Introduction

Libraries in the Global South are increasingly confronted with challenges relating to low patronage, declining use of library resources and services, and the rapidly changing information needs of users (Madu. et al, 2026). Several studies have attributed these challenges to factors such as inadequate professional competencies, insufficient digital skills, limited technological expertise, and the inability of some library personnel to effectively adapt to emerging trends in information and communication technologies (Michael & Olayemi, 2023). As the information environment continues to evolve, librarians are expected to acquire new knowledge and competencies to remain relevant and provide innovative services that meet users' expectations.

Recognising the importance of continuous professional development, professional library associations and organizations, including the African Library and Information Associations and Institutions and the Nigerian Library Association, have consistently organized workshops, seminars, conferences, and training programmes aimed at enhancing the professional

competencies of librarians. Prior to the outbreak of the COVID-19 pandemic, most of these continuous professional development activities were conducted through face-to-face interactions. While these physical training programmes provided valuable learning opportunities, participation was often constrained by factors such as geographical distance, high transportation and accommodation costs, workload commitments, institutional restrictions on travel, and inadequate funding (Chukwusa, 2021).

The emergence of the COVID-19 pandemic in 2020 significantly transformed the landscape of continuous professional development globally. Restrictions on movement and physical gatherings accelerated the adoption of virtual platforms for training, workshops, conferences, and knowledge-sharing activities (Gottlieb, et al., 2020). Consequently, virtual continuous professional development became a viable alternative for delivering continuing education and capacity-building programmes to librarians regardless of their geographical location. The Nigerian Library Association embraced this shift by organizing numerous webinars, virtual workshops, online conferences, and other digital learning initiatives designed to enhance librarians' professional knowledge, digital competencies, research skills, and service delivery capabilities.

Despite the increasing adoption of virtual professional development programmes and the substantial resources invested in their organization, there is limited empirical evidence regarding their effectiveness and impact on the professional growth and performance of librarians in Nigeria. Specifically, little is known about the extent to which these virtual continuous professional development initiatives have enhanced participants' knowledge, skills, competencies, professional practices, and overall service delivery. Furthermore, questions remain regarding participants' level of satisfaction, perceived benefits, challenges encountered, and the overall effectiveness of virtual learning as a professional development strategy within the Nigerian library profession.

It is against this background that this study seeks to evaluate the impact of virtual professional development programmes organized by the Nigerian Library Association in 2026. The study aims to provide empirical evidence on the effectiveness of these initiatives in enhancing librarians' professional competencies and to generate insights that can inform the planning, implementation, and improvement of future virtual professional development programmes for librarians in Nigeria.

Statement of the Problem

Despite the increasing adoption of virtual professional development initiatives among library associations globally and in Nigeria, empirical evidence regarding their effectiveness in enhancing librarians' professional competencies remains limited. The Nigerian Library Association has invested considerable resources in organizing webinars aimed at equipping librarians with contemporary knowledge and skills required for the digital information environment. However, there is inadequate evidence regarding the extent of librarians' participation in these webinars, their perceptions of the effectiveness of the programmes, the competencies acquired through participation, and the challenges limiting engagement. Furthermore, while virtual professional development is increasingly promoted as a cost-effective alternative to traditional face-to-face training, it remains unclear whether such programmes are achieving their intended objectives of repositioning librarianship in Nigeria and preparing practitioners for emerging professional demands. The absence of such evidence limits the ability of professional bodies, policymakers, and library administrators to optimize future capacity-building initiatives. Consequently, this study investigates the extent of participation, perceived effectiveness, competency outcomes, and participation challenges associated with the Nigerian Library Association Webinar Series as a strategy for repositioning librarianship in Nigeria.

Research Questions

- What is the level of participation in the webinar series on librarians' professional competencies?
- What is the extent and pattern of librarians' participation in the Nigerian Library Association webinar series?
- What are the perceptions of librarians to the effectiveness of the Nigerian Library Association webinar series for professional development?
- What are the challenges affecting librarians' participation in the Nigerian Library Association webinar series?

Literature Review

Extent and pattern of librarians' participation in webinar series

The increasing adoption of webinar series has expanded opportunities for librarians' continuing professional development (CPD), although participation patterns vary across contexts. Previous studies show that librarians predominantly engaged in conferences, workshops, and seminars for professional learning (Sambo et al., 2014; Corcoran & McGuinness, 2014; Namaganda, 2019). However, advances in digital technologies and the COVID-19 pandemic accelerated the shift towards webinars as flexible and accessible alternatives.

Studies consistently indicate that librarians demonstrate a high willingness to participate in webinar-based learning, particularly when programmes address emerging professional needs. Anene and Idiedo (2023) found that Nigerian librarians extensively participated in online workshops because webinars reduced travel costs, eliminated geographical barriers and offered convenient learning opportunities. Likewise, Idhalama et al. (2021) reported a high level of webinar participation among library and information professionals, supported by widespread use of smartphones, laptops and platforms such as Zoom and YouTube. Similarly, Mumelaš and Filipeti (2025) and Filipeti and Mumelaš (2025) observed strong participation and preference for webinars, courses and workshops among librarians seeking competencies in citizen science, reflecting the growing acceptance of online learning for specialised professional development.

Despite this positive disposition, participation is not always sustained. Oweipere and Mayowa-Adebara (2022) reported that relatively few librarians attended seven or more webinars, suggesting that participation remains occasional for many professionals. Similarly, Liu et al. (2023) found that although librarians expressed considerable interest in international professional learning opportunities, more than half rarely participated, indicating a gap between willingness and actual engagement. In contrast, Bowen-Chang and Hosein (2019) demonstrated active participation by academic librarians in Trinidad and Tobago in CPD activities at both national and international levels, while Ullah (2016) highlighted the important role of universities, library associations and research institutes in promoting librarians' participation in professional training. Evidence from Botswana further suggests that librarians continue to participate mainly in conferences, workshops and in-house training, with limited involvement in externally sponsored programmes (Mooko & Oladokun, 2021).

The pattern of participation is also influenced by the relevance of webinar content and librarians' professional responsibilities. Rodriguez (2015) found that repeated engagement with professional learning activities increased librarians' interest in further training, while Farrier et al. (2025) reported substantial participation in a multi-session webinar series designed to strengthen consumer health information services. Likewise, Maggio et al. (2015), Johnson and Bresnahan (2015) and Fritts and Casey (2010) showed that librarians actively participate in training programmes that provide practical skills required for evolving professional roles. Furthermore, Okwudibe and Adomi (2023) established that librarians with stronger ICT skills participated more frequently in Zoom-based professional development, suggesting that technological competence influences participation behaviour.

Perceptions of librarians to the effectiveness of webinar series for professional development

Studies suggest that librarians value webinars because they provide practical solutions to emerging professional challenges. Mumelaš and Filipeti (2025) found that participants expressed positive perceptions of a certified webinar on citizen science, acknowledging its effectiveness in enhancing their understanding of citizen science and strengthening libraries' capacity to support community engagement. Similarly, Farrier et al. (2025) reported that participants considered practical tips, encouragement and presenters' real-life experiences as the most valuable outcomes of a webinar series, indicating that librarians particularly appreciate webinars that address workplace realities.

The perceived effectiveness of webinars is further reflected in their influence on librarians' professional attitudes and intentions. Rodriguez (2015) found that participation in professional learning events improved librarians' confidence in discussing open access with faculty and stimulated demand for additional training opportunities. Likewise, Maggio et al. (2015) showed that librarians regarded workshops and online training as effective avenues for developing teaching competencies in evidence-based medicine, while Johnson and Bresnahan (2015) demonstrated that practical, hands-on training enhanced participants' knowledge and confidence in supporting research data services.

Studies also indicate that librarians perceive webinars as valuable because they support continuous learning and adaptation to evolving professional roles. Filipeti and Mumelaš (2025) reported that librarians recognised webinars as one of the most preferred formats for acquiring competencies needed for citizen science initiatives and improving library services. Similarly, Shahzad et al. (2025) found that librarians positively perceived electronic learning for continuing professional development, particularly when supported by their organisations, while Shahzad et al. (2023) concluded that librarians regarded e-learning as essential for responding to technological changes, professional growth and organisational demands.

Positive perceptions are also linked to the accessibility and convenience of webinar delivery. Anene and Idiedo (2023) observed that librarians appreciated webinars because they reduced travel costs, eliminated geographical barriers and enabled participation from home. Likewise, Idhalama et al. (2021) concluded that webinars play a significant role in professional learning and recommended their wider adoption across learning institutions in Nigeria. However, most existing studies evaluate perceptions following specific webinar programmes or online learning initiatives, with limited evidence on librarians' overall perceptions of the effectiveness of webinar series as a sustained strategy for professional development across diverse library settings. This gap underscores the need for further investigation.

Level of participation in the webinar series on librarians' professional competencies

The literature suggests that the level of participation in webinar series is positively associated with the development of librarians' professional competencies. Rather than merely increasing attendance at professional development activities, sustained participation in webinars enhances knowledge acquisition, practical skills, confidence and the ability to respond to evolving professional responsibilities.

Empirical evidence indicates that webinar participation contributes significantly to competency development by improving librarians' knowledge and professional practice. Folb et al. (2020) reported that librarians who participated in systematic review training demonstrated significant improvements in knowledge, with gains sustained over time. Participants also adopted evidence-based practices such as peer review of search strategies, grey literature searching and adherence to systematic review guidelines, suggesting that webinar-based learning can translate into professional practice. Similarly, Johnson and Bresnahan (2015) found that practical workshop participation improved librarians' knowledge, confidence and ability to apply research data management concepts in unfamiliar situations, while Maggio et al. (2015) showed that workshops and online training strengthened librarians' teaching competencies in evidence-based medicine.

Studies further suggest that webinar participation supports the acquisition of emerging professional competencies. Filipeti and Mumelaš (2025) found that librarians regarded webinars as effective for developing competencies required for citizen science, although specialised skills such as research data management, digitisation and open science required further strengthening. Likewise, Mumelaš and Filipeti (2025) emphasized that continuous webinar-based education enhances librarians' capacity to support citizen science initiatives and expand library services.

The contribution of webinar participation to professional competence is also reflected in librarians' technological readiness and workplace performance. Idhalama et al. (2021) found that librarians possessed high ICT skills that facilitated effective participation in webinars and recommended wider adoption of webinar-based learning. Consistent with this finding, Okwudibe and Adomi (2023) established that ICT skills were significantly associated with the frequency of participation in Zoom-based professional development and the benefits derived from such participation, indicating that technological competence both supports and is reinforced through webinar engagement.

Some studies have reported that webinar participation strengthens broader professional capabilities. Rodriguez (2015) demonstrated that repeated participation in professional learning activities increased librarians' confidence in supporting scholarly communication initiatives, while Farrier et al. (2025) found that webinar participants benefited from practical guidance and shared professional experiences that could be readily applied in their work. Similarly, the studies of Shahzad et al. (2025) and Shahzad et al. (2023) concluded that electronic learning enhances librarians' professional skills by promoting continuous learning, technological adaptation and career development. However, existing studies have largely examined competency gains following specific training programmes, with limited empirical evidence linking librarians' overall level of participation in webinar series to their professional competencies across different library environments. This limitation provides the rationale for further investigation in the present study.

Challenges affecting librarians' participation in webinar series

Despite the growing acceptance of webinar series for continuing professional development (CPD), the literature consistently shows that librarians encounter several barriers that constrain effective participation. Technological and infrastructural barriers emerge as the most persistent challenges. Anene and Idiedo (2023) and Oweipere and Mayowa-Adebara (2022) identified inadequate internet access, the cost of data bundles, lack of computers or smartphones, power outages, poor network connectivity and limited awareness of upcoming webinars as major obstacles to participation. Similarly, Shahzad et al. (2023) identified technical difficulties as a key impediment to e-learning adoption among librarians, while Shahzad et al. (2025) further emphasized inadequate technical support, poor internet infrastructure, low bandwidth and connectivity problems as significant barriers to effective participation. These findings suggest that the effectiveness of webinar series depends not only on their availability but also on reliable technological infrastructure.

Financial and organisational constraints also substantially influence librarians' participation. Liu et al. (2023) found that inadequate institutional funding was the primary reason many librarians rarely attended international professional learning programmes despite expressing strong interest. Likewise, Sambo et al. (2014) attributed limited participation in CPD to poor budgetary provisions, insufficient institutional support and weak implementation structures. Corcoran and McGuinness (2014) similarly argued that financial limitations, time constraints and inadequate employer encouragement reduce librarians' engagement in professional development, while Mooko and Oladokun (2021) observed that although some employers supported staff through paid leave or travel sponsorship, librarians continued to report inadequate funding and

mentoring opportunities. Namaganda (2019) likewise identified inadequate funding, limited management support, poor awareness of available opportunities and time constraints as barriers to CPD participation.

Individual and professional factors further constrain participation. Anene and Idiedo (2023) and Oweipere and Mayowa-Adebara (2022) identified lack of time, inadequate digital skills, limited awareness of webinar opportunities and negative attitudes towards technology as important barriers. Supporting this perspective, Okwudibe and Adomi (2023) established that ICT skills significantly influence both the frequency of participation in Zoom-based professional development and the barriers encountered, indicating that technological competence determines the extent to which librarians can benefit from webinar series. However, while existing studies have identified individual barriers, limited empirical attention has been given to how these challenges collectively influence librarians' participation in webinar series across different library settings. Addressing this gap is essential for developing strategies that enhance equitable and sustained participation in webinar-based professional development.

Methodology

This study adopted a cross-sectional descriptive survey design to evaluate librarians' participation in and perceptions of the Nigerian Library Association (NLA) webinar series as a strategy for continuous professional development and the repositioning of librarianship in Nigeria. The design was considered appropriate because it enabled the collection of data from participants at a single point in time and facilitated the description of prevailing opinions, experiences, and professional outcomes associated with participation in the webinar series.

The target population comprised librarians who are members of the Nigerian Library Association and had participated in at least one webinar organised by the Association. Since no comprehensive sampling frame of webinar participants was available, a combination of purposive and convenience sampling techniques was adopted. Purposive sampling was employed to ensure that only librarians with prior participation in the NLA webinar series were included in the study, as they possessed the requisite experience to provide informed responses. Subsequently, convenience sampling was used to recruit eligible participants who were willing and available to complete the survey during the data collection period.

Data were collected using a structured questionnaire developed by the researchers based on the objectives of the study and evidence from the reviewed literature. The instrument comprised two sections. Section A elicited respondents' demographic information, while Section B contained items measuring the major constructs of the study, including the extent and pattern of participation in the NLA webinar series, perceived effectiveness of the webinar series for professional development, influence of webinar participation on professional competencies, contribution of the webinar series to knowledge sharing, contribution to the repositioning of librarianship in Nigeria, and challenges affecting participation. Responses were measured using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

To ensure content and face validity, the questionnaire was subjected to expert review by three specialists in Library and Information Science with expertise in research methodology and professional development. Their observations and recommendations were incorporated to improve the clarity, relevance, comprehensiveness, and overall quality of the instrument before its administration. The questionnaire was administered electronically using Google Forms, and the survey link was disseminated through WhatsApp groups established for participants of various NLA webinar series. This approach facilitated broad geographical coverage and enabled librarians from different institutions across Nigeria to participate in the study. At the close of the data collection period, a total of 103 properly completed questionnaires were retrieved and found suitable for analysis.

The collected data were analysed using descriptive statistics, including frequencies, percentages, means, and standard deviations. Frequencies and percentages were used to summarise respondents' demographic characteristics, while means and standard deviations were employed to answer the research questions. A criterion mean of 3.00 was adopted as the decision benchmark; therefore, items with mean scores of 3.00 or above were regarded as accepted, indicating agreement among respondents, whereas items with mean scores below 3.00 were regarded as rejected, indicating disagreement. Ethical principles were strictly observed throughout the study. Participation in the survey was entirely voluntary, and informed consent was obtained from all respondents before they completed the questionnaire. Participants were assured that their responses would remain anonymous, confidential, and would be used solely for academic and research purposes. No personally identifiable information was collected, and respondents were informed of their right to decline participation or withdraw from the study at any stage without any adverse consequences.

Results

Table 1: Demographic information of Respondents (N = 103)

Demographic factors	Freq	%	Demographic	Freq	%
Age			***Years of professional experience***		
Below 25 years	3	2.9	Less than 5 years	23	22.3
25-34 years	18	17.5	11-15 years	14	13.6
35-44 years	34	33.0	16-20 years	19	18.4
45-54 years	36	35.0	5-10 years	35	34.0
55 years and above	12	11.7	More than 20 years	12	11.7
Duration of membership in the NLA			***Type of Library***		
11-15 years	19	18.4	Academic Library	84	81.6
16-20 years	12	11.7	Other	5	4.9
5-10 years	28	27.2	Public Library	1	1.0
Less than 5 years	27	26.2	Research Institute Library	2	1.9
More than 20 years	8	7.8	School Library	2	1.9
Not Applicable / Non-Member	9	8.7	Special Library	9	8.7
Highest academic qualification			***Gender***		
Bachelor's Degree (BLIS/B.Sc./B.A.)	22	21.4	Female	48	46.6
Diploma	4	3.9	Male	55	53.4
M.Phil.	1	1.0	***Ownership of Institution***		
Master's Degree (MLIS/M.Sc.)	40	38.8	Federal	40	38.8
Other	1	1.0	Other	4	3.9
PhD	35	34.0	Private	16	15.5
			State	43	41.7

Table 1 indicates that most respondents were within the economically active and professionally mature age brackets, particularly 45-54 years (35.0%) and 35-44 years (33.0%). The majority possessed 5-10 years of professional experience (34.0%) and were predominantly affiliated with academic libraries (81.6%). Respondents were largely Master's degree holders (38.8%), while state-owned institutions accounted for the highest institutional ownership category (41.7%). Male respondents (53.4%) slightly outnumbered females (46.6%). The findings further show that respondents had substantial professional engagement with the Nigerian Library Association through varying membership. This result suggests that the study was dominated by experienced and academically qualified librarians capable of providing informed evaluations of the NLA webinar series. The predominance of academic librarians further implies that perceptions of webinar effectiveness and professional competencies were shaped largely by experiences within higher education library environments.

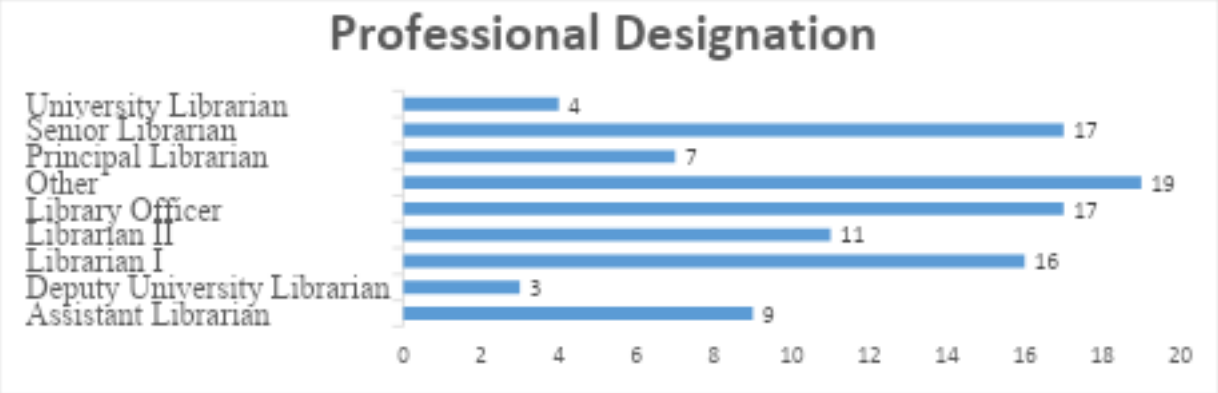

Figure 1: Respondents by professional ranks

Figure 1 shows that Library Officers and Senior Librarians recorded the highest frequencies among respondents, with 19 and 17 respondents respectively. Librarian I also constituted a notable proportion with 16 respondents, while Deputy University Librarians and University Librarians recorded the lowest representation. This distribution indicates that the respondents were mainly middle-level professionals actively engaged in operational and service-oriented library activities. The dominance of middle-level librarians implies that the findings largely reflect the perspectives of professionals directly involved in day-to-day library operations and professional development activities. Their active participation suggests that webinar initiatives are particularly relevant for librarians seeking career progression, skills enhancement, and increased professional visibility.

Table 2: NLA Webinars attended by respondents (multiple responses)

NLA webinar series attended with date	Frequency	Percentage
Emerging LibraryTech Skills (15 April, 2026)	57	55.3
The Complete Professional: Branding, Conduct, and Visibility (23 June, 2026)	56	54.4
Open Educational Resources (OER) (26 May, 2024)	32	31.1
The Unified Voice: Strategy, Branding, and Coordination (23 May, 2026)	28	27.2
Unlocking Global Recognition (22 September, 2024)	20	19.4
Web Development & Publishing (30 June, 2024)	15	14.6
Demystifying Cloud Computing (28 July, 2024)	11	10.7
Others (NLA Delta AI Webinar (June 2026)	1	1.0
ADUN Digital Transformation in Libraries Webinar (2025)	1	1.0

Table 2 shows that Emerging LibraryTech Skills (55.3%) and The Complete Professional: Branding, Conduct, and Visibility (54.4%) were the most attended webinar series, followed by Open Educational Resources (31.1%). This pattern suggests strong professional interest in digital competencies, visibility, and emerging technological trends among Nigerian librarians. The relatively lower attendance for Demystifying Cloud Computing (10.7%) and other specialised webinars indicates selective participation based on perceived relevance and immediate professional applicability.

Table 3: Extent and pattern of participation in the NLA webinar series

	SD	D	UN	A	SA	$\underline{X}$	σ
I participate regularly in webinars organised by the Nigerian Library Association.	8	18	25	24	28	3.45	1.274

	7.8%	17.5%	24.3%	23.3%	27.2%		
I attend NLA webinars whenever the topics align with my professional interests.	9	16	23	25	30	3.50	1.298
	8.7%	15.5%	22.3%	24.3%	29.1%		
I actively engage in discussions during NLA webinar sessions.	9	23	30	24	17	3.17	1.205
	8.7%	22.3%	29.1%	23.3%	16.5%		
I frequently interact with presenters or facilitators during webinars.	9	25	32	23	14	3.08	1.169
	8.7%	24.3%	31.1%	22.3%	13.6%		
I complete most webinar sessions from beginning to end.	10	15	19	28	31	3.53	1.320
	9.7%	14.6%	18.4%	27.2%	30.1%		
I access webinar recordings or materials after live sessions.	11	10	22	28	32	3.58	1.310
	10.7%	9.7%	21.4%	27.2%	31.1%		
I participate in NLA webinars as part of my continuous professional development activities.	3	11	28	20	41	3.83	1.158
	2.9%	10.7%	27.2%	19.4%	39.8%		
I encourage colleagues to participate in NLA webinar programmes.	6	6	20	29	42	3.92	1.169
	5.8%	5.8%	19.4%	28.2%	40.8%		
I maintain consistent participation in NLA webinars throughout the year.	7	14	26	26	30	3.56	1.234
	6.8%	13.6%	25.2%	25.2%	29.1%		
My participation in NLA webinars has increased over time.	5	12	23	28	35	3.74	1.188
	4.9%	11.7%	22.3%	27.2%	34.0%		
Weighted mean of extent and pattern of participation in the NLA webinar series = 3.54							

Key: SD = strongly disagree; D = Disagree; UN = Undecided; A = Agree; SA = Strongly agree; σ = Standard deviation & $\underline{X}$ = Mean. Decision rule: $\underline{X} \leq 2.33$ = low extent; $\underline{X}$ = 2.34 to 3.66 = Moderate extent; $\underline{X} \geq 3.66$ = High extent.

Table 3 reveals a weighted mean of 3.54, indicating a moderate extent and pattern of participation in the NLA webinar series based on the decision rule. The highest mean scores were recorded for encouraging colleagues to participate ($\bar{x}$=3.92), participation as part of continuous professional development ($\bar{x}$=3.83), and increased participation over time ($\bar{x}$=3.74). Conversely, the lowest mean scores related to frequent interaction with facilitators ($\bar{x}$=3.08), active engagement during discussions ($\bar{x}$=3.17), and regular participation in webinars ($\bar{x}$=3.45). The findings imply that although respondents value webinars for professional growth, participation remains more passive than interactive.

Table 4: Perceived effectiveness of the webinar series for professional development

	SD	D	UN	A	SA	$\underline{X}$	σ
NLA webinars provide learning opportunities that are relevant to contemporary library practice.	2	9	19	25	48	4.05	1.088

	1.9%	8.7%	18.4%	24.3%	46.6%		
The content of NLA webinars addresses emerging trends in librarianship.	1	10	17	28	47	4.07	1.050
	1.0%	9.7%	16.5%	27.2%	45.6%		
NLA webinars contribute meaningfully to my professional growth.	2	12	16	24	49	4.03	1.133
	1.9%	11.7%	15.5%	23.3%	47.6%		
The webinar sessions are delivered in ways that facilitate effective learning.	3	14	17	27	42	3.88	1.174
	2.9%	13.6%	16.5%	26.2%	40.8%		
Resource persons demonstrate adequate expertise in their subject areas.	3	10	17	31	42	3.96	1.111
	2.9%	9.7%	16.5%	30.1%	40.8%		
The knowledge acquired from NLA webinars is applicable to my professional responsibilities.	2	11	16	34	40	3.96	1.075
	1.9%	10.7%	15.5%	33.0%	38.8%		
NLA webinars effectively complement traditional professional development activities.	2	11	21	31	38	3.89	1.084
	1.9%	10.7%	20.4%	30.1%	36.9%		
The webinar series enhances my awareness of developments in the library profession.	3	13	14	28	45	3.96	1.163
	2.9%	12.6%	13.6%	27.2%	43.7%		
Participation in NLA webinars has improved my ability to respond to professional challenges.	3	11	19	32	38	3.88	1.114
	2.9%	10.7%	18.4%	31.1%	36.9%		
Overall, the NLA webinar series is an effective platform for professional development.	2	9	18	32	42	4.00	1.057
	1.9%	8.7%	17.5%	31.1%	40.8%		
Weighted mean of perceived effectiveness of the webinar series for professional development = 3.97							

Key: SD = strongly disagree; D = Disagree; UN = Undecided; A = Agree; SA = Strongly agree; σ = Standard deviation & $\underline{X}$ = Mean. Decision rule: $\underline{X} \leq 2.33$ = low extent; $\underline{X}$ = 2.34 to 3.66 = Moderate extent; $\underline{X} \geq 3.66$ = High extent.

Table 4 showed a weighted mean of 3.97, indicating a high perceived effectiveness of the webinar series for professional development. The highest-rated items were addressing emerging trends in librarianship ($\bar{x}$=4.07), providing relevant learning opportunities ($\bar{x}$=4.05), and contributing meaningfully to professional growth ($\bar{x}$=4.03). However, comparatively lower ratings were observed for webinar delivery facilitating effective learning ($\bar{x}$=3.88), improving responses to professional challenges ($\bar{x}$=3.88), and complementing traditional professional development activities ($\bar{x}$=3.89). These findings suggest that the webinar series is perceived as a valuable and contemporary professional learning platform capable of enhancing librarians' knowledge and professional relevance.

Table 5: Challenges affecting participation in the NLA webinar series

	SD	D	UN	A	SA	$\underline{X}$	σ
Poor internet connectivity limits my participation in NLA webinars.	11	12	19	24	37	3.62	1.358

	10.7%	11.7%	18.4%	23.3%	35.9%		
The cost of internet data affects my ability to participate regularly in webinars.	12	16	29	15	31	3.36	1.364
	11.7%	15.5%	28.2%	14.6%	30.1%		
Heavy workload reduces my participation in NLA webinar programmes.	12	20	27	19	25	3.24	1.332
	11.7%	19.4%	26.2%	18.4%	24.3%		
Webinar schedules often conflict with my professional responsibilities.	19	21	21	21	21	3.04	1.407
	18.4%	20.4%	20.4%	20.4%	20.4%		
Unstable electricity supply affects my participation in webinar sessions.	10	21	23	26	23	3.30	1.290
	9.7%	20.4%	22.3%	25.2%	22.3%		
Family or personal commitments limit my participation in NLA webinars.	17	28	24	19	15	2.87	1.304
	16.5%	27.2%	23.3%	18.4%	14.6%		
Limited access to appropriate digital devices affects my participation.	21	23	22	20	17	2.89	1.378
	20.4%	22.3%	21.4%	19.4%	16.5%		
Insufficient notice of upcoming webinars reduces my likelihood of participation.	20	20	27	19	17	2.93	1.352
	19.4%	19.4%	26.2%	18.4%	16.5%		
Technical difficulties encountered during webinars discourage participation.	20	19	24	17	23	3.04	1.427
	19.4%	18.4%	23.3%	16.5%	22.3%		
Time constraints make it difficult for me to participate consistently in NLA webinar programmes.	13	19	27	19	25	3.23	1.345
	12.6%	18.4%	26.2%	18.4%	24.3%		

Weighted mean of challenges affecting participation in the NLA webinar series = 3.15

Key: SD = strongly disagree; D = Disagree; UN = Undecided; A = Agree; SA = Strongly agree; σ = Standard deviation & $\underline{X}$ = Mean. Decision rule: $\underline{X} \leq 2.33$ = low extent; $\underline{X}$ = 2.34 to 3.66 = Moderate extent; $\underline{X} \geq 3.66$ = High extent.

Table 5 shows a weighted mean of 3.15, indicating a moderate level of challenges affecting participation in the NLA webinar series. The highest mean scores were associated with poor internet connectivity ($\bar{x}$=3.62), internet data costs ($\bar{x}$=3.36), and unstable electricity supply ($\bar{x}$=3.30). In contrast, the least significant challenges were family or personal commitments ($\bar{x}$=2.87), limited access to digital devices ($\bar{x}$=2.89), and insufficient notice of webinars ($\bar{x}$=2.93). The findings indicate that infrastructural and economic barriers remain the principal constraints limiting effective participation in virtual professional development programmes among librarians in Nigeria.

Discussion

The study found that librarians demonstrated a moderate level of participation in the Nigerian Library Association (NLA) webinar series. Participants showed greater commitment to attending webinars for continuous professional development, encouraging colleagues to participate, and increasing their participation over time. However, active engagement during webinar sessions and interaction with facilitators remained relatively limited, suggesting that participation was more attendance-oriented than interactive. This finding agrees with the studies of Anene and Idiedo (2023) and Idhalama et al. (2021), who reported that Nigerian librarians actively participate in webinar-based professional development because of its

flexibility, affordability, and accessibility. The finding also supports the work of Mumelaš and Filipeti (2025) and Filipeti and Mumelaš (2025), who observed strong participation in webinars among librarians seeking to improve professional competencies. Similarly, Rodriguez (2015) and Farrier et al. (2025) found that librarians increasingly engage in professional learning activities when such programmes address practical professional needs. Nevertheless, the finding also corroborates Oweipere and Mayowa-Adebara (2022), who noted that although librarians generally embrace webinars, sustained and intensive participation is still limited for many participants. Likewise, Liu et al. (2023) found that interest in professional development opportunities does not always translate into active participation. Thus, the present finding suggests that while NLA webinars have successfully attracted participants, strategies that encourage greater interaction and engagement during webinar sessions are still required.

The study further revealed that librarians perceived the NLA webinar series as an effective platform for professional development. Respondents believed that the webinar topics were relevant to contemporary library practice, addressed emerging developments in librarianship, enhanced professional growth, and provided knowledge applicable to their professional responsibilities. This finding is consistent with the studies of Mumelaš and Filipeti (2025), who found that librarians viewed webinars positively because they enhanced their understanding of emerging professional issues. It also agrees with Farrier et al. (2025), who reported that librarians considered webinars valuable because they provided practical guidance and real-life professional experiences that could be directly applied in practice. Similarly, Rodriguez (2015) established that participation in professional learning activities improved librarians' confidence and increased their interest in further training opportunities. The finding equally supports Maggio et al. (2015), Johnson and Bresnahan (2015), Filipeti and Mumelaš (2025), Shahzad et al. (2023), and Shahzad et al. (2025), all of whom concluded that online learning and webinars remain effective mechanisms for developing professional knowledge, supporting continuous learning, and enabling librarians to adapt to evolving technological and professional demands. The present finding therefore strengthens existing evidence that webinar-based professional development has become a credible and effective alternative to conventional face-to-face continuing professional development programmes.

The findings also demonstrated that participation in the NLA webinar series substantially enhanced librarians' professional competencies. Participants reported improvements in their ability to utilise emerging technologies, information management skills, decision-making abilities, confidence in performing professional responsibilities, innovation, communication, research competencies, and overall professional competence. This finding agrees with Folb et al. (2020), who found that participation in professional training programmes significantly improved librarians' knowledge and promoted the adoption of evidence-based professional practices. It also corroborates Johnson and Bresnahan (2015), who reported that workshop participation enhanced librarians' knowledge, confidence, and practical application of research data management skills. Likewise, Maggio et al. (2015) established that online training strengthened librarians' instructional competencies, while Rodriguez (2015) reported increased professional confidence following continuous professional development activities. The finding further supports Filipeti and Mumelaš (2025) and Mumelaš and Filipeti (2025), who concluded that webinars are valuable for developing competencies required for emerging areas of librarianship. In addition, the findings align with Idhalama et al. (2021), Okwudibe and Adomi (2023), Shahzad et al. (2023), and Shahzad et al. (2025), who all emphasized that webinar participation contributes significantly to technological competence, career development, and professional effectiveness. The consistency between the present findings and previous studies reinforces the growing recognition of webinars as important instruments for strengthening librarians' professional competencies.

Finally, the study found that librarians encounter a moderate level of challenges in participating in the NLA webinar series. The most prominent barriers were poor internet connectivity, high internet data costs, unstable electricity supply, workload pressures, and time constraints. Conversely, family commitments, limited access to digital devices, and inadequate notice of webinar programmes were perceived as relatively less significant barriers. These findings are consistent with Anene and Idiedo (2023) and Oweipere and Mayowa-Adebara (2022), who identified internet connectivity problems, high data costs, inadequate infrastructure, and power supply challenges as major obstacles limiting librarians' participation in webinars. The findings also agree with Shahzad et al. (2023) and Shahzad et al. (2025), who reported that poor internet infrastructure, inadequate technical support, and connectivity challenges significantly affect participation in online professional development. Similarly, Liu et al. (2023), Sambo et al. (2014), Corcoran and McGuinness (2014), Mooko and Oladokun (2021), and Namaganda (2019) all identified inadequate institutional support, financial limitations, and workload demands as major barriers to continuing professional development among librarians. Furthermore, the finding supports Okwudibe and Adomi (2023), who demonstrated that technological competence significantly influences both participation in webinar programmes and the extent to which librarians benefit from them. Therefore, although NLA webinars are widely perceived as effective, infrastructural and economic constraints continue to limit equitable and sustained participation among librarians in Nigeria.

Conclusion

This study evaluated the impact of the Nigerian Library Association webinar series on librarians' professional development towards repositioning of librarianship in Nigeria. The findings demonstrate that librarians moderately participated in the webinar series and regarded the programmes as highly effective in supporting continuous professional development. Participation in the webinars enhanced librarians' professional competencies, strengthened knowledge sharing and collaboration, and contributed to the repositioning of librarianship by promoting technology adoption, professional readiness, and innovative library service delivery. Although participants acknowledged the considerable benefits of the webinar series, infrastructural and economic constraints, particularly poor internet connectivity, high internet data costs, and unstable electricity supply, continued to limit optimal participation. Generally, the study concludes that the NLA webinar series has become an effective and sustainable mechanism for building librarians' capacities and supporting the transformation of librarianship in Nigeria.

Based on the findings and conclusion of this study, the following recommendations were made:

- The Nigerian Library Association (NLA) should sustain and expand its webinar series by offering more needs-based and interactive professional development programmes that incorporate live discussions, breakout sessions, mentoring opportunities, and post-webinar learning resources to enhance participant engagement and maximize competency development.
- Library management and parent institutions should strengthen institutional support for librarians' participation in virtual professional development by providing reliable internet access, subsidising internet data costs where feasible, allocating dedicated time for participation during official work hours, and investing in digital infrastructure that facilitates uninterrupted online learning.
- Government agencies and relevant policymakers, particularly those responsible for digital infrastructure and higher education, should prioritise investments in stable electricity supply, affordable broadband connectivity, and digital inclusion initiatives to reduce infrastructural barriers that limit librarians' participation in virtual professional development programmes.
- Librarians should actively participate in continuous professional development opportunities provided through the NLA webinar series and deliberately apply the acquired knowledge and skills by integrating emerging technologies, innovative practices, and collaborative knowledge-sharing into their professional activities to improve library service delivery and advance the profession.

Implications of the Findings

The findings have important practical and policy implications for the Nigerian Library Association, library administrators, and policymakers. The positive outcomes associated with the webinar series suggest that virtual professional development should remain an integral component of librarians' continuing education programmes. The Nigerian Library Association should continue to organise regular, needs-based webinars while incorporating more interactive learning approaches to enhance participant engagement. Library management and parent institutions should provide greater institutional support by improving internet access, subsidising data costs, and investing in digital infrastructure that enables librarians to participate effectively in online professional development. The findings also highlight the need for sustained investment in digital capacity-building initiatives that will strengthen librarians' competencies, promote collaborative knowledge sharing, and improve the quality of library services in an increasingly digital information environment.

Limitations and Suggestions for Further Research

This study has some limitations that should be considered when interpreting its findings. First, the study employed a cross-sectional survey design, which captured respondents' perceptions at a single point in time and therefore did not allow for the examination of changes in participation or competency development over time. Second, the study relied on self-reported data obtained through a structured questionnaire, making the findings susceptible to respondents' subjective perceptions and the possibility of social desirability bias. Third, the study was limited to librarians who had participated in the Nigerian Library Association webinar series and who voluntarily responded to the online questionnaire. Consequently, the findings may not fully represent the experiences and perceptions of all librarians in Nigeria, particularly those who have not participated in the webinar series or who had limited access to the online survey. Despite these limitations, the study provides valuable empirical evidence on the role of virtual professional development in strengthening librarians' competencies and supporting the repositioning of librarianship in Nigeria.

Future studies should adopt longitudinal research designs to examine the long-term effects of webinar participation on librarians' professional competencies, career progression, and service delivery. Researchers may also employ mixed-methods approaches by combining surveys with interviews or focus group discussions to obtain deeper insights into participants' experiences and the factors influencing webinar effectiveness. In addition, comparative studies involving different professional library associations, library types, or countries would provide broader evidence on best practices for

virtual continuing professional development. Further research should also investigate the relationship between webinar participation and measurable organisational outcomes, such as innovation in library services, user satisfaction, and institutional performance.

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SCHOOL LIBRARIANS' ADAPTING ROLES IN THE DIGITAL AGE: THE NIGERIAN EXPERIENCE

BY

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Abstract

The rapid advancement of Information and Communication Technology (ICT) has brought significant changes to the education systems worldwide, redefining how knowledge is acquired, organized, processed and disseminated. In the digital age, the role of school librarians has transformed significantly. This role has expanded beyond traditional responsibilities of book curation and reading promotion to include; digital literacy, technology integration , information resource curation ,and collaborative teaching. This paper examines the school librarians' adapting roles in the digital age with particular emphases on the Nigerian educational context. It explores how school librarians support teaching and learning through information and digital education, management of digital and electronic resources , and collaboration with teachers in curriculum delivery . The paper also discusses the challenges confronting school librarians ,such as inadequate ICT infrastructure, limited funding ,insufficient professional development opportunities ,and lack of institutional recognition .The paper concludes by proposing strategies aimed at strengthening the capacity and relevance of school librarians to effectively contribute to quality education and student academic success in an increasingly digital learning environment. It is therefore suggested that for school librarians to successfully adapt to the digital age in Nigeria, stakeholders must pursue aggressive infrastructure upgrades, targeted training, robust policy integration, and proactive advocacy to redefine the profession's value.

Keywords: School librarians, School libraries, Digital literacy, Digital age, Information, Communication Technology (ICT), Nigeria

INTRODUCTION

The digital age is a historic era defined by the widespread transition from traditional industry to an economy and society driven by information technology. It is an era defined by the pervasive integration of digital technology and the internet into daily life, transforming communication, commerce, and every aspect of human interaction, work, and societal structure. According to Madan (2025), the digital age has fundamentally transformed the educational ecosystem by shifting the role of school librarians from mere book custodians to indispensable information professionals. Today, they guide students through complex digital resources, serving as vital facilitators who ensure learners can locate, evaluate, and utilize accurate information effectively. Education has naturally adapted to this shift, elevating digital and information literacy into foundational competencies for 21st-century learners. In response, school librarians anchor this educational transformation. Because today's students are constantly exposed to vast amounts of online content, these professionals are more essential than ever. Rather than simply managing print collections, librarians actively teach students how to navigate the digital landscape, empowering them to critically evaluate online resources and ensuring that the information they find is both truthful and highly useful (Hodgson, 2023).

Globally, schools are increasingly integrating digital technologies such as multi-media resources, online learning platforms, and virtual information environments into teaching and learning processes, subsequently, the traditional role of the school librarian as a custodian of print collections is being redefined universally. School librarians are now expected to function as agents of digital literacy, instructional collaborators and technology integration specialists. From a Nigerian perspective, this transformation presents both opportunities and challenges. Nigeria's education sector is increasingly influenced by digital initiatives such as e-learning platforms, virtual classrooms, open educational resources, and mobile technologies. As a result, school librarians are expected to develop competencies in digital resource management, online information

retrieval, media and information literacy instruction, and the ethical use of information. Their roles now extend to collaborating with teachers in curriculum delivery, guiding students in navigating digital information environments, and fostering critical thinking skills necessary for participation in a knowledge-driven global society (Mathew, 2012).

However, the evolving role of school librarians in Nigeria is shaped by contextual realities, including inadequate ICT infrastructure, limited funding, inconsistent policy implementation, and disparities between urban and rural schools. Despite these constraints, school librarians remain pivotal to bridging the digital divide and promoting equitable access to information. By adapting to emerging technologies and redefining their professional responsibilities, Nigerian school librarians can significantly contribute to educational quality, digital inclusion, and national development.

In Nigeria, these shifts carry outstanding implications given the uneven allocation of ICT infrastructure, limited funding for school libraries, and variable professional training opportunities. While some schools are adopting digital library services and information literacy programs, others still operate within traditional archetypes due to resource and policy limitations. However, school librarians have begun to play in-depth roles in supporting digital inclusion, collaborating with educators, and supporting students' critical engagement with information. This paper investigates the evolving role of school librarians in Nigeria, such as digital literacy educators and also beyond facilitating access to information, librarians help students develop skills such as critical thinking, media literacy, and digital citizenship articulates key .Some challenges such as outdated technology and insufficient budget leading to inability to invest in digital resources to school librarians and their capacity to provide a 21c library experience were unearthed while recommendations such as inclusion of digital librarianship in librarian education curricula, governments and school boards should allocate budgets for digital library infrastructure, online subscriptions, and librarian training and also formulate policies recognizing the importance of librarians as crucial drivers in our school system especially as instructional partners.

Evolving Roles of School Librarians in the Digital Age

Throughout the 20th century, the landscape of school libraries has changed rapidly. They have been required to adapt, becoming not only reading and research experts but also curriculum experts, and technology navigators. (Take action for libraries, 2021). A school librarian manages the school library and supports students, teachers, and staff in their information and literacy needs. In this role, the school librarian collaborates with educators to integrate information literacy and research skills into the curriculum, helping students develop critical thinking and effective research abilities. (www.careerexplorer.com in "What does a school librarian do")

School librarian's job as posited by Snelling (2021), in some ways is the same as it always been :connecting students and staff to information , be it print or digital , and promoting literacy ,whether that's reading or coding .According to Hodgson(2023), school libraries and librarians are no longer just about books ,they now include technology. This helps libraries to stay helpful by providing digital resources and also teaches students to us online information. As pointed out, the evolving role of school libraries include; information access, curators of digital content, supporting technology integration, and, collaborative space. Belair and Waskie-Laura (2021) posit that as access has expanded, the role of the school librarian has similarly evolved. They assist students and colleagues through the process of narrowing the breath of information at their disposal to meet their needs. School librarians can achieve this goal by curating and sharing high-quality, relevant and meaningful resources.

As information facilitators, school librarians now teach students how to access and evaluate digital information sources. This includes guiding research using online journals, educational databases, and genuine educational websites. Furthermore, Snelling (2021), noted that librarians often serve as technology leads within their school building and they provide invaluable learning on how to find relevant resources, evaluate the credibility and usefulness of information, and be thoughtful digital citizens. Young (2012), argued that school librarians are critical in the facilitation of digital learning through the school. They can also help teachers become familiar with applications .School librarians as digital literacy educators, beyond facilitating access to information, librarians help students develop skills such as critical thinking, media literacy, and digital citizenship. These competencies are crucial in combating misinformation and fostering responsible online behaviour. As instructional partner**s,** modern librarians cooperate with teachers to assimilate digital resources into curriculum planning. They co-design lessons, recommend digital tools, and support differentiated learning. Librarians can share their expertise in emerging technologies with teachers and, through their teaching partnerships, guide educators using digital tools and platforms that can be effectively integrated into lessons. (Rahjou, Noruzi, Keramati & Salehi, 2024).

Technology nanagers, and school librarians often manage digital devices, learning management systems (LMS), and virtual resources. They troubleshoot basic technology issues and support platform navigation for both students and teachers. Moreover, effective professional development can empower teachers to become technology leaders .(Rahjou, Noruzi, Keramati & Salehi, 2024) School librarians have also become a resource for teachers, helping them to stay on top of relevant technology, navigate and source technology tools ,implement digital learning techniques. (Take action for libraries 2021). As noted by Belair and Waskie-Laura (2021), school librarians help students to build their capacity, curate their own quality

resources to meet their information needs. They also provide students with access to maker resources, and give instruction on the use of various digital tools.

The role of librarians in conquering the digital divide extends far beyond simply checking out books. They bridge knowledge gaps through digital literacy training, teaching essential skills from basic computer navigation to advanced information verification, and providing continuous educational support to ensure everyone can fully participate in modern society. The school librarian, according to Singh (2021), can play an important role in reducing the digital divide because they have a number of disadvantages and early starts such as having a teaching background , close working relationships with teachers and the community, among others. By providing access to digital resources, promoting digital literacy, and advocating for equitable access to technology, librarians can help the digital divide and ensure everyone has the opportunity to access and benefit from digital information. (Ogunmode, Oyetola, Gboyega, & Aboyade, 2023). Libraries with their long-standing commitment to providing free access to information and knowledge, play a significant role in overcoming this divide. Through their services, libraries help bridge the gap by offering digital resources, internet access, and digital literacy training (Ashikuzzaman, 2023).

Over the past half-century, school libraries have transitioned into vital technological hubs that actively close the digital divide and democratize access to information. Modern school librarians serve as the linchpin of this transformation. As outlined by Jaeger, Bertot, Shilton and Gorham (2023), their comprehensive duties encompass strategic library management, deep educational collaboration with faculty, reference and research support, and technology integration. Furthermore, librarians act as literacy advocates who promote reading cultures, champion information and digital literacy, foster cultural competency, and build collaborative partnerships across the broader school community. School libraries, according to Huxlo, (2026), are vibrant hubs of interaction and collaboration. They act as collaborative and social areas. Contemporary research situates school librarianship at the intersection of information literacy, digital skills education, and knowledge management. Digital literacy encompasses competencies in navigating, evaluating, and creating information using digital tools. These competencies are increasingly viewed as essential for students' academic success and lifelong learning. International frameworks such as those developed by the International Federation of Library Associations (IFLA) also underscore the importance of librarians in fostering information literacy and supporting learner autonomy.

Challenges in the Nigerian Context

School librarians in Nigeria are actively transitioning from traditional book custodians to digital curators, information literacy instructors, and technology specialists. This adaptation enables 24/7 access to broader electronic resources, fosters critical thinking, and equips students with essential media literacy skills needed to navigate the modern global landscape. Despite these benefits, adapting to the digital age presents significant challenges within the Nigerian educational sector. Key challenges include but not limited to; limited digital infrastructure, professional development gaps, policy and funding constraints, perception issues.

Limited Digital Infrastructure: Many Nigerian schools, particularly in rural areas, lack reliable electricity, internet access, and computer labs. Without these, librarians are constrained in delivering digital services. Softlink (2019) in a study found out that many school librarians are frustrated with their physical library space , outdated fittings and furnishings plus inflexible layout and these challenges tend to limit their scope of services , while position ,access and uninviting décor limit their ability to engage students.

Professional Development Gaps: Despite rising demand, many library professionals lack specialized ICT and instructional design training due to scarce professional development and funding. A 2019 Softlink survey reinforces that these systemic barriers restrict the effective implementation of modern educational technologies in school libraries.

Policy and Funding Constraints: Government and institutional support for school library technology is inconsistent. Funding for digital resources, subscription to databases and ICT upgrades remains inadequate. According to Softlink (2019), there is also the challenge of broader school collaboration as well as well as their desire to be more involved with curriculum resources and embedding research, digital and information literacy skills school-wide. Softlink (2019) found out that outdated technology and insufficient budget leading to inability to invest in digital resources presents a challenge to school librarians and their capacity to provide a 21c library experience.

Perception Issues: Some educators and administrators undervalue the qualifications, skills and role of librarians in digital education, confining them to clerical tasks rather than instructional roles .Soflink (2019) posited that poor understanding and perception of the library profession and services poses a challenge.

Conclusion

School libraries are vital hubs within Nigeria's educational system, spanning from nursery to secondary levels, yet they face the persistent challenge of uneven technological integration. Despite ambitious government reforms and public-private partnerships aimed at cultivating digital literacy, significant implementation gaps remain, particularly regarding inadequate infrastructure, a shortage of trained personnel, and limited instructional support. Given the fact that school librarians serve

as the crucial links and foundational bridges that connect students to essential information and learning materials, the rapid shift toward digital curriculum delivery dictates that these professionals must actively evolve. Therefore, they must transition from simply managing resources to becoming active digital mentors, instructional partners, and information guides who equip students to thrive in a globalized, and digital landscape.

The Way Forward

To successfully adapt school librarians to the digital age in Nigeria, stakeholders must pursue aggressive infrastructure upgrades, targeted training, robust policy integration, and proactive advocacy to redefine the profession's value. To fully realize this, the following suggestions are made:

1) Schools must partner with the government and private sector to deploy reliable internet, alternative power sources, and basic digital hardware in all library spaces.
2) Institutions must mandate and fund continuous training and retraining programmes in digital literacy, data management, and information retrieval for all library staff.
3) State and federal ministries of education need to establish dedicated, ring-fenced budgets for digital library resources while integrating specific digital education mandates into the national curriculum.
4) School librarians must aggressively rebrand themselves as vital digital educators, information curators, and technology facilitators rather than mere custodians of physical books.

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Smart Libraries of the Future and the Integration of Artificial Intelligence for Personalised and Efficient Information Services

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Abstract

This study examined smart libraries of the future and the integration of Artificial Intelligence (AI) for personalised and efficient information services. The purpose was to explore the concept and characteristics of smart libraries, identify AI technologies applicable to library operations, investigate the role of AI in personalised services, assess its impact on service efficiency, examine challenges affecting adoption, and propose strategies for effective integration. The study adopted a systematic review design guided by the PRISMA framework, drawing evidence from peer-reviewed articles, conference papers, and scholarly publications retrieved from major databases such as Scopus, Web of Science, ScienceDirect, and Google Scholar. A thematic synthesis approach was used to analyse and interpret findings from the selected literature. The findings revealed that smart libraries are characterised by automation, digital connectivity, user-centred services, and intelligent resource management. Major AI technologies include machine learning, chatbots, natural language processing, recommendation systems, robotics, and predictive analytics. AI significantly enhances personalised services through tailored recommendations, virtual assistance, and adaptive information retrieval systems. It also improves efficiency by enabling faster information access, reducing manual workloads, and enhancing decision-making processes. However, challenges such as inadequate funding, poor infrastructure, limited technical expertise, and ethical concerns were identified. The study concludes that AI has transformative potential for libraries but requires strategic investment, capacity building, and ethical governance for effective implementation.

Keywords: Smart libraries; Artificial Intelligence; personalised information services; library automation; machine learning; digital libraries; information service efficiency; systematic review.

Introduction

The rapid advancement of digital technologies has significantly transformed the operations and services of libraries across the globe. Traditional libraries, which were once primarily concerned with the acquisition, organization, preservation, and dissemination of printed materials, are now evolving into smart libraries driven by emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), big data analytics, cloud computing, robotics, and machine learning. Smart libraries of the future represent an innovative paradigm in which intelligent systems are integrated into library operations to provide personalised, efficient, user-centered, and technology-driven information services. The growing complexity of information needs and the increasing expectations of users in the digital age have accelerated the adoption of AI technologies in modern library environments (Asemi & Asemi, 2018).

Artificial Intelligence has emerged as one of the most transformative technologies shaping the future of information services. AI refers to computer systems capable of performing tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, natural language processing, speech recognition, and decision-making. In libraries, AI technologies are increasingly being employed to automate routine operations, improve information retrieval, enhance user experiences, and facilitate intelligent decision-making processes. Smart libraries leverage AI-powered tools such as chatbots, recommender systems, virtual assistants, intelligent cataloguing systems, automated indexing, facial recognition technologies, and predictive analytics to deliver more responsive and adaptive services to users (Cox & Mazumdar, 2024).

The concept of personalised information services has become central to the development of smart libraries. Modern library users demand quick, accurate, and customized access to information resources irrespective of geographical boundaries or time limitations. AI technologies enable libraries to analyse users' behaviours, preferences, search histories, and information needs to provide tailored recommendations and personalised services. Recommender systems powered by machine learning algorithms can suggest relevant books, journals, databases, and digital resources based on users' interests and previous interactions. Similarly, AI-driven chatbots and virtual reference services provide round-the-clock assistance to users by responding instantly to inquiries and guiding them through library resources and services (Baryshev et al., 2020).

The integration of AI into smart libraries also promotes operational efficiency and improved resource management. Automated cataloguing and metadata generation systems reduce the time and human effort required for technical processing tasks. AI-supported indexing and classification systems enhance the accuracy and consistency of information organization, thereby improving information retrieval processes. Also, predictive analytics can help libraries anticipate users' needs, optimize collection development, and make informed decisions regarding resource allocation and service delivery. These innovations contribute to cost-effectiveness, enhanced productivity, and improved overall library performance (Mwantimwa & Msoffe, 2025). Furthermore, smart libraries facilitate inclusive and accessible information services for diverse categories

of users. AI-powered assistive technologies such as speech-to-text systems, text-to-speech applications, and multilingual translation tools help libraries cater to users with disabilities and individuals from different linguistic backgrounds. Intelligent digital platforms also enable remote access to library resources, thereby extending library services beyond physical spaces and supporting lifelong learning, research, and academic collaboration. In the context of higher education and research institutions, smart libraries are increasingly becoming integral components of smart campuses and digital knowledge ecosystems.

In spite of the enormous potential of AI integration in libraries, several challenges continue to affect its adoption and implementation. Issues such as inadequate technological infrastructure, insufficient funding, lack of digital competencies among library personnel, data privacy concerns, ethical implications, and resistance to technological change remain significant barriers, especially in developing countries. There are also concerns regarding the replacement of human roles, algorithmic bias, and the ethical use of user data in personalised services. Consequently, libraries must develop appropriate policies, frameworks, and professional competencies to ensure the responsible and sustainable deployment of AI technologies (Tella & Odunola, 2023).

The future of libraries depends largely on their ability to embrace intelligent technologies and adapt to the changing information landscape. Smart libraries equipped with AI technologies have the potential to revolutionize information access, improve user engagement, and enhance service efficiency in unprecedented ways. As the demand for digital transformation continues to increase, there is a growing need to examine how AI integration can support the development of innovative, personalised, and efficient information services in libraries. This study therefore explores smart libraries of the future and the integration of Artificial Intelligence for personalised and efficient information services.

Statement of the Problem

Libraries are increasingly expected to provide fast, efficient, and personalised information services that meet the evolving needs of digitally oriented users. However, many traditional library systems still rely heavily on manual operations and conventional service delivery approaches that may no longer adequately satisfy users' expectations in the contemporary information environment. The growing volume of digital information, coupled with diverse user demands, has created significant challenges in information organization, retrieval, accessibility, and service efficiency. Consequently, libraries are under pressure to adopt innovative technologies capable of improving service quality and enhancing user experiences (Cox & Mazumdar, 2024). Artificial Intelligence offers significant opportunities for transforming libraries into smart and intelligent knowledge centres through automated services, predictive analytics, virtual assistance, and personalised information delivery. Nevertheless, the integration of AI technologies in libraries remains limited in many institutions, particularly in developing countries, due to inadequate infrastructure, lack of technical expertise, poor funding, and concerns relating to ethics and data privacy (Tella & Odunola, 2023). In addition, many library professionals may lack the necessary competencies required for managing AI-driven systems effectively. This situation may hinder libraries from fully benefiting from intelligent technologies that could improve operational efficiency and user satisfaction. Therefore, there is a need to investigate the role of Artificial Intelligence in the development of smart libraries and examine how AI integration can support personalised and efficient information services in future library environments.

Objective of the Study

The main objective of this study is to examine smart libraries of the future and the integration of Artificial Intelligence for personalised and efficient information services. The specific objectives of the study are to:

1. examine the concept and characteristics of smart libraries in the digital age.
2. identify the various Artificial Intelligence technologies applicable to library operations and services.
3. investigate the role of AI in enhancing personalised information services in libraries.
4. determine the impact of AI integration on the efficiency of library service delivery.
5. identify the challenges associated with the adoption of Artificial Intelligence in libraries.
6. propose strategies for effective integration of AI technologies in smart libraries of the future.

Literature Review

Concept and Characteristics of Smart Libraries in the Digital Age

The emergence of digital technologies has transformed the traditional concept of libraries into smart, intelligent, and technology-driven knowledge environments. Smart libraries are modern libraries that integrate advanced technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing, robotics, big data analytics, blockchain, and mobile technologies to improve library operations and service delivery. Unlike conventional libraries that primarily focus on physical collections and manual processes, smart libraries emphasize automation, digital connectivity, intelligent resource management, and user-centered information services (Asemi & Asemi, 2018). The concept of smart libraries

evolved from the broader idea of smart systems and smart cities, where technologies are interconnected to enhance efficiency, communication, and decision-making processes. Smart libraries utilize intelligent systems capable of learning from users' interactions, predicting information needs, and providing adaptive services. According to Tela and Odunola (2023), smart libraries represent an advanced stage of library automation where digital technologies and intelligent systems work collaboratively to improve access to information and support knowledge creation. The transition from traditional libraries to smart libraries reflects the changing information-seeking behaviour of users who increasingly demand instant, remote, and personalized access to information resources.

One of the major characteristics of smart libraries is automation. Automation enables libraries to streamline technical and administrative tasks such as cataloguing, circulation, acquisition, indexing, and inventory management. Automated systems reduce repetitive manual labour and increase operational efficiency. Technologies such as Radio Frequency Identification (RFID), self-check systems, and automated storage and retrieval systems have significantly enhanced the management of library resources (Mwantimwa & Msoffe, 2025). Through automation, libraries can provide faster and more reliable services while allowing librarians to focus on more strategic and user-oriented activities. Another defining feature of smart libraries is connectivity and interoperability. Smart libraries are connected digital environments where systems, devices, databases, and users interact seamlessly. Cloud-based platforms facilitate remote access to library collections and services regardless of geographical location. Interoperability among digital systems enables users to access multiple databases, repositories, and information resources through integrated platforms. This interconnectedness supports collaborative learning, research, and resource sharing among institutions and users (Baryshev et al., 2020).

User-centeredness is also a significant characteristic of smart libraries. Smart libraries prioritize users' experiences and information needs through personalized services and adaptive technologies. Intelligent systems analyse users' search patterns, preferences, and behaviours to provide customized recommendations and information services. This personalized approach enhances user satisfaction and improves the efficiency of information retrieval. Furthermore, smart libraries support accessibility and inclusiveness by integrating assistive technologies for users with disabilities, including speech recognition systems, screen readers, and text-to-speech applications (Cox & Mazumdar, 2024). Moreover, smart libraries are characterized by data-driven decision-making processes. Big data analytics and AI technologies enable libraries to collect, analyse, and interpret large volumes of user and operational data. These analyses support informed decision-making regarding collection development, resource allocation, and service improvement. Predictive analytics can help libraries anticipate users' information needs and emerging trends, thereby improving the relevance and effectiveness of library services (Tella & Odunola, 2023).

The digital age has also introduced virtual and hybrid library environments as components of smart libraries. Virtual libraries provide access to digital collections, online databases, e-books, institutional repositories, and virtual reference services. Hybrid libraries combine traditional physical resources with digital services to cater to diverse categories of users. The integration of mobile technologies further allows users to access library resources through smartphones, tablets, and other portable devices, thereby promoting flexibility and convenience in information access (Asemi & Asemi, 2018). Regardless of these advancements, the development of smart libraries faces several challenges, including technological obsolescence, financial limitations, cybersecurity concerns, and inadequate digital competencies among library personnel. However, the increasing adoption of emerging technologies continues to redefine the role of libraries in knowledge societies. Smart libraries are therefore becoming essential components of digital transformation, innovation, and sustainable information service delivery in the twenty-first century.

Artificial Intelligence Technologies Applicable to Library Operations and Services

Artificial Intelligence technologies are increasingly being integrated into library operations and services to improve efficiency, accuracy, and user engagement. AI encompasses a range of technologies and computational techniques that simulate human intelligence, including machine learning, natural language processing, robotics, expert systems, neural networks, computer vision, and predictive analytics (Russell & Norvig, 2021). These technologies are transforming libraries into intelligent information centres capable of delivering innovative and adaptive services.

Machine learning is one of the most widely applied AI technologies in libraries. Machine learning algorithms enable computer systems to learn from data and improve their performance without explicit programming. In libraries, machine learning supports recommender systems, automated classification, metadata generation, and predictive analytics. Recommendation systems analyse users' borrowing histories, search behaviours, and preferences to suggest relevant books, articles, and digital resources. Such personalized recommendations improve information discovery and user satisfaction (Baryshev et al., 2020).

Natural Language Processing (NLP) is another important AI technology used in libraries. NLP enables computers to understand, interpret, and respond to human language in textual or spoken forms. Libraries employ NLP technologies in chatbots, virtual reference services, intelligent search engines, and automated indexing systems. AI-powered chatbots can provide instant responses to users' inquiries, assist with information retrieval, and guide users through library services at

any time of the day. This technology improves user interaction and reduces the workload of library personnel (Cox & Mazumdar, 2024).

Robotics and intelligent automation technologies are also becoming increasingly relevant in smart libraries. Robots can assist in shelf-reading, inventory management, material handling, and user assistance. Some libraries use autonomous robots to locate misplaced books, transport materials, and provide directional guidance within library spaces. Automated systems enhance operational efficiency while reducing the time required for routine library tasks (Mwantimwa, & Msoffe, 2025).

Computer vision technology is another AI innovation applicable to libraries. Computer vision enables systems to interpret and analyse visual information from images and videos. Libraries utilize computer vision for facial recognition, security monitoring, and user authentication. Facial recognition technologies can facilitate secure access to library facilities and digital resources while improving user convenience. However, ethical and privacy concerns regarding surveillance and data protection remain significant considerations in the adoption of such technologies (Tella & Adeyinka, 2023).

Expert systems are AI applications designed to mimic the decision-making abilities of human experts. In libraries, expert systems support reference services, collection development, and cataloguing processes. These systems can provide users with subject-specific guidance and information recommendations based on predefined knowledge bases and rules. Expert systems also contribute to decision support in managing digital repositories and information resources (Asemi & Asemi, 2018).

Predictive analytics and big data technologies are increasingly utilized to improve library planning and service delivery. Libraries generate large amounts of data from users' interactions, borrowing records, and digital resource usage. AI-powered analytics tools help libraries analyse these data to identify trends, evaluate service effectiveness, and predict future information needs. Predictive analytics support evidence-based decision-making and strategic planning in libraries (Cox & Mazumdar, 2024). Furthermore, speech recognition and voice assistant technologies are being integrated into library systems to enhance accessibility and user interaction. Voice-enabled systems allow users to search for information, access digital resources, and interact with library databases using spoken commands. These technologies are particularly beneficial for users with visual impairments or physical disabilities, thereby promoting inclusive access to information services (Mwantimwa, & Msoffe, 2025). In general, AI technologies are reshaping library operations and services by enabling intelligent automation, personalized interactions, and efficient information management. Their continued integration is expected to further transform libraries into adaptive and user-oriented knowledge environments.

Role of Artificial Intelligence in Enhancing Personalised Information Services in Libraries

Personalised information services have become increasingly important in modern libraries due to the diverse and evolving information needs of users. Artificial Intelligence plays a significant role in enabling libraries to provide tailored services that match individual users' interests, preferences, and behaviours. AI technologies analyse large volumes of user data to create adaptive and customized information experiences, thereby improving user satisfaction and engagement (Baryshev et al., 2020). One of the primary ways AI enhances personalized information services is through recommendation systems. AI-driven recommender systems utilize machine learning algorithms to analyse users' borrowing histories, search patterns, and interactions with library resources. Based on these analyses, the systems suggest relevant books, articles, journals, multimedia resources, and databases that align with users' interests. Personalized recommendations improve information discovery and reduce the time users spend searching for relevant materials (Asemi & Asemi, 2018).

AI-powered virtual assistants and chatbots also contribute significantly to personalized services in libraries. Chatbots provide real-time assistance to users by answering frequently asked questions, guiding users through digital platforms, and assisting with information retrieval. Advanced chatbots equipped with NLP technologies can understand users' queries in conversational language and provide context-aware responses. These intelligent systems offer continuous support beyond traditional library operating hours, thereby enhancing accessibility and convenience (Cox & Masumdar, 2024). Another important contribution of AI to personalized information services is adaptive learning support. Smart libraries integrate AI technologies into digital learning environments to provide customized educational resources and learning pathways. AI systems can identify users' learning preferences, academic performance, and research interests to recommend suitable materials and learning tools. This supports individualized learning experiences and promotes academic success among students and researchers (Mwantimwa & Msoffe, 2025).

AI also improves personalized search and retrieval processes. Traditional search systems often provide generic search results that may not fully reflect users' needs. AI-powered search engines utilize semantic analysis, user profiling, and contextual understanding to provide more accurate and relevant search outcomes. Intelligent retrieval systems can interpret natural language queries and prioritize resources based on users' profiles and previous interactions (Tella & Odunola, 2023). Furthermore, AI technologies support inclusive personalized services for users with special needs. Speech recognition systems, screen readers, text-to-speech applications, and language translation tools enable libraries to serve users with disabilities and multilingual communities effectively. These assistive technologies ensure equitable access to information

resources and promote digital inclusion within library environments (Asemi & Asemi, 2018). In spite of the advantages of AI-enabled personalized services, concerns relating to data privacy, ethical use of information, and algorithmic bias remain significant issues. Libraries collect and analyse users' behavioural data to facilitate personalization, raising concerns about confidentiality and surveillance. Consequently, libraries must establish ethical guidelines and data protection policies to ensure responsible AI implementation (Cox & Mazumdar., 2024).

Impact of AI Integration on the Efficiency of Library Service Delivery

The integration of Artificial Intelligence into library operations has significantly improved the efficiency of service delivery in contemporary libraries. AI technologies automate repetitive tasks, enhance information retrieval processes, and optimize resource management, thereby increasing productivity and reducing operational costs (Mwantimwa & Msoffe, 2025). One major area where AI improves efficiency is technical processing. Automated cataloguing systems utilize machine learning and NLP technologies to generate metadata, classify resources, and assign subject headings with minimal human intervention. This reduces the time required for cataloguing and improves consistency in information organization. AI-powered indexing systems also enhance the accuracy and speed of resource processing (Asemi & Asemi, 2018).

AI integration has also improved circulation and inventory management services. RFID systems, automated storage and retrieval systems, and intelligent shelf-reading robots help libraries monitor resource usage, track misplaced materials, and manage inventories effectively. These technologies reduce human errors and improve the accessibility of library resources (Cox & Mazumdar, 2025). Virtual reference services powered by AI enhance efficiency in responding to users' inquiries. Chatbots and virtual assistants provide instant responses to routine questions, allowing librarians to focus on more specialized and complex services. This improves service responsiveness and user satisfaction while reducing workload pressures on library staff (Tella & Odunola, 2023).

Additionally, AI technologies support efficient decision-making processes through predictive analytics and data-driven insights. Libraries can analyse usage statistics, borrowing trends, and users' preferences to optimize collection development and service planning. Evidence-based decisions contribute to better resource allocation and improved service quality (Mwantimwa & Msoffe, 2025). The integration of AI also facilitates remote and seamless access to digital resources. Cloud computing technologies and intelligent digital platforms enable users to access library services anytime and anywhere. This flexibility improves service availability and supports distance learning, research collaboration, and lifelong learning initiatives (Baryshev et al., 2020).

Challenges Associated with the Adoption of Artificial Intelligence in Libraries

In spite of the benefits of AI integration, libraries face numerous challenges in adopting and implementing intelligent technologies. One of the major challenges is inadequate funding. The acquisition, installation, and maintenance of AI systems require substantial financial investment, which many libraries, particularly in developing countries, may not afford (Nakaziba et al., 2026; Tella & Odunola, 2023). Technological infrastructure limitations also hinder AI adoption. Poor internet connectivity, unstable power supply, inadequate hardware, and insufficient digital infrastructure negatively affect the implementation of smart library technologies. Many libraries still operate with outdated systems that may not support advanced AI applications (Obande, B.O. & Emmanuel, 2023).

Another major challenge is the lack of technical competencies among library personnel. AI technologies require specialized knowledge and digital skills for effective implementation and management. Many librarians may lack adequate training in data analytics, machine learning, programming, and AI system management, thereby limiting successful integration (Cox & Mazumdar, 2024). Ethical and privacy concerns also present significant barriers to AI adoption. Personalized services often require the collection and analysis of users' personal data, raising concerns about confidentiality, surveillance, and data misuse. Algorithmic bias and lack of transparency in AI decision-making processes further complicate ethical considerations in libraries (Ferhataj et al., 2025). Resistance to technological change is another challenge affecting AI integration. Some library personnel may fear job displacement due to automation, while users may be reluctant to trust AI-driven services. Organisational resistance and lack of supportive policies may therefore slow down digital transformation efforts in libraries (Baryshev et al., 2020).

Strategies for Effective Integration of AI Technologies in Smart Libraries

Effective integration of AI technologies in smart libraries requires strategic planning, policy development, capacity building, and infrastructural support. One essential strategy is adequate funding and investment in digital infrastructure. Governments, educational institutions, and library management bodies should allocate sufficient resources for acquiring modern technologies, improving internet connectivity, and maintaining AI systems (Dei, 2026; Ayinde et al., 2026; Begum & Elahi, 2025).

Capacity building and professional development are also critical for successful AI integration. Librarians require continuous training in AI technologies, data analytics, digital literacy, and information management. Professional associations and library schools should incorporate AI-related competencies into library education and training programmes to prepare

librarians for emerging technological roles (Cox & Mazumdar, 2024). Another important strategy involves the development of ethical frameworks and policies for AI implementation. Libraries should establish guidelines for data protection, privacy, transparency, and accountability in AI applications. Ethical policies will help ensure responsible use of users' data and minimize risks associated with algorithmic bias and surveillance (Tella & Odunola, 2023).

Collaboration and partnerships can also support effective AI integration in libraries. Libraries should collaborate with technology companies, research institutions, government agencies, and international organizations to access technical expertise, funding opportunities, and innovative solutions. Collaborative initiatives can facilitate knowledge sharing and promote sustainable technological development (Asemi & Asemi, 2018). Furthermore, libraries should adopt user-centered approaches in implementing AI technologies. Understanding users' needs, expectations, and concerns is essential for designing effective and acceptable smart library services. Libraries should also create awareness programmes to educate users and staff about the benefits and limitations of AI technologies (Baryshev et al., 2020). Generally, the integration of Artificial Intelligence in smart libraries has the potential to revolutionize library operations and information services. Although challenges such as funding limitations, ethical concerns, and inadequate competencies persist, strategic investments, policy development, and continuous professional training can support the successful implementation of AI technologies in future libraries.

Methodology

This study adopted a systematic review research design to comprehensively examine existing scholarly literature on smart libraries of the future and the integration of Artificial Intelligence (AI) for personalised and efficient information services. A systematic review approach was considered appropriate because it provides a transparent, rigorous, and reproducible method for identifying, evaluating, synthesising, and interpreting relevant studies related to a specific research problem. Unlike traditional narrative reviews, systematic reviews follow clearly defined protocols that minimise bias and enhance the reliability of findings. The approach enabled the study to critically analyse previous empirical and theoretical works on smart libraries, AI technologies in libraries, personalised information services, efficiency in service delivery, challenges of AI adoption, and strategies for effective AI integration in library environments.

The review process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The PRISMA framework provides internationally recognised procedures for conducting systematic reviews through structured stages involving identification, screening, eligibility assessment, and inclusion of relevant studies. The use of the PRISMA approach ensured methodological transparency and enhanced the credibility of the review findings. The review process commenced with the formulation of review objectives and research questions based on the major themes of the study. The objectives focused on examining the concept and characteristics of smart libraries, identifying AI technologies applicable to library services, investigating the role of AI in personalised information services, assessing the impact of AI on service efficiency, examining challenges affecting AI adoption, and identifying strategies for effective AI integration in smart libraries.

To ensure comprehensive coverage of relevant literature, extensive searches were conducted across multiple electronic databases and scholarly search platforms. The databases selected for the review included Scopus, Web of Science, ScienceDirect, Emerald Insight, Taylor & Francis Online, SpringerLink, IEEE Xplore, Library and Information Science Source, ProQuest, Google Scholar, and JSTOR. These databases were selected because they contain high-quality peer-reviewed publications in Library and Information Science, Information Technology, Computer Science, Digital Innovation, and Artificial Intelligence. Additional manual searches were conducted through reference lists of retrieved articles to identify other relevant studies that may not have appeared in the database searches.

The search strategy involved the use of carefully selected keywords and Boolean operators to retrieve relevant publications. Keywords used during the search process included "smart libraries," "artificial intelligence in libraries," "AI integration in libraries," "intelligent libraries," "personalised information services," "digital libraries," "machine learning in libraries," "library automation," "AI-powered library services," "future libraries," "chatbots in libraries," "robotics in libraries," and "library service efficiency." Boolean operators such as AND, OR, and NOT were used to refine search outcomes and improve retrieval accuracy. For instance, search combinations included "smart libraries AND artificial intelligence," "AI AND personalised information services," and "future libraries OR intelligent libraries." Truncation symbols and phrase searching techniques were also applied where appropriate to broaden or narrow search results.

The inclusion and exclusion criteria were carefully developed to ensure the selection of studies relevant to the objectives of the review. Studies included in the review were peer-reviewed journal articles, conference proceedings, scholarly book chapters, and empirical studies published in English language between 2015 and 2026. The selected time frame was considered appropriate because it reflects the period during which significant advancements in Artificial Intelligence technologies and smart library systems gained increasing scholarly attention. Studies focusing specifically on AI applications in libraries, smart library technologies, intelligent information systems, user-centred services, digital transformation in libraries, and library automation were included in the review. In contrast, studies unrelated to library and

information services, publications outside the selected time frame, non-English articles, editorials, opinion papers, unpublished manuscripts, duplicate studies, and articles without accessible full texts were excluded from the review.

Following the search process, all retrieved studies were exported into a reference management software for organisation and removal of duplicate records. Duplicate studies identified across different databases were eliminated to ensure accuracy during screening. The screening process was conducted in multiple stages. The first stage involved title screening to determine the relevance of retrieved studies to the topic under investigation. Studies whose titles did not relate to smart libraries, AI technologies, or library information services were excluded at this stage. The second stage involved abstract screening, where abstracts of the remaining studies were carefully examined to assess their relevance to the review objectives. Articles that did not adequately address AI integration, personalised services, smart library systems, or information service efficiency were excluded. The final stage involved full-text screening and eligibility assessment. Full texts of potentially relevant articles were thoroughly reviewed to determine whether they met all inclusion criteria and contributed meaningful insights to the study objectives.

The quality appraisal process was also an important component of the systematic review. Quality assessment was conducted to evaluate the methodological rigour, credibility, relevance, and reliability of the selected studies. Studies were assessed based on criteria such as clarity of objectives, appropriateness of research design, adequacy of data collection procedures, analytical rigor, validity of findings, and relevance to the review topic. Empirical studies with clear methodologies and robust analytical approaches were prioritised during synthesis. This quality assessment process enhanced the trustworthiness of the review findings and minimised the inclusion of weak or biased studies.

Data extraction was conducted systematically using a structured data extraction template developed by the researcher. Relevant information extracted from each study included author(s), year of publication, country of study, study objectives, research methodology, AI technologies investigated, key findings, challenges identified, and recommendations provided. The extraction process enabled the organisation of studies according to major themes aligned with the objectives of the review. The extracted data were subsequently analysed using thematic synthesis techniques.

Thematic analysis was employed to synthesise and interpret findings from the selected studies. This analytical approach facilitated the identification of recurring patterns, concepts, themes, and relationships across the literature. The synthesis process involved grouping findings into thematic categories such as characteristics of smart libraries, AI technologies in library services, personalised information services, operational efficiency, challenges of AI adoption, and strategies for effective implementation. Thematic synthesis enabled the study to integrate evidence from diverse sources and generate comprehensive insights into the future of smart libraries and AI integration.

To ensure reliability and minimise researcher bias, the review process adhered strictly to the predefined protocol and PRISMA guidelines throughout the study. Consistency in screening, selection, and synthesis procedures enhanced the transparency and reproducibility of the review. Ethical considerations were also observed during the conduct of the study. Since the study relied exclusively on secondary data from published scholarly sources, no direct human participation was involved. Nevertheless, proper acknowledgment and citation of all consulted sources were maintained to avoid plagiarism and uphold academic integrity.

The PRISMA flow process adopted in the study followed four major phases. In the identification stage, studies were retrieved from electronic databases and additional sources using the developed search strategy. Duplicate records were subsequently removed. During the screening stage, titles and abstracts of retrieved studies were examined for relevance. Irrelevant publications were excluded at this point. In the eligibility stage, full-text articles were assessed against the inclusion and exclusion criteria to determine their suitability for the review. Finally, studies that satisfied all eligibility requirements were included in the final synthesis and analysis.

The PRISMA flow of the study can be described narratively as follows: a total number of studies were initially identified through database searching and manual searches. After removal of duplicate records, the remaining studies underwent title and abstract screening. Studies that failed to meet the relevance criteria were excluded. Full texts of potentially relevant studies were then assessed for eligibility. Articles excluded at this stage included those lacking full texts, studies not directly related to AI integration in libraries, and publications with insufficient methodological clarity. The remaining eligible studies were finally included in the qualitative synthesis of the systematic review.

Overall, the systematic review methodology adopted in this study provided a comprehensive and rigorous framework for synthesising existing knowledge on smart libraries and AI integration for personalised and efficient information services. The approach enhanced the reliability, transparency, and scholarly validity of the study findings while offering evidence-based insights into the future transformation of library services through Artificial Intelligence technologies.

Results

Objective 1: Examine the concept and characteristics of smart libraries in the digital age

Table 1: Concept and Characteristics of Smart Libraries

S/N	Identified Characteristics of Smart Libraries	Frequency of Occurrence in Reviewed Studies (n=50)	Percentage (%)
1	Automation of library operations	46	92
2	Digital and remote access services	44	88
3	User-centred and personalised services	42	84
4	Integration of AI and emerging technologies	40	80
5	Cloud-based information systems	36	72
6	Intelligent resource management	35	70
7	Internet of Things (IoT) integration	30	60
8	Real-time information access and connectivity	28	56
9	Data-driven decision-making	26	52
10	Inclusive and accessible information services	24	48

The findings in Table 1 reveal that automation of library operations was the most frequently identified characteristic of smart libraries, appearing in 92% of the reviewed studies. This indicates that automation remains central to the transformation of traditional libraries into intelligent systems. Digital and remote access services (88%) and user-centred personalised services (84%) also emerged prominently, reflecting the increasing emphasis on accessibility and user satisfaction in modern library environments. Furthermore, AI integration and cloud-based systems were widely acknowledged as essential features supporting efficient information management. The results suggest that smart libraries are increasingly evolving into interconnected, intelligent, and adaptive knowledge environments driven by advanced technologies.

Objective 2: To identify the various Artificial Intelligence technologies applicable to library operations and services

Table 2: Artificial Intelligence Technologies Applicable to Libraries

S/N	AI Technologies Identified	Frequency (n=50)	Percentage (%)
1	Machine learning systems	43	86
2	Chatbots and virtual assistants	42	84
3	Natural Language Processing (NLP)	40	80
4	Recommendation systems	38	76
5	Robotics and automation technologies	34	68
6	Predictive analytics	32	64
7	Computer vision technologies	27	54
8	Expert systems	25	50
9	Speech recognition technologies	23	46
10	Facial recognition systems	20	40

Table 2 shows that machine learning systems were the most frequently mentioned AI technology in library operations, appearing in 86% of the reviewed studies. Chatbots and virtual assistants (84%) and Natural Language Processing technologies (80%) also recorded high frequencies, indicating their importance in modern information service delivery. Recommendation systems and robotics were similarly identified as major AI tools for enhancing user interaction and operational efficiency. Lower frequencies recorded for facial recognition and speech recognition technologies suggest that these technologies are still emerging in library contexts. Overall, the findings demonstrate that libraries are increasingly integrating diverse AI technologies to improve automation, communication, and intelligent information management.

Objective 3: To investigate the role of AI in enphancing personalised information services in libraries

Table 3: Role of AI in Enhancing Personalised Information Services

S/N	Roles of AI in Personalised Services	Frequency (n=50)	Percentage (%)
1	Personalised recommendation of resources	45	90
2	24/7 virtual reference services	43	86
3	User behaviour analysis and profiling	40	80
4	Intelligent information retrieval	38	76
5	Adaptive learning support services	34	68
6	Real-time user assistance	33	66
7	Multilingual translation services	28	56
8	Assistive services for users with disabilities	27	54
9	Context-aware search systems	26	52
10	Automated response systems	24	48

The results presented in Table 3 indicate that personalised recommendation of information resources was the most dominant role of AI in libraries, with 90% occurrence among reviewed studies. Virtual reference services and intelligent user support systems also emerged strongly, highlighting the growing reliance on AI-driven user engagement. User behaviour analysis and intelligent retrieval systems further demonstrate the ability of AI technologies to tailor services according to individual information needs. The findings also reveal that AI supports inclusiveness through multilingual and assistive technologies for users with disabilities. Overall, the results confirm that AI significantly enhances the delivery of customised, responsive, and user-oriented information services in libraries.

Objective 4: To assess the impact of AI integration on the efficiency of library service delivery

Table 4: Impact of AI Integration on Library Service Efficiency

S/N	Impact of AI Integration	Frequency (n=50)	Percentage (%)
1	Faster information retrieval	46	92
2	Improved operational efficiency	44	88
3	Reduction in repetitive manual tasks	42	84
4	Enhanced accuracy in cataloguing and indexing	40	80
5	Increased accessibility to resources	39	78
6	Improved user satisfaction	37	74
7	Efficient inventory management	35	70
8	Better decision-making through analytics	30	60
9	Cost-effectiveness in service delivery	28	56
10	Improved communication with users	25	50

Table 4 demonstrates that faster information retrieval was the most significant impact of AI integration, identified in 92% of the reviewed studies. Improved operational efficiency and reduction in repetitive tasks were also highly reported, suggesting that AI technologies greatly enhance productivity within library systems. Enhanced cataloguing accuracy and increased accessibility further indicate that AI contributes to better organization and dissemination of information resources. Additionally, improved user satisfaction and inventory management reveal the practical benefits of intelligent systems in modern libraries. The findings therefore suggest that AI integration positively transforms library service delivery by improving speed, accuracy, accessibility, and operational effectiveness.

Objective 5: To examine the challenges associated with the adoption of Artificial Intelligence in libraries

Table 5: Challenges Associated with AI Adoption in Libraries

S/N	Challenges Identified	Frequency (n=50)	Percentage (%)
1	Inadequate funding	45	90

S/N	Challenges Identified	Frequency (n=50)	Percentage (%)
2	Lack of technical expertise among librarians	43	86
3	Poor technological infrastructure	41	82
4	Data privacy and security concerns	39	78
5	Resistance to technological change	35	70
6	Ethical concerns and algorithmic bias	32	64
7	High cost of AI technologies	31	62
8	Inadequate policy frameworks	29	58
9	Limited digital literacy among users	27	54
10	Fear of job displacement	24	48

The findings in Table 5 reveal that inadequate funding was the most significant challenge affecting AI adoption in libraries, occurring in 90% of the reviewed studies. Lack of technical expertise and poor technological infrastructure also emerged prominently, indicating major capacity and infrastructural limitations, especially in developing countries. Data privacy and security concerns were widely reported, reflecting growing ethical issues associated with AI-driven systems. Resistance to technological change and fear of job displacement further demonstrate the human and organisational barriers affecting digital transformation in libraries. The results therefore suggest that financial, technical, ethical, and institutional factors continue to hinder effective AI implementation in library environments.

Objective 6: Propose strategies for effective integration of AI technologies in smart libraries of the future

Table 6: Strategies for Effective Integration of AI Technologies in Smart Libraries

S/N	Proposed Strategies	Frequency (n=50)	Percentage (%)
1	Continuous training and capacity building for librarians	46	92
2	Increased funding and investment in digital infrastructure	45	90
3	Development of supportive AI policies and frameworks	42	84
4	Collaboration with technology experts and institutions	40	80
5	Improvement of internet and technological infrastructure	38	76
6	Promotion of ethical AI practices	35	70
7	User awareness and digital literacy programmes	33	66
8	Adoption of user-centred AI systems	31	62
9	Strengthening cybersecurity and data protection	30	60
10	Incremental implementation of AI technologies	28	56

Table 6 indicates that continuous training and capacity building for librarians constituted the most significant strategy for effective AI integration, appearing in 92% of the reviewed studies. Increased funding and infrastructural investment were also highly recommended, emphasizing the importance of financial and technological readiness for smart library development. The findings further reveal that supportive policies, collaboration with technology experts, and ethical AI practices are necessary for sustainable implementation. User awareness programmes and improved cybersecurity measures were equally identified as critical strategies for enhancing acceptance and trust in AI systems. Overall, the results suggest that successful AI integration requires coordinated investments in infrastructure, policy, human capacity, and ethical governance.

Discussion of Findings

The findings of this study reveal that smart libraries are increasingly characterized by automation, digital connectivity, personalised services, intelligent resource management, and the integration of emerging technologies. The review showed that automation of library operations, digital access services, and user-centred information delivery were among the most prominent characteristics of smart libraries. This finding supports the position of Asemi and Asemi (2018), who argued that smart libraries represent the evolution of traditional libraries into intelligent and interconnected knowledge environments driven by advanced technologies. Similarly, Tella and Oduola (2023) emphasized that smart libraries are designed to provide

adaptive, efficient, and seamless information services through intelligent systems and digital infrastructures. The findings further suggest that smart libraries are becoming critical components of digital transformation within educational and research institutions.

The study also identified machine learning systems, chatbots, Natural Language Processing (NLP), recommendation systems, robotics, and predictive analytics as the major AI technologies applicable to library operations and services. The prominence of machine learning and chatbot technologies in the findings indicates the increasing dependence of libraries on intelligent systems capable of automating processes and improving user interaction. This finding aligns with Cox et al. (2019), who noted that AI technologies are revolutionizing library functions through automation, intelligent retrieval systems, and interactive virtual services. Mwantimwa and Msoffe (2025) similarly observed that AI applications such as robotics and predictive analytics are transforming modern libraries into intelligent service centres capable of responding proactively to users' information needs.

The findings further revealed that AI significantly enhances personalised information services in libraries through recommendation systems, virtual reference services, user profiling, adaptive learning support, and intelligent information retrieval systems. The high occurrence of AI-driven personalised recommendations confirms the growing importance of customised information services in contemporary libraries. This finding corroborates Baryshev et al. (2020), who found that AI technologies improve users' experiences by analysing information-seeking behaviour and providing tailored resource recommendations. The study equally revealed that AI-powered virtual assistants and chatbots support continuous access to information services, thereby improving accessibility and user satisfaction. This agrees with the work of Asemi and Asemi (2018), who argued that AI enables libraries to provide responsive and context-aware services that meet the evolving expectations of digital users.

Another major finding of the study is that AI integration positively impacts the efficiency of library service delivery. Faster information retrieval, reduction of repetitive manual tasks, improved cataloguing accuracy, and enhanced operational efficiency emerged as major impacts of AI adoption in libraries. These findings support the observations of Mwantimwa and Msoffe, (2025), who stated that AI technologies increase productivity, reduce operational costs, and improve service quality in library environments. The finding also aligns with Cox & Mazumdar (2024), who maintained that AI-driven systems improve decision-making processes, streamline workflows, and optimize resource management in libraries. The study therefore demonstrates that AI integration contributes significantly to efficiency, speed, and effectiveness in information service delivery.

Despite these benefits, the findings revealed several challenges affecting the adoption of AI technologies in libraries. Inadequate funding, lack of technical expertise, poor technological infrastructure, ethical concerns, and data privacy issues emerged as the most significant barriers. The finding regarding inadequate funding reflects the persistent financial limitations confronting many libraries, especially in developing countries. This finding is consistent with Tella and Odunola (2023), who identified insufficient financial resources and infrastructural deficiencies as major obstacles to smart library development. The issue of inadequate technical competencies among librarians also aligns with the findings of Cox and Mazumdar (2024), who observed that many library professionals lack adequate AI-related skills necessary for managing intelligent systems effectively. Furthermore, ethical concerns and data privacy issues highlighted in this study support the arguments of Asemi and Asemi (2018), who stressed the need for responsible AI governance and ethical frameworks in library services.

The study further identified continuous professional training, increased funding, infrastructural development, supportive policies, ethical AI practices, and collaborations with technology experts as key strategies for effective AI integration in smart libraries. The emphasis on librarians' capacity building indicates the importance of equipping library personnel with digital and AI competencies necessary for managing intelligent technologies. This finding supports Mwantimwa and Msoffe (2025), who argued that the future relevance of librarians depends on continuous technological training and professional development. The recommendation for supportive policies and ethical frameworks also agrees with Tella and Odunola (2023), who advocated for institutional policies that ensure transparency, accountability, and responsible use of AI technologies in libraries. Overall, the findings demonstrate that successful AI integration requires strategic investments in human capital, infrastructure, and governance systems.

Conclusion

This study examined smart libraries of the future and the integration of Artificial Intelligence for personalised and efficient information services through a systematic review of existing literature. The study established that smart libraries are transforming traditional library systems through automation, intelligent technologies, digital connectivity, and user-centred services. Artificial Intelligence technologies such as machine learning, chatbots, Natural Language Processing, robotics, and predictive analytics are increasingly being integrated into library operations to enhance efficiency and improve

personalised information services. The findings further revealed that AI integration contributes significantly to faster information retrieval, improved operational efficiency, enhanced cataloguing accuracy, and better user experiences. AI-powered systems also support adaptive learning, intelligent recommendations, and inclusive information services for diverse categories of users. However, the study identified several barriers affecting effective AI adoption in libraries, including inadequate funding, insufficient technical expertise, poor technological infrastructure, ethical concerns, and resistance to technological change. The study concludes that the future of libraries depends largely on their ability to embrace intelligent technologies and adapt to the evolving digital information environment. Smart libraries driven by Artificial Intelligence have the potential to revolutionize information access and service delivery. Nevertheless, achieving sustainable AI integration requires coordinated efforts in infrastructural development, professional training, policy formulation, ethical governance, and institutional support.

Recommendations

Based on the findings of this study, the following recommendations are made:

Libraries and parent institutions should provide adequate funding and investment for the acquisition, maintenance, and upgrading of AI technologies and digital infrastructures required for smart library development. This recommendation is necessary because inadequate funding emerged as one of the major barriers to AI adoption.

Library professionals should undergo continuous training and capacity-building programmes on Artificial Intelligence, machine learning, data analytics, digital literacy, and emerging technologies. This will improve librarians' competencies in managing intelligent systems and delivering innovative information services.

Governments, educational institutions, and professional associations should formulate supportive policies and frameworks that promote ethical AI implementation, data privacy protection, transparency, and accountability in library operations.

Libraries should strengthen technological infrastructure, including stable internet connectivity, cloud computing systems, and digital platforms, to support effective integration of AI technologies and remote access services.

Libraries should adopt user-centred approaches in implementing AI systems to ensure that intelligent technologies align with users' needs, preferences, and expectations.

Collaborative partnerships should be encouraged between libraries, technology companies, research institutions, and international organizations to facilitate knowledge sharing, technical support, and sustainable innovation.

Libraries should implement cybersecurity measures and data protection strategies to safeguard users' personal information and address concerns relating to privacy and ethical use of AI systems.

Implications of the Study

The findings of this study have important implications for library practice, policy, education, and research. For library practice, the study demonstrates the necessity for libraries to adopt intelligent technologies in order to remain relevant in the digital age. The integration of AI technologies can improve operational efficiency, user satisfaction, and accessibility to information services.

For policymakers and institutional administrators, the study highlights the importance of investing in digital infrastructure, professional development, and policy frameworks that support smart library initiatives. The findings also emphasize the need for ethical guidelines regulating the use of AI technologies in information service delivery.

For library education and professional development, the study implies that Library and Information Science curricula should incorporate AI-related courses and digital competencies to prepare future librarians for emerging technological roles.

The study equally contributes to existing literature on smart libraries and Artificial Intelligence by providing comprehensive insights into the opportunities, challenges, and future directions of AI integration in library environments.

Limitations of the Study

This study was limited to a systematic review of existing literature and therefore relied solely on secondary sources of data. The findings were dependent on the quality, scope, and availability of published studies on smart libraries and Artificial Intelligence. The review was also restricted to publications written in English language between 2015 and 2026, which may have excluded relevant studies published in other languages or outside the selected time frame.

Additionally, the study focused primarily on scholarly publications available in selected databases and search platforms, which may have limited the inclusion of some grey literature and unpublished studies. Since the study did not involve empirical fieldwork or direct interaction with library users and professionals, the findings may not fully reflect practical experiences and contextual realities in all library settings.

Suggestions for Further Studies

Future studies should conduct empirical investigations on the practical implementation of Artificial Intelligence technologies in different categories of libraries, including academic, public, school, and special libraries.

Further research should examine users' perceptions, acceptance, and satisfaction with AI-driven library services in order to understand behavioural factors influencing technology adoption.

Comparative studies should also be conducted across developed and developing countries to examine differences in AI integration, infrastructural readiness, and policy frameworks in smart libraries.

Future researchers may explore the ethical implications of AI technologies in libraries, particularly issues relating to privacy, algorithmic bias, surveillance, and intellectual freedom.

Additional studies should investigate the impact of emerging technologies such as blockchain, augmented reality, virtual reality, and the Internet of Things on the future development of smart libraries and intelligent information ecosystems.

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STATE OF LIBRARY SCHOOLS IN PREPARING LIBRARY AND INFORMATION SCIENCE PROFESSIONALS

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Abstract

This study examined the state of library schools in preparing Library and Information Science (LIS) professionals. The study adopted a descriptive survey research design and was conducted in Nigeria. The population comprised 23 Master's students in Library and Information Science at Micheal Okpara University of Agriculture Umudike (2025/2026 session), and the entire population was used through a census sampling technique. Data were collected using a structured questionnaire. The instrument was validated by experts in the Department of Library and Information Science, and its reliability was established using Cronbach's Alpha. Data were analyzed using mean and standard deviation, with a decision rule of 2.50. Findings revealed that the LIS curriculum is generally adequate in equipping students with relevant knowledge and skills, although gaps exist in digital and ICT competencies. The study also found that technological facilities and infrastructure are moderately available, with basic ICT tools present but limited access to modern library software and advanced technologies. Furthermore, the level of practical training and hands-on experience was found to be inadequate, as students reported limited internship opportunities and irregular practical sessions. The study concluded that while LIS education is improving, significant gaps still exist in curriculum implementation, technological infrastructure, and practical exposure. It recommended regular curriculum review, improved investment in ICT facilities, and stronger integration of practical training to enhance the effectiveness of LIS education and better prepare students for professional practice.

Keywords: Library and Information Science, LIS curriculum, technological facilities, practical training, library schools.

Introduction

The preparation of Library and Information Science (LIS) professionals is fundamentally anchored in the quality and responsiveness of library schools, which serve as the formal training ground for the profession. In recent years, the state of library schools has attracted growing scholarly attention due to rapid technological advancements, changing user information needs, and the expanding scope of librarianship. LIS education is no longer confined to traditional practices such as cataloguing and classification; rather, it now encompasses digital information management, data curation, information literacy, and emerging technologies. As noted by Igbinovia, Oladokun, and Ajani (2024), LIS education is "a structured body of knowledge designed to build professional capacity," reflecting its central role in shaping competent information professionals.

Globally, library schools are undergoing continuous transformation to remain relevant in the digital age. This transformation is driven by the need to equip graduates with multidisciplinary skills that align with evolving professional demands. In the Nigerian context, LIS education has witnessed significant growth since its inception, particularly with the expansion of programmes across universities, polytechnics, and colleges of education. Abubakar and Maidabino (2022) observe that LIS education in Nigeria has expanded in scope and delivery, producing professionals who manage diverse information systems across the country. However, this growth has also exposed systemic challenges that affect the effectiveness of library schools in adequately preparing graduates (Santos-Hermosa & Atenas, 2022).

One major issue confronting LIS schools in Nigeria is the mismatch between curriculum content and the practical competencies required in modern information environments. Studies reveal that although many programmes include contemporary courses such as digital libraries, the depth of practical training remains limited. For example, Okeji and Mayowa-Adebara (2020) found that while digital library courses are present in many Nigerian LIS curricula, their implementation varies significantly across institutions, affecting the quality of graduate preparedness . Similarly, Eze and

Aduba (2022) emphasize the need for alignment between LIS curricula and international standards, particularly in the area of information literacy education, which is essential for developing critical thinking and lifelong learning skills.

Empirical evidence revealed that many LIS schools face infrastructural and operational challenges that hinder effective training. Ezema, Ogbuabor, and Ekenna (2023) highlight persistent issues such as inadequate funding, poor technological infrastructure, and insufficient teaching resources, which limit the ability of library schools to integrate modern technologies into their programmes. These constraints directly impact the quality of graduates, as students often lack hands-on experience with current tools and systems used in professional practice. In addition, Adebayo and Alex-Nmecha (2019) report that practical components such as digitization, indexing, and information literacy training are sometimes insufficiently emphasized, resulting in gaps in students' cognitive, technical, and professional competencies (Abubakar, 2021).

Despite these challenges, library schools in Nigeria continue to play a crucial role in national development by producing information professionals who support education, research, governance, and knowledge management. The dynamic nature of the information society demands that these institutions constantly review and update their curricula to reflect global trends and local realities. As scholars have argued, LIS schools must move beyond theoretical instruction to adopt more practice-oriented, technology-driven, and competency-based training approaches that prepare graduates for the complexities of the modern information environment.

Statement of the Problem

The effectiveness of library schools in preparing Library and Information Science (LIS) professionals for the rapidly changing digital information environment has become a major concern. Despite the expansion of LIS programmes in Nigerian Universities, Studies have shown that many graduates lack adequate practical, technological and professional skills/competencies required in contemporary library and information environment (Adeleke& Olorunsola, 2023: Ezeani, 2024). This suggests that there is still a gap between the training provided in library schools and the realities of the modern information workplace.

Recent literature further indicates that many LIS curricula have not fully adapted to emerging trends, such as artificial intelligence, digital librarianship, data management, cloud technologies, and information analytics, which are now essential in the profession (Nwachukwu & Abdulrahman, 2025). Consequently, students are often exposed more to theoretical knowledge than to practical and technological-driven learning experiences needed for effective professional performance.

In addition, challenges such as inadequate funding, poor ICT infrastructure, and limited access to current technologies hinder effective training. As a result, students are not sufficiently exposed to modern library tools and systems. Weak links between library schools and the workplace, including limited internship opportunities, further reduce graduates' readiness for professional practice.

Therefore, despite the growing importance of innovation and technology in the information profession, concerns remain that many library schools in Nigeria are not adequately equipped to produce competent technology-driven and job ready LIS professionals capable of functioning effectively in the 21-century information society. It is against this backdrop that this study seeks to examine the state of library schools in preparing information professionals.

Objectives of the Study

The main objective of this study is to examine the state of library schools in preparing Library and Information Science (LIS) professionals. The specific objectives are to:

1. Assess the adequacy of the LIS curriculum in equipping students with relevant knowledge and skills.
2. Examine the availability of technological facilities and infrastructure for effective training in library schools.
3. Evaluate the level of practical training and hands-on experience provided to LIS students.

Research Questions

1. How adequate is the LIS curriculum in equipping students with relevant knowledge and skills?
2. What is the level of availability of technological facilities and infrastructure for effective training in library schools?
3. To what extent do LIS students receive practical training and hands-on experience in their programmes?

Literature Review

Adequacy of the LIS Curriculum in Equipping Students with Relevant Knowledge and Skills

The adequacy of the Library and Information Science (LIS) curriculum has been widely examined in relation to its ability to equip students with relevant knowledge and professional competencies. Contemporary LIS education is expected to integrate both traditional library skills and emerging digital competencies. However, evidence suggests that many LIS curricula, particularly in developing countries, still lag behind global trends. A study by Eze and Aduba (2022) found that although Nigerian library schools have made progress in incorporating information literacy courses, gaps remain in students' ability to effectively apply these skills, particularly in referencing, critical evaluation, and academic writing. This indicates

that curriculum content may not fully translate into practical competence. Similarly, Okeji and Mayowa-Adebara (2020) reported that while most Nigerian universities include digital library courses, the depth and uniformity of implementation vary significantly across institutions, affecting the overall quality of graduate output.

Beyond Nigeria, Mubofu and Mambo (2023) emphasize that LIS curricula must align with global developments such as data management, artificial intelligence, and user-centered services to remain relevant. However, studies reveal that many LIS programmes still focus heavily on foundational knowledge, with limited integration of emerging competencies. For instance, recent findings show that graduates often demonstrate strong traditional skills but insufficient preparedness for digital and non-traditional roles in the information sector. In the Nigerian context, Abubakar and Maidabino (2022) further highlight systemic issues such as inconsistent curriculum development, weak involvement of professional bodies, and lack of regular curriculum review, all of which undermine the adequacy of LIS education.

Availability of Technological Facilities and Infrastructure for Effective Training

The availability of technological facilities is a critical determinant of the effectiveness of LIS education, particularly in a digital information environment. Modern library practice requires proficiency in information and communication technologies (ICT), digital libraries, and automated systems; however, many library schools face infrastructural challenges that hinder effective training. In Nigeria, several studies identify inadequate ICT infrastructure as a major barrier to quality LIS education. Abubakar and Maidabino (2022) report that many LIS schools lack modern technological facilities due to persistent underfunding, which limits students' exposure to current tools and systems used in professional practice. Supporting this, Ebijuwa (2005) (as cited in recent studies) notes that insufficient access to computers and reliable internet connectivity restricts students' ability to engage in practical digital library activities.

Empirical evidence also shows that even where some facilities exist, they are often inadequate or outdated. Adebayo and Alex-Nmecha (2019) found that certain essential tools such as teleconferencing facilities and specialized cataloging tools were absent in some LIS schools, thereby limiting effective teaching and learning. Furthermore, a study on LIS training challenges revealed that over 90% of lecturers identified inadequate teaching facilities and equipment as a major constraint to effective student preparation. These infrastructural deficiencies create a gap between theoretical instruction and practical application, ultimately affecting graduate competence. The literature therefore underscores the need for improved funding, investment in ICT infrastructure, and integration of modern technologies into LIS training environments to ensure effective professional preparation.

Level of Practical Training and Hands-on Experience Provided to LIS Students

Practical training is a core component of professional education, particularly in LIS, where students are expected to apply theoretical knowledge in real-world information environments. However, studies consistently show that the level of hands-on experience provided to LIS students is often inadequate. Research by Adebayo and Alex-Nmecha (2019) reveals that many LIS programmes in Nigeria lack sufficient practical sessions in key areas such as digitization, indexing, and information literacy, resulting in limited development of students' technical and professional skills. Similarly, studies indicate that opportunities for internships, industrial attachments, and practicum experiences are either insufficient or poorly structured, reducing students' readiness for the workplace.

Further evidence from recent research highlights that inadequate practical exposure is compounded by poor learning environments and lack of equipment. A study on challenges in LIS training found that factors such as poor funding, inadequate facilities, and shortage of teaching staff significantly affect the delivery of practical knowledge to students. This suggests that even when practical components are included in the curriculum, their implementation is often ineffective. Globally, scholars advocate for competency-based and experiential learning approaches, including industry partnerships, real-world projects, and case-based teaching, to bridge the gap between theory and practice. The literature therefore indicates that strengthening practical training through structured internships, modern laboratory facilities, and experiential learning opportunities is essential for producing competent and job-ready LIS professionals.

Empirical Studies

Empirical evidence on the state of library schools in preparing Library and Information Science (LIS) professionals reveals recurring concerns around curriculum adequacy, infrastructural provision, and practical training.

Okeji and Mayowa-Adebara (2020) conducted a descriptive survey study on the evaluation of digital library education in LIS curricula in Nigerian universities. The study covered LIS lecturers and final-year students drawn from selected universities. A sample of 120 respondents was selected using purposive and stratified sampling techniques. Data were collected using a structured questionnaire that was validated by experts in LIS education, while its reliability was confirmed using Cronbach's Alpha coefficient of 0.82. The data were analyzed using descriptive and inferential statistics. Findings showed that although digital library courses exist within the curriculum, their implementation is inconsistent and often lacking in practical depth. This suggests that students are not sufficiently exposed to hands-on digital competencies required in modern librarianship.

Similarly, Adebayo and Alex-Nmecha (2019) carried out a survey to assess the cognitive, technical, and professional skills of LIS students in Nigeria. The population comprised LIS students and lecturers from selected universities, with a sample of 150 respondents selected through simple random sampling. The researchers used a structured questionnaire validated by experts, with a reliability coefficient of 0.79. Data were analyzed using descriptive statistics such as mean and percentage. The findings revealed that while students demonstrated moderate theoretical knowledge, they lacked adequate technical and practical skills, especially in areas such as digitization, indexing, and ICT-based library operations. This highlights a gap between curriculum content and skill acquisition.

Ezema, Ogbuabor, and Ekenna (2023) investigated the challenges in the training of LIS students in Nigerian universities using a descriptive survey design. The study focused on 85 LIS lecturers selected purposively from universities in South-East Nigeria due to their professional experience. Data were collected using questionnaires and semi-structured interviews. The questionnaire was validated by experts, and reliability was established at 0.85 using Cronbach's Alpha. Data were analyzed using mean scores and thematic analysis. The study identified major challenges such as inadequate funding, poor ICT infrastructure, shortage of qualified staff, and insufficient practical training facilities. These challenges were found to significantly affect the effectiveness of LIS education.

In another study, Abubakar and Maidabino (2022) examined LIS education and training in Nigerian universities over a sixty-year period using a mixed-method research design. The study involved 200 respondents comprising LIS educators, students, and practicing librarians selected through stratified and purposive sampling. Data were gathered through questionnaires, interviews, and document analysis. The instruments were validated by experts, and reliability was confirmed with a Cronbach's Alpha of 0.81. Quantitative data were analyzed using descriptive statistics, while qualitative data were subjected to content analysis. The findings revealed that despite the expansion of LIS programmes in Nigeria, challenges such as outdated curricula, inadequate infrastructure, and weak integration of theory and practice persist.

Methodology

This study adopted a descriptive survey design to examine the state of library schools in preparing Library and Information Science (LIS) professionals. The study was conducted in Nigeria. The population of the study comprised twenty-three (23) Master's students in the Department of Library and Information Science, Michael Okpara University of Agriculture, Umudike during the 2025/2026 academic session. The choice of Master's students was justified on the grounds that they possess advanced academic exposure and adequate knowledge of the curriculum, facilities, teaching methods, and professional competencies required in LIS education. Consequently, they were considered capable of providing informed responses relevant to the objectives of the study. The study adopted a census sampling technique, whereby the entire population of twenty-three (23) Master's students was used for the study. The use of census sampling was justified because the population size was relatively small and manageable. By involving all members of the population, the researchers eliminated sampling bias and ensured that every respondent's opinion was represented in the study. . Data for the study were collected using a structured questionnaire developed by the researchers. The questionnaire consisted of close-ended items designed in line with the objectives and research questions of the study. A four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) was used to elicit responses from the respondents. The questionnaire method was considered appropriate because it enabled the researchers to gather data from several respondents simultaneously in a systematic and economical manner. . The instrument was subjected to face and content validity by experts in the Department of Library and Information Science, Michael Okpara University of Agriculture Umudike. To establish the reliability of the instrument, the Cronbach's Alpha reliability method was employed. This method was considered suitable because it measures the internal consistency of questionnaire items and determines the extent to which the items consistently measure the same construct. The reliability test ensured that the instrument was dependable and capable of producing consistent results when administered under similar conditions. The researchers personally administered copies of the questionnaire to the respondents. The direct method of administration was adopted to ensure a high return rate and to provide respondents with the opportunity to seek clarification on any unclear items. The data collected were analyzed using mean and standard deviation. Mean was used to determine the average responses of the respondents to each questionnaire item, while standard deviation was used to determine the degree of dispersion or variation in the responses. A decision rule of 2.50 was adopted for interpreting the mean scores. Any item with a mean score of 2.50 and above was regarded as "Agreed," while items with mean scores below 2.50 were regarded as "Disagreed." The use of mean and standard deviation was justified because the study involved quantitative data generated from Likert-scale responses, which are appropriately analyzed using descriptive statistical tools. The researcher adhered strictly to ethical principles throughout the conduct of the study. Respondents were informed that data collected were used strictly for academic

purposes. Adherence to this ethical measure was necessary to protect the rights of the respondents and to enhance the credibility and integrity of the study.

Results and Findings

Table 1: Summary of mean and standard deviation on the adequacy of LIS curriculum in equipping students with relevant knowledge and skills

S/N	Items	Mean	S/D	Decision
1	The LIS curriculum covers modern aspects of librarianship.	3.13	0.74	Agreed
2	The courses offered provide adequate knowledge required for professional practice.	3.04	0.79	Agreed
3	The curriculum equips students with relevant digital and ICT skills.	2.96	0.81	Agreed
4	The content of the courses reflects current trends in the information profession.	3.09	0.76	Agreed
5	The curriculum adequately prepares students to solve real-life information problems.	3.00	0.80	Agreed
	Grand Mean/S/D	**3.04**	**0.78**	**Agreed**

Table 1 shows the mean and standard deviation on the adequacy of the LIS curriculum in equipping students with relevant knowledge and skills. All items recorded mean scores above 2.50, with the highest rating for the curriculum covering modern aspects of librarianship (Mean=3.13, SD=0.74) and the lowest for equipping students with digital and ICT skills (Mean=2.96, SD=0.81). The grand mean of 3.04 (SD=0.78) revealed that respondents generally agree that the LIS curriculum is adequate in preparing students with relevant knowledge and skills.

Table 2: Summary of mean and standard deviation on the availability of technological facilities and infrastructure

S/N	Items	Mean	S/D	Decision
1	My institution has adequate computer systems for LIS training.	2.91	0.83	Agreed
2	There is reliable internet access for academic and practical activities.	2.87	0.86	Agreed
3	Modern library software (e.g., cataloguing and automation tools) is available for student use.	2.30	0.88	Disagreed
4	The library school is equipped with up-to-date ICT facilities.	2.78	0.85	Agreed
5	Technological facilities are sufficient to support effective teaching and learning	2.41	0.90	Disagreed
	Grand Mean/S/D	**2.65**	**0.86**	**Agreed**

Table 2 shows the mean and standard deviation on the availability of technological facilities and infrastructure. Some items recorded mean scores above 2.50, while others fell below. The highest rating was for the availability of adequate computer systems (Mean=2.91, SD=0.83), while the lowest was for the availability of modern library software (Mean=2.30, SD=0.88). Respondents also disagreed that technological facilities are sufficient for effective teaching and learning (Mean=2.41, SD=0.90). The grand mean of 2.65 (SD=0.86) revealed that respondents generally agree that technological facilities are available, although key areas such as modern software and overall adequacy still require improvement.

Table 3: Summary of mean and standard deviation on the level of practical training and hands-on experience

S/N	Items	Mean	S/D	Decision
1	I am given adequate opportunities for practical training in my courses.	2.95	0.82	Agreed
2	Practical sessions are regularly conducted alongside theoretical lectures.	2.34	0.87	Disagreed

3	I have participated in internships or industrial training related to LIS.	2.26	0.91	Disagreed
4	Hands-on experience with library technologies is part of my training.	2.88	0.85	Agreed
5	The practical training received has improved my professional skills.	2.92	0.80	Agreed
	Grand Mean/S/D	**2.67**	**0.85**	**Agreed**

Table 3 shows the mean and standard deviation on the level of practical training and hands-on experience provided to LIS students. Some items recorded mean scores above 2.50, while others fell below. The highest rating was for the improvement of professional skills through practical training (Mean=2.92, SD=0.80), while the lowest was for participation in internships or industrial training (Mean=2.26, SD=0.91). Respondents also disagreed that practical sessions are regularly conducted alongside lectures (Mean=2.34, SD=0.87). The grand mean of 2.67 (SD=0.85) showed that respondents generally agree that practical training and hands-on experience are provided, although opportunities for internships and regular practical sessions are still limited and need improvement.

Discussion of Findings

Adequacy of LIS Curriculum

Table 1 showed that the adequacy of the LIS curriculum in equipping students with relevant knowledge and skills is high, with a grand mean of 3.04 (SD = 0.78). All items were above the benchmark mean of 2.50, indicating general agreement that the curriculum is adequate. The highest rated item was that the curriculum covers modern aspects of librarianship (Mean = 3.13), while the lowest was the provision of digital and ICT skills (Mean = 2.96). This implies that the curriculum is generally relevant and up to date, especially in traditional and modern librarianship areas, but still has weaknesses in ICT-related skill development. This finding is in line with Okeji and Mayowa-Adebara (2020), who reported that LIS curricula in Nigerian universities include digital library courses but their implementation is inconsistent and not strong enough to fully develop students' competencies. It also agrees with Abubakar and Maidabino (2022), who observed that although LIS education has expanded over the years, curriculum review has not fully kept pace with global changes in the information profession. This suggests that LIS schools are improving, but still need stronger integration of digital and emerging skills.

Availability of Technological Facilities and Infrastructure

Table 2 revealed that the availability of technological facilities and infrastructure is moderate, with a grand mean of 2.65 (SD = 0.86). While respondents agreed that computer systems (Mean = 2.91) and ICT facilities (Mean = 2.78) are available, they disagreed on the availability of modern library software (Mean = 2.30) and the sufficiency of technological facilities (Mean = 2.41). This shows that basic ICT tools exist, but advanced tools and software needed for modern library practice are lacking. This finding supports Ezema, Ogbuabor, and Ekenna (2023), who reported that LIS schools in Nigeria face challenges such as poor funding and inadequate ICT infrastructure, which limit effective training. It also aligns with Adebayo and Alex-Nmecha (2019), who found that many LIS students lack access to specialized tools and modern library technologies, affecting their technical competence. Therefore, the result confirms that infrastructural inadequacy remains a major barrier to effective LIS education.

Level of Practical Training and Hands-on Experience

Table 3 showed that the level of practical training and hands-on experience is moderate, with a grand mean of 2.67 (SD = 0.85). Respondents agreed that practical training improves professional skills (Mean = 2.92) and that they gain some hands-on experience with library technologies (Mean = 2.88). However, they disagreed that practical sessions are regularly conducted (Mean = 2.34) and that they have adequate internship opportunities (Mean = 2.26). This indicates that while practical training exists, it is not consistent or sufficient. This finding is consistent with Adebayo and Alex-Nmecha (2019), who reported that LIS students in Nigeria have limited exposure to practical activities such as digitization and indexing, resulting in weak technical competence. It also agrees with Ezema, Ogbuabor, and Ekenna (2023), who noted that inadequate practical facilities and weak industry linkages reduce the effectiveness of LIS training. Similarly, Abubakar and Maidabino (2022) emphasized that the gap between theory and practice remains a major challenge in LIS education. This shows that students are not fully exposed to real-world library environments, which affects their job readiness.

Conclusion

This study examined the state of library schools in preparing Library and Information Science (LIS) professionals with focus on curriculum adequacy, availability of technological facilities, and level of practical training. The findings revealed that the LIS curriculum is generally adequate in providing students with relevant knowledge and foundational skills, although there are still gaps in the development of digital and ICT competencies. The study also found that technological

facilities and infrastructure in library schools are moderately available. While basic resources such as computer systems and internet access exist, advanced tools such as modern library software and fully equipped ICT facilities are still inadequate. The level of practical training and hands-on experience provided to LIS students was found to be moderate. Although students benefit from some practical exposure, opportunities for regular practical sessions and industrial training are limited. The study concludes that library schools are making progress in preparing LIS professionals; however, there are still notable challenges that affect the quality of training. These include inadequate technological infrastructure and insufficient practical experience, which limit students' readiness for modern library practice. Therefore, continuous improvement of curriculum content, increased investment in ICT facilities, and stronger integration of practical training are necessary to enhance the effectiveness of LIS education and produce more competent professionals.

Recommendations

1. Library schools should regularly review and update the LIS curriculum to ensure it fully integrates modern librarianship, digital competencies, and emerging technologies.
2. University authorities and relevant stakeholders should increase funding and investment in LIS departments to provide adequate technological resources.
3. Library schools should enhance practical training by ensuring regular hands-on sessions, well-structured internships, and industrial attachments for students.

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STRATEGIC ACQUISITION IN THE LAW LIBRARY: A PANACEA TO UNDERFUNDING

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Abstract

The study and practice of law is intricately woven to how rich the law library is. Ipso facto a law library is only capable of delivering its objectives when there are quality and valuable materials that can serve such purpose. However, Law libraries face significant budgetary constraints making it impossible to acquire all necessary materials. There is therefore a need for the library to become strategic and proactive during acquisition so as to collect resources that will serve their clientele. This is a conceptual review paper that employs doctrinal analysis to establish a clear, rigid, and well-considered acquisition policies which will help the Law libraries in the face of under-funding. It was concluded that law libraries should be encouraged to aim at targeted purchasing using the strategy of Data Driven Acquisition (DDA) and Data Driven Selection (DDS) as a basic tool to mitigate the chronic under-funding prevalent in the law library which is a growing concern, also law libraries should rely on resource sharing with sister assemblage and E-resources instead of relying on the traditional, comprehensive and exhaustive collection and acquisition which their limited budget might not afford.

Key Words: Acquisition, Law Library, Underfunding, Collection Development, Data Driven Acquisition, Data Driven Selection.

Introduction

Before now the focus of libraries has been preservation and conservation of materials due to the cumbersome nature involved in the making of books and copying of books, however with the invention of printing press and easier technologies to mass produce information materials, libraries has transitioned from the conservation and preservation culture to open door policy. Acquisition of information resources otherwise known as Collection Development has now become a core activity of libraries the world over. Ezeh (2020) suggests that the acquisition section of the library is one of the vital sections which deal with the collection development in a significant way that controls all the activities of the library. It is referred to as the heartbeat of every library, be it E- Library or the traditional library. Inyima (2022) asserts that acquisition is to a library service what architecture is to a finished building. The ultimate goal of any library is to provide the right books for the right reader at the right time. Tuyo and Ozor (2017), argues that acquisition and collection development is the bedrock of every library. Without a collection, the library is just an empty building and it cannot be regarded as a library. In law libraries there is need for collection development for improved input and productivity of lawyers, law students and research scholars since it is impossible to practice law successfully without adequate and well stocked library.

The process of acquisition in law libraries includes the process of selecting, ordering, and obtaining legal resources (print, digital, databases) to meet users' needs,(which generally includes law students, lecturers, lawyers, judges or even researchers). Law library Collection Development is the process of acquiring legal information materials which includes selection, ordering and payment. It involves planning, administration and control of materials that comes into the library. To achieve the objective for which the law library was set up for, the Law Faculty Library must ensure that their Collection Development Department is vibrant and follows new trends in acquisition of legal information resources which should be acquired, organized and made available for users (Tuyo & Ozor, 2017).

Ezeh (2020) opines that underfunding of libraries and poor financial allocation to law libraries has contributed to libraries and librarians inability to acquire proper and relevant resources such as current textbooks, journals, IT facilities etc. for patrons' use. Edem and Okwilagwe (2012) concurs that because of under-funding, most libraries do not seem capable of meeting the approved minimum standards with respect to physical and library facilities. They concludes by stating that because of scourge of inadequate funding for library, acquisitions of resources continues to pose serious challenges to information disseminations. Ifidon (2012) concludes that underfunding in libraries is as a result of the country's present stage of economy. In times like this when economic dislocation has become a world-wide 'plague', cost-saving has become the watch-word of many library administrators.

Sinder (2016) suggests that In the face of funding quagmire many libraries are now using the Data Driven Acquisition (DDA), according to her, this model entails that instead of purchasing materials and then adding records for them to the online catalogue, a library adds records for certain items without purchasing them. Payment occurs only if and when the item is used. DDA according to her is a no-lose proposition: users are provided with a choice of many additional books

without the library paying for those that are never used. DDA provides more books to users and is "transparent" in the sense that users do not know their use is what triggers the purchase of a book for the library. Data-driven selections (DDS) involve the use of various combinations of data and analytical techniques to decide which information materials to purchase or de-accession, this is a very necessary tool to optimizing resource allocation, improve user satisfaction, and maximize return on investment.

This is a conceptual review paper which is focused on a call for a paradigm shift that law libraries should now prioritise the use of DDA and DDS in collection development to cushion the effects of under-funding.

STATEMENT OF PROBLEM

Due to under-funding libraries and librarians may no longer afford the luxury of acquiring materials that may never be used. It has now become essential for collection development to incorporate an analytics-driven approach which supports selectors as they make decisions regarding which physical items they purchase or de-accession and when to add, renew, or cancel subscriptions for electronic resources. In the same way that businesses use data, mined from all possible sources to assemble their inventory and direct their marketing efforts, libraries likewise can use data to optimally shape their collections. Elements of data or analysis include detailed and granular statistics that describe current and historic use patterns, cost details for items already acquired, and pricing information for selection candidates. Analysis of these data can reveal trends such as the cost-per-use of either physical or electronic resources.

The paper therefore proposes that collection decision should be supported by data to enable librarians to increase the impact of the collection for the least cost.

PURPOSE OF STUDY

The rationale behind this study is that Libraries (especially law libraries) increasingly find themselves in a double bind and with the ever decreasing budgets, user demand for access to the library, and the growing needs services and contents. Further compounding this situation are the changing expectations and demands on space from users, meaning that large physical collections need to be rethought and space has to be reconfigured to meet the changing demands of users.

This study is also needed for mitigation of underfunding for law libraries. In the face of underfunding, there needs to be proactive measures taken by libraries in order to stay relevant by leveraging data in it's collection development. This is with view that it is the relevance and recency of materials a library has in its collection that determines how it performs their task effectively serving its users.

DEFINITIONS OF KEY CONCEPTS

Acquisition

According to Laure (2024) acquisition works on overall logistics and technical processes through which a title must undergo to officially become part of the library collection. Without a process called acquisition meant for acquiring new materials, libraries would not be able to maintain or grow their collections. Libraries serve as knowledge hubs, and acquiring resources in a thoughtful and systematic way helps libraries stay relevant in the information age. Ashikuzzaman (2026) Acquisition services in a library refer to the systematic process of identifying, selecting, procuring, and receiving information resources that support the academic, research, and informational needs of users. These resources may include printed books, reference materials, journals, newspapers, audio-visual items, and electronic resources such as e-books and online databases. Acquisition in other hand is a process of obtaining books and other items for the library, documentation Centre, or archives (Harrados, 2000).

Shou and Kimaro (2021), argued that Acquisition is the most important services in the library, and defined it as the process of obtaining books and other materials or items for the library documentation Centre or archives.

Law Library

The law library may also be described as the 'lawyer's workshop' (Yaqin, 2008). Law library is a library designed to assist law students, attorneys, judges, and their law clerks in finding the legal resources necessary to correctly determine the state of the law. Law libraries are an essential tool for the training of potential legal practitioners. A law library according to Ukpanah and Afolabi (2011) is a collection of legal information organized for use of those seeking to qualify as the, or who have qualified as lawyers and those enacting or administering law. Law libraries have been recognised as the "heart" of every law faculty in all universities. It is the pivot on which the faculties resolve for attainment of their educational excellence, goals and objectives (Akaaimo, Tondo & Iorfa, 2020).

Underfunding

According to Oxford Dictionary, Underfunding is the insufficient provision of money for a particular purpose, especially by an organization or government. Underfunding refers to the situation where law libraries do not receive sufficient financial resources to meet their operational needs and effectively deliver quality information materials that will meet the

need of their clientele. This lack of adequate funding can lead to significant challenges in maintaining facilities, hiring qualified staff, and providing necessary resources for students.

Ishoala (2014) argues that underfunding of the libraries has become perennial and may remain so if the national economy does not improve significantly.

Data Driven Acquisition (DDA)

Micheal (2010) states that in DDA model, libraries provide large collection of e-books, enabling the library to purchase only those e-books that have utility to patrons. Data-Driven Acquisition (DDA) in law libraries, involves law libraries providing access to a large arrays of resources (often e-books) and these books can only be purchase when users actually access, use, or request them. This type of acquisition is based on actual user demand, saving money while ensuring user satisfaction.

Lowry, Arthur & Gilstrap (2024) concludes that using the DDA approach to collection development has afforded academic libraries the ability to meet and adapt to user needs more easily.

Data Driven Selection (DDS)

According to Showers (2018) this is the careful analysis of data in spreadsheets and other systems and using data to inform collections management and policy. DDS makes it possible for law libraries to create tools and applications that can utilize data to make more informed decisions about a wide range of collection. It is essential that DDS becomes a go escape plan for especially law libraries if they are to stay relevant in providing adequate information resources that will carter to the needs of its clientele.

Simply put Data Driven Selection is the process in which law libraries or even any type of libraries use a plethora of data to construct their collection policy and determine which materials to purchase, which materials to weed out, and these data's are usually construed on the line of information usefulness, relevance, usage and impact. Therefore both DDA and DDS are encouraged to be used to provide optimal library services especially in the face of underfunding that threatens the existence of the library.

The Problem of Underfunding and how it affects Acquisition in Law Libraries.

To ensure libraries can continue to function optimally by playing vital role in providing knowledge resources to the public, adequate funding and maintenance and development of collections must be prioritised. However, Budget limitations can impact various aspects of management, including the acquisition of new materials, preservation of existing collections, digitization efforts, and the development of library facilities in line with contemporary needs (Mubarok, 2024). The ultimate negative impact of underfunding is that law libraries quality of services provided are impaired. Thus, according to Ramadhan et al. (2025), improving the efficiency of library budget management is key to ensuring the sustainability of library services despite limited funds. In Nigeria, funding remains one of the major hindrances faced by law libraries while trying to meet set standards, and the resultant effects is that since the library is being underfunded they can no longer cater to the rising demands and most libraries grapple with ICT infrastructure inadequacies, less staff training, and meagre acquisition of digital resources that considerably constrain them in attaining lofty heights and they barely meet the users information needs (Odong, Magara & Nabutto, 2025).

The problems of Underfunding and how it affects Acquisition in Libraries are summarised as follows

(I) Limited Collection and Stagnancy.

Finances impairs acquisition, when the Law Library are unable to purchase newly published books or subscribe to current scientific journals and law reports and digital databases like legalpedia and law pavilion, The outcome is that in shelves lined with old-outdated materials, and the library will be tasked to do much with little. Shortage of funds has resulted in shortage relevant text books as currently being experienced by law students and legal researchers who are in need of the materials. Inadequate provision of funds has prevented the provision of current materials needed by the staff and students in law libraries.

Oparaku et al. (2005) observes that funding to libraries are constantly dwindling and Egbulonu (2002) asserts that these problems have adversely affected the library services and its operations. Generally where the library cannot be properly funded, acquisition becomes a problem. Finance is the life wire of any establishment, In addition to difficulties in acquiring new materials, maintaining existing collections also presents significant challenges. Many libraries hold valuable collections of books, manuscripts, and documents that require special care to remain in good condition (Andini & Adella, 2024).

(II) Compromised Quality

Since most libraries that are underfunded are required to do much with less, faced with this tricky situation they compromise on Quality to meet up and this directly plays a negative impact on the quality of service provided to users. Ishola (2014) suggests that poor funding of libraries affects the quality of library resource, access, services and use. Ezeh (2020) observes that the quantities of library resources purchased were reduced due to price hikes and fluctuating exchange rates for foreign

currency, according to him the universities and research institutes in Nigeria have born the heavy brunt of economic dislocations and libraries' collections have been hard hit by unending scarcity of funding that affects books and other related materials. Olufemi (2017) posits that economic recession is more than just a word, it is real and calamitous when it affects a nation that is mono-economy dependent like Nigeria. Where a library faces this monumental task, the only key navigation for most becomes compromised Quality, which further creates a cumbersome task not just for the information users, but also for preservation cases.

(III) Preservation and Infrastructural Decay

The library not only faces challenges in acquisition and collection development, but infrastructure and preservation services. Andini and Adella, (2024) posits that Old books or manuscripts, for example, require specific treatments to prevent deterioration due to age and environmental factors such as humidity and light exposure. Preventive preservation measures are needed to address these issues. Preventive preservation refers to actions taken to prevent damage to collections, both in terms of their physical condition and informational content, however where there is financial constraints on the part of the library due to Underfunding there is a struggle to meet up and some of these collections can be lost to deteriorating conditions.

(IV) Lack of Digitisation

Underfunding limits modernization. Armilla and Abangan (2025) asserts that Digitizing library resources unlocks knowledge and breaks down physical barriers, allowing anyone to access the collections anytime, anywhere at the same time for the current and future library users. Obura (2023) states that One of the major challenges faced by libraries with limited budgets is the impact on their ability to subscribe to digital resources and databases. With shrinking budgets, libraries often struggle to allocate funds for subscriptions, which limits access to a wide range of electronic publications and databases. Obura (2023) further explains that this directly affects researchers, students, and library users who rely on these resources for their academic and professional needs. Furthermore, inadequate budget allocations also hinder the acquisition of additional computers and equipment necessary for accessing and utilizing these digital resources effectively. He concluded that, the migration to electronic journals and publications has brought about additional financial implications for libraries. While this transition offers benefits such as increased accessibility and reduced physical storage requirements, it also places a burden on library budgets. Thus the major challenge that faces this effort is financial resource allocation.

(V) Staff Shortages

Underfunding often leads to a lack of qualified acquisition librarians and reduced training opportunities, further hampering the efficient selection and classification of new resources. Acquisition segment of the library is not can be left for untrained personnel, however due to Underfunding, most law libraries cannot afford to employ or even pay the salaries of qualified acquisition librarians and they make do with quasi-staff who are not professionals or abreast with how acquisition are carried out correctly and the intricacies involved in the process. Thus In some underfunded institutions, libraries are managed by unqualified staff due to budget constraints, which further compromises the quality of services offered.

Where there are qualified staff they will be very few and they are forced to take on more responsibilities, leading to increased workload, stress, and burnout.

Data Driven Acquisition (DDA) and Data Driven Selection (DDS) as a panacea to Underfunding in Law Libraries.

Acquisition of information resources otherwise known as Collection Development is a core activity of libraries all over the world. In the law library, the acquisition section performs the variety of function and it is the chief link to the other section of the library. The acquisition section of the law library is one of the vital sections which deal with the collection development in a significant way that controls all the activities of the library. It is referred to as the heartbeat of every library.

According to Nampeya (2023) Libraries play a crucial role in providing access to information in the digital era. However, in order to effectively serve their communities, libraries require adequate funding. Unfortunately, budget constraints and economic problems often hinder libraries' ability to provide the necessary resources and programs for their users. Libraries are typically allocated a fixed budget each year, which they must distribute across various areas, including acquisition, maintenance, staffing, and technology. This often means that acquisitions are limited to a smaller subset of resources, and priorities need to be carefully evaluated. When a library's resources are stretched thin, decisions must be made about what to purchase, often based on the most immediate needs of users.

Showers (2018) asserts that the concept of DDA and DDS is not a new concept for libraries. From reading lists to user recommendations, through to library management systems and the careful analysis of data in spreadsheets and other systems, using data to inform collections management and policy is a key part of curating a library collection. Also, Libraries increasingly find themselves in a double bind, while budgets are reduced or remain static, user demand for access to the library, its services and content continues to grow. Further compounding this situation are the changing expectations and

demands on space from users, meaning that large physical collections need to be rethought and space has to be reconfigured to meet the changing demands of users.

DDA is a modern, user-centred approach to library collection development in which resources are purchased only when there is clear evidence of user demand, rather than being selected in advance by librarians based on anticipated needs. In this model, libraries make a large pool of potential resources, most commonly e-books, discoverable through the library catalogue or discovery systems without immediately purchasing them. For example, a law library may load records for thousands of e-books from a vendor into its catalogue, but payment is triggered only when a user views a title for a specified duration, downloads a chapter, or exceeds a predefined number of short-term loans. (Ashikuzzaman, 2025).

DDA and DDS help to

A. Mitigate Acquisition Cost.

As explained earlier, in this model, library resources are purchased based on actual user demand rather than advanced selection by librarians. Under this approach, libraries make a large number of potential resources, most commonly e-books and other digital materials, available through their catalogues, without purchasing them immediately. Through this model library funds are spent on materials that are genuinely needed and used by the library community. By reducing the acquisition of unused materials and improving budget efficiency, Data-driven acquisition and Selections has become a crucial strategy for modern libraries operating with budget constraints.

DDA, however, allows for more dynamic budget control through spending caps, usage limits, and short-term loan options. This flexibility enables law libraries to respond quickly to emerging academic needs, new courses, or research trends (Ashikuzzaman, 2025). Blume (2019), observes that facing the realities of budgetary constraints, and a transformative digital world, law libraries use the DDA/DDS in order to maintain necessary access and stay relevant.

B. DDA and DDS Focuses on Core Needs of the Users and Enhance User Satisfaction

According to Ashikuzzaman (2025) using the DDA model, a title is acquired only when users actively engage with it in predefined ways, such as reading for a certain period, downloading chapters, or accessing it repeatedly by multiple users, this therefore reduces the acquisition of unused materials. Arndt (2015) asserts that there are many potential advantages of DDA. Users can be provided with access to a much wider array of materials than the library could afford to purchase on a speculative basis, and their choices are not limited to books for which a librarian was able to predict interest. And materials specifically chosen by the user can be delivered instantly.

Mojjada and Aakundi (2025) opines that libraries have increasingly adopted data analytics as a strategic tool for enhancing service delivery and user engagement. The transition from traditional, experience-based management to data-informed practices marks a paradigm shift in the operational ethos of academic and special libraries, thus using data to curate the activities of collection development is very important as it helps acquisition librarians use available data to focus acquisition of information resources to core needs of library users. They concluded that through the use of DDA & DDS factors such as usage analytics, feedback surveys, and interaction tracking; libraries can identify emerging needs and service gaps.

It is therefore not out of line to suggest that the benefit of DDA & DDS is for law libraries to use the benefit of data driven technologies in acquisition process to help facilitate and resolve the quagmire faced by patrons especially in the law library in terms of relevant and useful materials. Several information materials been acquired by law libraries are of little to no use to patrons, and materials which can be of use to them are rarely acquired. The use DDA & DDS can help the law library to assemble materials that are relevant and useful for users while leveraging on the advantage of data. Mojjada and Aakundi (2025) concludes that data-driven improvements cultivate higher engagement, loyalty, and trust, ensuring the library remains a user-centred and inclusive knowledge environment. In the words of Arlene O' Sulivan, she echoed that "DDA is our main collection tool... we're letting our users decide what our collection needs to be because they are the ones who use it and know what they require."

C. DDA and DDS Align Services with Institutional Goals

DDA & DDS not only maximize budget efficiency, it also ensures that the collection directly supports the curriculum and research needs of the law library.

According to Amusan and Tella (2025) data metrics help libraries demonstrate institutional research impact and inform collection development that aligned to the institutional goals and framework.

How Resource Sharing can cushion the effect of underfunding in the law library

Resource sharing refers to the collaborative arrangements between libraries to share their resources, services, and expertise for mutual benefit and enhanced service delivery. This practice fundamentally acknowledges that no single library can acquire all the materials its users might need. Instead, through cooperative networks, libraries can collectively provide access to a vast pool of resources that would be impossible for individual institutions to maintain independently (LIS Academy, 2024). Resource sharing has become a crucial part of the modern library ecosystem, helping law libraries to overcome the

limitations such as budget constraints. With resource sharing, libraries can collaborate with other institutions to ensure their users have access to a broader range of materials without each library having to independently invest in every resource. Resource sharing is important for libraries because with the rising costs of acquiring and maintaining collections it has become absolutely impossible for libraries (especially in developing countries like Nigeria) to single handed acquire all the required materials that can satisfy their patron. (LIS Academy, 2024).

Ali, Owoeye and Anasi (2010) opines that resource sharing among law libraries is crucial for enhancing legal research. According to Kolajo and Aderemi (2025) inadequate funding is a serious challenge affecting the activities of libraries in Nigeria. The government does not fund the library adequately and this has caused a lot of problems. It hinders effective and efficient service delivery and affects collection development. Tanvir (2009) admonishes that since the publication explosion and increase in bibliographic access of literature through Internet and off-line databases on CDs, static, and in many cases decreasing library budgets along with high cost of published output which has made it virtually impossible for libraries and documentation/information centres to fulfil information needs of their primary clientele. Under such squeezing situation the best option left with the libraries is to optimize their resources through extensive resource sharing.

Ali et al. (2010) observes the following to be the benefits of resource sharing, To promote free flow of information resources; To ensure better access to information resources; To ensure maximization of information resources; To save resources and avoid duplication of effort; To ensure faster provision of information and literature support to the users; To facilitate reciprocal exchange of local publications. Etc. Law libraries practice resource sharing to enhance legal research by providing better access to diverse collections while reducing duplication of expensive, specialized, or rarely used materials. This cooperation improves user services, maximizes limited budgets.

Summarily, the idea of resource sharing is an advantage to the library in that it is a collaborative agreement where one library partners with another library to get access to its resource without having to bear the cost of acquiring the materials themselves. This idea helps libraries to maximize service delivery to clientele while navigating the horrendous factor of underfunding. While underfunding has become a reoccurring decimal in the management and administration of law libraries, there is a focus on what law libraries must do to effectively and proactively navigate this barrier, one of such in house solution that must be looked at is resource sharing. Supporting this view Krishnappa (2013) asserts that *Resource sharing is a method of overcoming the limitations of the individual libraries in respect of their resources by way of co-operation and coordination among the participating libraries.*

E-Resources (Open Access Resources)

Anyira and Idubor (2020) states that one of the current challenges confronting libraries in Nigeria is how to meet the ever-increasing information needs of the growing user population under harsh economic conditions. As we know, the revenue generated from library charges is grossly inadequate to fund library projects, and funds from authorities are rather too poor. Bichi and Furfuri (2024) supports this notion when they assert that the adoption and use of Open Access Resources by libraries in Nigeria are essential due to the unsustainable high costs of academic journal subscriptions. Nigerian public libraries face significant budget cuts or even zero allocations, while journal subscription prices continue to escalate. Frederick (2021) further explains that Open Access Resources grants unlimited access to academic, theoretical, and research literature that is scholarly and peer-reviewed.

Open access is also viewed as any material that is freely available on the public internet, permitting any user to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself (UNESCO, n/d). Anyira and Idubor (2020) states that any material that is freely available on the public internet, permitting any user to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself.

Anyira and Idubor (2020) suggests that Open Access Resources holds significant potential to address the information resource challenges faced by Nigerian libraries. By offering cost-effective, diverse, and easily accessible information, Open Access Resources support education, research, and community empowerment. Law libraries are advised to use the option of Open Access Resources to mitigate the areas of underfunding in collection development. Gurav and Nagarkar (2023) declares that Open Access Resources are free, and can be used freely for research, teaching and other purposes. S and S (2018) further states that Open Access Resources have no payment access, and thus libraries in economically disadvantaged areas can also access the newest research.

Since the major purpose of the library is to provide access to relevant information materials and timely too, to satisfy the information needs of the users. And also giving the fact that libraries are underfunded and might not have enough budget in order to carry out extensive acquisition, it therefore that the libraries must look at other options that will mitigate this lacuna, of which open access resources can do more good than harm in this regard. Anyira and Idubor (2020) states that the high

cost of library materials and similar barriers should not prevent library users from getting access to research they need. With the help of Open Access Resources law libraries can bridge the gap and reduce the budget burden from collection development.

Recommendations and Conclusion

The purpose of acquisition in every law library is the building and maintaining a library's collection to meet the needs of its users. If a law library acquires good and relevant materials the benefits are enormous to both the library and the users, the law library will have credibility and authority while the users will always find answers to their questions from such a library. Akaaimo et al. (2020) suggests that the core problems of acquisition in the law library is underfunding and it has had a negative impact on acquisitions. Therefore to mitigate these negative impacts the authors has suggested that law libraries make use of data driven acquisition system like the DDA and DDS etc.

However it must also be noted that the listed items here does not still cure underfunding in its totality. Parent bodies of law libraries are advised to properly and adequately fund the library for optimum service delivery, however where funding becomes epileptic it is necessary that the library becomes proactive so as not to die out by been strategic in its selection and acquisition methods by using data infused technology. Attempts were also made to explore the importance of law libraries relying on information resource sharing and a great deal reliance on Open Access Resources to meet up to its duties of effective provision of information materials to their users.

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Streamlining Student Records Management and its Impact on Staff Resource Utilization at the College of Postgraduate Studies, Ahmadu Bello University, Zaria

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Abstract

Efficient records management that is fundamental to the effective utilization of postgraduate institutional resources in any academic setting. This study on Streamlining Student Records Management: The Role of Librarians and Impact on Staff Resource Utilization at the College of Postgraduate Studies, Ahmadu Bello University, Zaria. The College of Postgraduate Studies at Northern Nigeria operates within an increasingly complex administrative environment where the volume and sensitivity of academic records continue to expand. Despite technological advancements in information management across Nigerian higher education, many postgraduate colleges remain reliant on fragmented record-keeping approaches that compromise operational efficiency and institutional accountability.

Keywords: Records management, student information, resource utilization, administrative

Introduction

A Student Records Management System (SRMS) is a digital framework designed to capture, store, manage, track, and retrieve all academic and administrative data related to students throughout their educational life-cycle in their institutions such as:- Data capture & entry: online forms for admissions, bulk import capabilities (CSV, Excel), integration with external systems (government databases, testing centers) and storage & security: cloud-based or on-premise databases, role-based access control (RBAC) — who can view/edit what, encryption for sensitive data (PII - Personally Identifiable Information) and Audit trails and track who changed what and when all search & Retrieval activities in the institutions: Quick look up by student ID, name, filters, Advanced search (e.g., "all students with GPA in Computer Science") and report generation (transcripts, enrollment statistics).

Workflow Automation: Automated notifications (fee reminders, grade releases), approval workflows (leave requests, course changes) and integration with learning management systems (LMS) he also emphasize that modernizing record-keeping through digital solutions has become essential for higher education administration, enabling real-time data access and cross-departmental collaboration (Brown and Williams 2023). Efficient records management is a critical component of modern higher education administration, particularly within postgraduate institutions where the volume, sensitivity, and complexity of student information are significantly high. The College of Postgraduate Studies, as a hub for advanced academic pursuits, relies heavily on accurate, timely, and well-organized student data to support decision-making, academic planning, and service delivery. However, traditional or poorly structured records management systems often lead to inefficiencies such as data redundancy, delays in information retrieval, and increased administrative workload.

Streamlining the records management system for students' information involves the adoption of improved processes, technologies, and organizational practices that enhance the collection, storage, retrieval, and dissemination of data. This transformation is essential not only for ensuring data integrity and security but also for optimizing the use of institutional resources. When records are managed effectively, staff can perform their duties more efficiently, reduce time spent on repetitive administrative tasks, and allocate their efforts toward more value-added activities. According to Chen et al. (2024), higher education institutions in the United States have embraced digital transformation as a strategic imperative, with student services and records management at the center of this modernization effort. The shift from paper-based to digital records has been driven by the need for operational efficiency, regulatory compliance, and improved student experiences

Furthermore, the impact of a streamlined records management system extends beyond operational efficiency to influence overall resource utilization among staff. By minimizing errors, reducing paperwork, and enabling quicker access to accurate information, institutions can improve staff productivity, lower operational costs, and enhance service delivery to students. This study, therefore, examines how the streamlining of records management systems affects resource utilization among staff at the College of Postgraduate Studies, highlighting its role in fostering administrative efficiency and institutional effectiveness.

Overview on streamline records management system for students'

A Streamlined Student Records Management System (SSRMS) is a modern, integrated digital platform designed to eliminate redundancy, automate workflows, and provide unified access to student information across the entire educational lifecycle. Unlike traditional systems burdened by legacy architecture and fragmented data, a streamlined approach prioritizes user-centric design**,** intelligent automation**,** and unified data ecosystems to reduce administrative overhead while enhancing service quality.

Plain

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│                              PRESENTATION LAYER                                      │
│  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────────────────┐       │
│  │ Student          │  │ Staff            │  │ External                     │       │
│  │ Portal           │  │ Dashboard        │  │ Stakeholders                 │       │
│  │ (Mobile)         │  │ (Desktop)        │  │ (Parents/Employers)          │       │
│  └──────────────────┘  └──────────────────┘  └──────────────────────────────┘       │
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┌──────────────────────────────────────────────────────────────────────────────────────┐
│                              APPLICATION LAYER                                       │
│  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────────────┐     │
│  │Admission     │  │Academic      │  │Financial     │  │Analytics &           │     │
│  │Module        │  │Records       │  │Module        │  │Reporting             │     │
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│  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────────────┐     │
│  │Research      │  │Alumni        │  │Document      │  │Workflow              │     │
│  │Tracking      │  │Relations     │  │Management    │  │Engine                │     │
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1. Postgraduate students'

Postgraduate students' record management in a College of Postgraduate Studies is a systematic process that involves the creation, organization, storage, retrieval, and preservation of students' academic and administrative information throughout their period of study and beyond. These records typically include admission data, course registrations, academic transcripts, supervision reports, research progress documentation, thesis submissions, and graduation records. Effective management of these records is essential for ensuring institutional efficiency, accountability, and quality service delivery in higher education.

2. Records management

Records management in higher education is defined as the structured control of records across their lifecycle—from creation to eventual disposal or archiving. Within postgraduate education, this process becomes even more critical due to the complexity of research-based programs and the need for continuous monitoring of students' academic progress. Student records are considered vital institutional assets because they serve as evidence of academic activities and support decision-making, policy formulation, and accreditation processes.

3. Colleges of Postgraduate Studies

In Colleges of Postgraduate Studies, the management of student records has increasingly shifted from manual, paper-based systems to electronic and digital platforms. Traditional methods are often associated with challenges such as data redundancy, misplacement of files, delays in retrieval, and increased administrative burden. In contrast, digital record management systems—such as Student Information Systems (SIS)—enable institutions to centralize data, improve accessibility, and enhance operational efficiency. Well-organized data systems allow different departments to share information seamlessly, thereby reducing delays and improving staff productivity

4. Records on Minutes of meeting

Minutes of meeting records in a College of Postgraduate Studies constitute an essential component of institutional records management, serving as the official and legal documentation of decisions, deliberations, and actions taken during meetings.

These meetings may include postgraduate board meetings, faculty committees, research and ethics committees, and departmental review sessions. The minutes provide a reliable account of proceedings, ensuring that institutional decisions are transparent, traceable, and aligned with established policies and regulations.

a. Minutes of meetings are defined as the formal written record of discussions, resolutions, and action points agreed upon during official gatherings (International Organization for Standardization, 2016). In the context of postgraduate studies, these records often capture critical academic and administrative matters such as admission approvals, supervision assignments, thesis evaluations, policy reviews, and graduation recommendations. As such, they play a vital role in maintaining institutional memory and supporting continuity in decision-making processes.

b. Effective management of minutes of meeting records involves their accurate recording, timely preparation, proper classification, secure storage, and easy retrieval when needed. According to Shepherd and Yeo (2003), records must be managed systematically throughout their lifecycle to ensure authenticity, reliability, and usability. In Colleges of Postgraduate Studies, this requires adherence to standardized procedures and formats when documenting meeting proceedings, including clear identification of meeting dates, attendance, agenda items, discussions, resolutions, and assigned responsibilities.

c. The transition from paper-based to electronic records management systems has significantly improved the handling of meeting minutes in higher education institutions. Digital systems enable institutions to store minutes in centralized databases, facilitate quick access, and enhance collaboration among stakeholders. Moreover, electronic recordkeeping reduces the risk of physical damage, loss, or misplacement of documents while improving version control and audit trails (Ngulube, 2015). These advantages are particularly important in postgraduate settings, where decisions often have long-term academic and administrative implications.

d. Minutes of meeting records also support accountability and governance within Colleges of Postgraduate Studies. They serve as evidence of compliance with institutional policies, accreditation requirements, and regulatory standards. For instance, decisions regarding student progression, disciplinary actions, and research approvals must be properly documented to ensure fairness and transparency. According to Iwhiwhu and Eyekpegha (2009), properly managed records enhance organizational efficiency and provide a basis for evaluating performance and institutional effectiveness

Records are created or generated

Records in the College of Postgraduate Studies are created or generated as a result of routine academic, administrative, and research activities carried out within the institution. Record creation is the first stage in the records management lifecycle, and it involves the production or receipt of documents that provide evidence of transactions, decisions, and actions. These records may exist in both physical and electronic formats and are essential for documenting the operations and functions of the College.

According to International Organization for Standardization (2016), records are created when information is captured in a fixed form to serve as evidence of business activities. In the context of a College of Postgraduate Studies, records are generated at various points, including student admission processes, course registration, examination and assessment, supervision of research, and administrative decision-making. For example, application forms, admission letters, and enrollment records are created during the admission phase, while transcripts, result sheets, and progress reports are generated during students' academic progression.

Furthermore, records are also created through official communications and institutional governance processes. Minutes of meetings, memoranda, circulars, and policy documents are produced during meetings of postgraduate boards, committees, and administrative units. These records document deliberations, decisions, and actions taken, thereby ensuring accountability and continuity in institutional operations. As noted by Shepherd and Yeo (2003), records must be created in a reliable and consistent manner to ensure their authenticity and evidential value.

The increasing adoption of Information and Communication Technology (ICT) has transformed how records are generated in Colleges of Postgraduate Studies. Electronic systems such as Student Information Systems (SIS), email platforms, and document management systems automatically generate and store records in digital formats. For instance, online course registration systems create real-time records of student enrollment, while digital supervision platforms generate records of research progress and feedback. These technologies enhance efficiency, reduce manual errors, and improve accessibility to information (Ngulube, 2015).

In addition, records are generated through research activities, which are a core function of postgraduate education. Documents such as research proposals, ethical approval forms, theses, dissertations, and publications are created as part of students' academic requirements. These records not only demonstrate academic achievement but also contribute to the institution's intellectual output and reputation. Proper documentation of research activities is crucial for maintaining academic standards and ensuring compliance with regulatory and ethical requirements.

However, the process of records creation must be guided by established policies and standards to ensure consistency and quality. According to Iwhiwhu and Okorodudu (2012), organizations must implement clear guidelines on how records are created, captured, and maintained to prevent issues such as incomplete documentation, duplication, and loss of information. Staff training and awareness are also essential to ensure that records are properly generated and managed from the outset.

Records management storage

Records storage in the College of Postgraduate Studies is a critical component of an effective records management system, as it ensures that institutional records are securely maintained, easily retrievable, and preserved for future use. Storage refers to the processes and facilities used to keep records whether in physical or electronic form throughout their lifecycle, from active use to archival preservation or disposal. Proper storage systems are essential for safeguarding the integrity, confidentiality, and accessibility of postgraduate students' information and administrative documents.

According to International Organization for Standardization (2016), records must be stored in conditions that ensure their protection against unauthorized access, loss, or deterioration. In a College of Postgraduate Studies, records such as admission files, academic transcripts, minutes of meetings, research documents, and policy records are stored using both manual and electronic systems. Physical storage typically involves filing cabinets, shelves, registries, and archives, where records are arranged using classification schemes to facilitate easy retrieval. However, these traditional systems are often associated with challenges such as limited storage space, risk of damage from environmental factors, and time-consuming retrieval processes.

In contrast, electronic records storage systems have become increasingly prominent in higher education institutions. Digital storage solutions, including databases, cloud storage, and institutional repositories, enable the centralized management of records and provide faster and more efficient access to information. Electronic systems also support backup and disaster recovery mechanisms, reducing the risk of data loss. As noted by Ngulube (2015), digital recordkeeping enhances accessibility, improves security through controlled access, and allows multiple users to retrieve information simultaneously without compromising data integrity.

Effective storage of records in postgraduate institutions also requires adherence to classification and indexing systems. Records must be organized in a logical and consistent manner to ensure that they can be easily located when needed. Shepherd and Yeo (2003) emphasize that proper classification is fundamental to records management, as it supports efficient retrieval and reduces the time and effort required to access information. In Colleges of Postgraduate Studies, classification systems may be based on functions such as admissions, academics, research, and administration.

Security is another key aspect of records storage. Given the sensitive nature of postgraduate students' information, institutions must implement measures to protect records from unauthorized access, theft, or breaches. These measures may include restricted access to physical storage areas, password protection for electronic systems, encryption, and regular system audits. According to Iwhiwhu and Eyekpegha (2009), ensuring the security of records is essential for maintaining confidentiality and institutional credibility.

Importance of records management storage

The importance of records management storage in a College of Postgraduate Studies cannot be overstated, as it plays a vital role in ensuring the preservation, accessibility, security, and effective utilization of institutional information. Records storage is a key phase in the records management lifecycle, involving the systematic maintenance of both physical and electronic records in a manner that supports administrative efficiency and academic excellence.

One of the primary importance's of records storage is the preservation of vital information. Postgraduate institutions generate large volumes of records, including admission files, academic transcripts, research documents, and minutes of meetings. Proper storage ensures that these records are protected from physical damage, loss, or deterioration over time. According to International Organization for Standardization (2016), records must be stored in conditions that guarantee their long-term preservation and usability as evidence of institutional activities.

Another significant importance of records storage is the facilitation of easy and timely retrieval of information. Efficient storage systems—whether manual or electronic—enable staff to quickly access required records for decision-making, student services, and administrative processes. Shepherd and Yeo (2003) emphasize that well-organized storage systems reduce the time and effort required to locate records, thereby improving productivity and operational efficiency. In a College of Postgraduate Studies, this is particularly important for activities such as verifying student records, processing results, and supporting research supervision.

Records storage also enhances data security and confidentiality, which are critical in managing sensitive postgraduate students' information. Secure storage systems help prevents unauthorized access, data breaches, and misuse of information. Measures such as restricted access, password protection, and data encryption are essential in safeguarding records.

According to Iwhiwhu and Eyekpegha (2009), effective storage systems contribute to maintaining the integrity and confidentiality of organizational records, thereby building trust and credibility. Also proper records storage supports institutional accountability and compliance with regulatory requirements. Colleges of Postgraduate Studies are often required to provide evidence of their academic and administrative activities for accreditation, audits, and policy evaluations. Stored records serve as reliable sources of information that can be used to demonstrate compliance with established standards and regulations. In addition, effective records storage contributes to improved resource utilization. When records are systematically stored and easily accessible, staff spends less time searching for information and more time performing value-added tasks. This reduces duplication of efforts, minimizes administrative delays, and enhances overall efficiency. Digital storage systems, in particular, help save physical space and reduce the costs associated with paper-based recordkeeping. **Streamlining students' records**

Streamlining students' records refers to the systematic organization, digitization, storage, retrieval, and management of student information to improve efficiency and accuracy. Effective record management has significant impacts on educational institutions, students, and administrative staff. Improved Administrative Efficiency: Streamlined student records reduce the time required to process admissions, registration, examinations, and graduation procedures. Automated record systems enable quick access to student information, minimizing paperwork and administrative delays (Asogwa, 2012). Enhanced Decision-Making: Accurate and readily available student data supports evidence-based decision-making by school administrators. Information on enrollment trends, academic performance, and student demographics can be analyzed to improve planning and resource allocation (Popoola & Oluwole, 2007). Increased Accuracy and Data Integrity: Proper record management reduces errors, duplication, and loss of information. Digital record systems ensure that student data remains consistent, complete, and up-to-date, thereby enhancing institutional credibility (International Organization for Standardization [ISO], 2016).Better Student Services: Streamlined records facilitate faster processing of transcripts, certificates, academic advising, and other student-related services. This improves student satisfaction and supports timely academic progression (Aina, 2004) added that Enhanced Security and Confidentiality. Electronic records management systems provide controlled access to sensitive student information through passwords, encryption, and user authorization. This helps protect students' privacy and ensures compliance with data protection regulations (Penn, Pennix, & Coulson, 1994). Improved Accountability and Transparency, well-maintained records promote accountability in educational institutions by providing verifiable evidence of academic achievements, financial transactions, and administrative decisions. This transparency helps reduce disputes and fraud (Akporhonor & Iwhiwhu, 2007) Support for Institutional Planning and Accreditation: Accurate student records are essential for accreditation exercises, quality assurance assessments, and institutional evaluations. Streamlined records provide reliable data required by regulatory bodies and educational stakeholders (UNESCO, 2015).

Way forward

Technological infrastructure

a. Deploy cloud-Based storage solutions**:** Transition from physical filing cabinets to secure, scalable cloud storage with automated backup and disaster recovery capabilities

b. Implement role-Based access control (RBAC)**:** Ensure sensitive postgraduate student data is accessible only to authorized personnel, with comprehensive audit trails tracking all modifications

c. Integrate workflow automation**:** Automate routine notifications (fee reminders, thesis deadlines, committee meetings), approval workflows (supervisor assignments, ethical approvals), and status updates

Conclusion

The streamlining of records management systems in Colleges of Postgraduate Studies requires a combination of technological adoption, policy development, staff training, and continuous improvement. Implementing these recommendations will enhance administrative efficiency, optimize resource utilization among staff, and improve overall service delivery within the institution.

Recommendation

Colleges of Postgraduate Studies should adopt comprehensive electronic records management systems. The transition from manual to digital platforms—such as Student Information Systems (SIS) will significantly reduce issues of data redundancy, misplacement, and delays in information retrieval.

Institutions should develop and implement clear records management policies and standards in line with guidelines provided by the International Organization for Standardization. These policies should cover all stages of the records lifecycle, including creation, classification, storage, retrieval, retention, and disposal. Standardization ensures consistency, reliability, and accountability in handling postgraduate students' records.

There is a need for regular training and capacity building for staff involved in records management. Staff should be equipped with the necessary skills to effectively use digital systems, manage electronic records, and maintain data security.

Colleges of postgraduate studies should strengthen records storage infrastructure by integrating both physical and electronic storage systems. This includes investing in secure databases, cloud storage solutions, and backup systems to prevent data loss and proper classification and indexing systems should be adopted to ensure easy retrieval of records when needed.

Institutions should prioritize data security and confidentiality by implementing robust security measures. These may include access control mechanisms, password protection, encryption, and regular system audits. Given the sensitive nature of postgraduate students' information, safeguarding records is essential for maintaining institutional credibility and compliance with regulatory requirements.

Effective management of minutes of meetings should be emphasized. Institutions should ensure timely documentation, proper formatting, and secure storage of meeting records, as these documents serve as evidence of decisions and support transparency and accountability in governance.

Colleges of postgraduate studies should establish regular monitoring and evaluation mechanisms to assess the performance of their records management systems. Continuous assessment will help identify gaps, improve processes, and ensure that the system remains responsive to the evolving needs of the institution.

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The Changing Face of Librarianship in Nigeria: Emerging Skills, Professional Identity, and Future Relevance

By

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Abstract

This paper examines the changing face of librarianship in Nigeria within the context of rapid technological advancement, evolving educational practices, and increasing demands for relevance in the knowledge society. It discusses the concept of librarianship and highlights the shift from traditional custodial roles to more dynamic, technology-driven, and user-centred professional practices. Particular attention is given to the emerging skills required of contemporary librarians, including digital literacy, research support, research data management, information technology competence, advocacy, and community engagement. The paper further explores issues of professional identity, drawing attention to the challenges Nigerian librarians face in redefining their roles, visibility, and professional value across academic, public, and special library settings. It argues that without deliberate efforts to adapt to these changes, librarianship risks diminished relevance in Nigeria's evolving information environment. The paper concludes that the future relevance of librarianship in Nigeria depends on the profession's ability to adapt, reposition, and respond effectively to societal and institutional needs. To achieve this, the paper recommends continuous professional development for librarians, regular review of Library and Information Science curricula, stronger institutional support, and deliberate professional repositioning as key strategies for strengthening professional identity and ensuring the sustainability of librarianship in Nigeria.

Keywords: Emerging Skills; Librarianship, Nigeria, Professional Identity, Future Relevance

Introduction

Libraries have long been regarded as supporters of knowledge, repositories of culture, and sanctuaries for seekers of wisdom. The development of librarianship in Nigeria can be traced to the colonial era, particularly through the establishment of public and academic libraries that supported formal education and administrative activities. Following independence, the creation of institutions such as the National Library of Nigeria and the Nigerian Library Association contributed significantly to the professionalisation of librarianship and the expansion of library services across the country. For decades, Nigerian libraries focused primarily on acquiring, organising, preserving, and providing access to print-based information resources, reflecting the traditional functions of libraries worldwide (Yusuf *et al*., 2023).

Librarianship was characterised by routine activities such as acquisition, cataloguing, classification, and circulation of printed materials. Librarians were largely perceived as custodians of books, operating within a structured and relatively stable information environment (Okonkwo, 2024). However, the rapid advancement of information and communication technologies (ICTs), coupled with the proliferation of digital information resources, has significantly altered the landscape of library services globally and within Nigeria. According to Osemudiamen and Obeka (2026) gone are the days when libraries were solely repositories of physical books. Today, libraries are embracing digitisation initiatives, making vast collections of resources accessible online. From e-books and digital archives to online databases and virtual libraries, these digital offerings have democratised access to knowledge, breaking down barriers of geography and socioeconomic status. Libraries are not just keeping pace with the digital revolution; they are leading it, serving as hubs for digital literacy and champions of open access to information. According to Anderson (2019), the integration of technology has enhanced efficiency in cataloguing, indexing, and retrieving materials, thereby streamlining the research process for library patrons.

As libraries continue to evolve, the responsibilities of librarians are also undergoing significant transformation. Contemporary librarians are no longer limited to traditional technical functions but are increasingly involved in digital content management, information literacy instruction, research support, data management, scholarly communication, and the application of emerging technologies. These changing responsibilities have influenced the competencies required of librarians and have contributed to a redefinition of their professional identity within the information society. The changing responsibilities of librarians have also raised important questions regarding professional identity. As the profession expands beyond traditional library functions, librarians are increasingly viewed as information specialists, knowledge managers, educators, and research partners. This shift has necessitated a re-examination of how librarians perceive themselves and how they are perceived by society, employers, and information users (Atanda *et al.,* 2025) In recent years, the integration of ICT into library operations has transformed the way information is created, accessed, and disseminated. Nigerian libraries are increasingly adopting digital tools, electronic databases, institutional repositories, and automated systems to enhance service delivery (Adekoya and Inyang, 2022). Furthermore, emerging technologies such as artificial intelligence, cloud computing, and digital preservation systems are redefining the scope of librarianship, requiring professionals to develop new competencies. The application of smart technology to enhance user experiences, automate tasks, and improve services is known as artificial intelligence in libraries. AI helps libraries identify resources, handle massive volumes of data, and

even forecast future reading and research trends. Artificial Intelligence matters to libraries because it is used for organising and making available large collections of information (American Library Association , 2019).

Librarianship in Nigeria has traditionally focused on the organisation, preservation, and dissemination of information resources. However, rapid developments in information and communication technologies, changes in teaching and learning practices, and increasing user expectations have significantly altered the professional landscape. Globally, libraries are shifting from passive repositories to active centres of learning and research support (International Federationof Library Associations, IFLA, 2019). Future librarianship involves not just the traditional duties of librarians but also the changing responsibilities and skills needed to navigate the challenges of the digital era. In the 21st century, the world has witnessed the transformation of libraries from storehouse of books to digital libraries. Digital libraries reduce the costs associated with printing, storing, and distributing traditional printed books and this improves resource allocation and lowers the cost of information (Rajkumar *et al*., 2024). This technological shift has furthermore given rise to what is often described as the "changing face" of librarianship. The profession is transitioning from a traditional, collection-centred model to a dynamic, user-centred and technology-driven discipline. Librarians are now expected to function as information managers, digital curators, research partners, and facilitators of knowledge creation. Recent studies emphasise that the future of librarianship in Nigeria is increasingly shaped by innovation, digital transformation, and the ability to adapt to evolving user needs (Osemudiamen and Obeka, 2026; Oladokun *et a*l., 2025).

Despite these advancements, the transformation of librarianship in Nigeria is not without challenges. Issues such as inadequate technological infrastructure, limited funding, and gaps in digital competencies continue to affect the effective adoption of emerging trends. Additionally, the profession still struggles with issues of perception and recognition, as librarians are often undervalued within academic and societal contexts. Against this backdrop, there is a growing need to critically examine the changing nature of librarianship in Nigeria, particularly in terms of emerging skills, evolving professional identity, and future relevance. Understanding these dynamics is essential for repositioning the profession to meet the demands of the digital age and ensuring its continued contribution to national development.

2. Concept of Librarianship: A Brief Overview

Librarianship is a professional field concerned with the organisation, management, and effective use of information resources for the benefit of society. Traditionally, it centred on the care of books and other printed materials within libraries. Over time, however, the scope of librarianship has widened considerably to include non-print and digital resources such as electronic journals, online databases, multimedia materials, and institutional repositories. The profession is fundamentally service-oriented, with an emphasis on ensuring that information is not only available but also accessible and useful to its users. Ranganathan's (1931) enduring principles of library science highlight this user-centred nature, stressing that information resources exist primarily to be used. A major aspect of librarianship is the systematic organisation of information to allow for easy identification and retrieval. This involves activities such as classification, cataloguing, indexing, and the creation of metadata. Through these processes, libraries are able to arrange their resources in a logical and consistent manner, enabling users to locate needed information with minimal difficulty. In addition to organisation, librarianship places strong emphasis on information services. These services include reference and advisory work, user education, information literacy instruction, and current awareness services. Librarianship is the profession concerned with managing information resources to meet the information needs of users (Rubin, 2017). As Rubin (2017) observes, the true value of librarianship lies not merely in managing collections, but in connecting people with reliable information in ways that support learning, research, and informed decision-making.

In the contemporary information environment, librarianship has become increasingly shaped by advances in information and communication technologies. Modern librarians now work with automated library systems, digital libraries, virtual reference platforms, and emerging tools such as data analytics and artificial intelligence. This shift has transformed librarians into information managers, digital curators, and research support professionals. According to Onunka *et al*. (2023), the modern practice of librarianship reflects the growing need to manage information in diverse formats while maintaining ethical standards and professional competence in a rapidly changing digital landscape.

Overall, librarianship plays a vital role in education, research, and national development by promoting equitable access to information and knowledge. It supports lifelong learning, preserves cultural and intellectual heritage, and upholds important professional values such as intellectual freedom, privacy, and inclusiveness. As emphasised by the International Federation of Library Associations and Institutions (IFLA, 2019), librarianship is not only a technical profession but also a social one, committed to empowering individuals and communities through access to accurate, relevant, and timely information.

3. The Changing Face of Librarianship in Nigeria

In the digital age, librarians are playing a more significant role in information curation, data management, and technological proficiency, mirroring a larger trend. It is now essential for the contemporary librarians to equip themselves with strong digital skills, which enables them to incorporate technology for improving user interactions and simplifying information access. Moreover, it is essential for them to adopt new technologies like artificial intelligence, big data analytics, and

digitisation in order to stay updated and efficient in catering to the needs of a wide range of users. A machine learning model can forecast the number of visitors to a library based on previous data, weather, and events, which will provide vital statistics to the librarians to plan accordingly to cater to the requirements of the patrons and eliminate their shortcomings (Cox and Mazumdar, 2024). Librarians, as providers of continuous learning opportunities, should also cultivate a welcoming atmosphere that meets the varied requirements of their communities, advocating for equal access to information and resources.

The changing face of librarianship in Nigeria is evident in the adoption of electronic resources, institutional repositories, and online service delivery. Librarians now engage more directly with teaching, learning, and research processes, collaborating with academics and students (Onunka *et al*. 2023). The practice has undergone significant transformation in recent decades, largely influenced by technological advancement, changes in educational delivery, and evolving information needs of users. Traditionally, librarianship in Nigeria focused on the acquisition, organisation, preservation, and circulation of print-based information resources. Librarians were largely viewed as custodians of books and managers of physical collections. However, this traditional orientation has increasingly become inadequate in addressing the complexities of the contemporary information environment. One of the most visible drivers of change in Nigerian librarianship is the growth of information and communication technologies (ICTs). The introduction of electronic resources, online databases, institutional repositories, and digital libraries has reshaped how information is accessed and used. Nigerian academic libraries, in particular, now support electronic journals, e-books, and open access platforms, requiring librarians to develop competencies beyond conventional library operations (Oladokun, 2024). As a result, librarians are no longer confined to physical library spaces but increasingly provide virtual and remote services to users.

In addition to technological change, shifts in teaching, learning, and research practices have expanded the role of librarians in Nigeria. The rise of student-centred learning, online education, and research-driven university rankings has placed greater emphasis on information literacy, research support, and scholarly communication services. Librarians are now expected to collaborate with academic staff, support students in developing critical information skills, and assist researchers with literature searching, citation management, and publication processes (Cox, 2021). These developments reflect a broader transition from passive service provision to active engagement in the academic enterprise. Furthermore, the changing face of librarianship in Nigeria is reflected in the growing involvement of librarians in research-related activities. Services such as institutional repository management, open access advocacy, and research data support are increasingly becoming part of library responsibilities. This shift aligns with global trends in librarianship, where libraries are repositioned as partners in knowledge creation rather than mere repositories of information (IFLA, 2019). In Nigeria, however, the pace of this transition varies across institutions due to differences in funding, infrastructure, and managerial support.

Beyond academic libraries, public and special libraries in Nigeria are also experiencing changes in service orientation. Libraries are increasingly expected to serve as centres for community development, lifelong learning, and digital inclusion. Librarians are therefore required to engage more actively with diverse user communities, provide access to digital tools, and support information needs related to health, governance, entrepreneurship, and civic participation. This expanded social role further underscores the changing professional expectations placed on librarians in the Nigerian context.

Despite these positive developments, the transformation of librarianship in Nigeria is not without challenges. Inadequate funding, limited access to modern technologies, insufficient training opportunities, and low professional recognition continue to constrain the effective repositioning of librarians. Nevertheless, the ongoing changes signal a clear shift in the identity and function of librarianship in Nigeria from traditional custodianship to a dynamic, service-oriented, and knowledge-driven profession. Understanding this changing face is essential for addressing emerging skill requirements and strengthening the future relevance of librarianship in Nigeria.

4. Emerging Skills for Contemporary Nigerian Librarians

The transformation of librarianship in Nigeria has brought about a corresponding shift in the skills required of contemporary librarians. As libraries respond to technological advancement, changing user expectations, and evolving research and learning environments, traditional competencies alone are no longer sufficient. Librarians are increasingly expected to possess a blend of technical, professional, and interpersonal skills that enable them to remain relevant and effective in modern information settings. One of the most critical emerging skills is digital and information literacy competence. Contemporary Nigerian librarians must be proficient in navigating digital information environments, evaluating electronic resources, and guiding users in the ethical and effective use of information. With the increased reliance on online databases, electronic journals, and open access platforms, librarians play a key role in supporting users to locate, assess, and utilise digital information resources effectively (Oladokun, 2024). This responsibility has positioned librarians as educators and facilitators of lifelong learning rather than mere custodians of information.

Another important skill area is research support and scholarly communication. Librarians are increasingly involved in supporting research activities through literature searching, reference management, citation analysis, and guidance on academic publishing. In Nigerian academic libraries, librarians now contribute to research visibility by managing

institutional repositories and promoting open access publishing. These roles require knowledge of scholarly communication systems, research impact metrics, and publication ethics (Cox 2021; IFLA, 2019). Closely related to research support is the emerging need for research data management (RDM) skills. As research activities expand in Nigerian universities, librarians are expected to support data organisation, preservation, sharing, and reuse. Although RDM services are still developing in many Nigerian institutions, the growing emphasis on data-driven research highlights the need for librarians to acquire competencies in data documentation, metadata creation, data storage, and data protection practices. Developing these skills will enhance the relevance of librarians in the research lifecycle and align Nigerian libraries with global best practices.

Information technology competence has also become an essential skill for contemporary librarians. Beyond basic computer literacy, librarians are now required to understand library management systems, digital library platforms, and emerging technologies that support service delivery. The ability to adapt to new technological tools enables librarians to design innovative services, support virtual users, and maintain efficient access to information resources in both physical and digital environments (Rubin and Rubin, 2020). In addition to technical skills, advocacy, communication, and community engagement skills are increasingly important. Librarians must be able to communicate their value effectively, advocate for library services, and engage diverse user communities.

Another emerging competency required of contemporary Nigerian librarians is artificial intelligence (AI) literacy and digital innovation skills. Study by Monyela and Tella (2024) revealed that the growing integration of artificial intelligence tools into information retrieval, knowledge organisation, reference services, and library management systems has created the need for librarians to understand and effectively utilise AI-driven technologies. Librarians are increasingly expected to evaluate AI tools, support users in their responsible use, and integrate them into library services while addressing ethical concerns relating to privacy, bias, and information integrity. AI literacy has therefore become an important component of professional competence in modern librarianship (Cox, 2023).

Project management and leadership skills have also emerged as essential competencies for librarians operating in dynamic information environments. Contemporary libraries frequently undertake digitisation projects, repository development initiatives, information literacy programmes, and collaborative research support services that require effective planning, coordination, monitoring, and evaluation. Librarians who possess leadership and project management skills are better positioned to manage change, mobilise resources, and drive innovation within their institutions (Atanda *et al*., 2025). These competencies are particularly important in Nigeria, where libraries often face funding constraints and must maximise available resources to achieve organisational goals.

Furthermore, instructional design and teaching skills are becoming increasingly important as librarians assume expanded educational roles. Information literacy programmes, digital literacy training, and research support workshops require librarians to design learning materials, deliver instruction, and assess learning outcomes. As higher education institutions increasingly adopt blended and online learning approaches, librarians must develop pedagogical competencies that enable them to support teaching and learning effectively within both physical and virtual environments (Majola, 2026).

Additionally, knowledge management and content creation skills have gained prominence in contemporary librarianship. Librarians are increasingly involved in creating digital content, managing institutional knowledge assets, curating online resources, and facilitating knowledge sharing within organisations. These responsibilities require competencies in content development, social media engagement, digital marketing, and knowledge management practices. Such skills enhance the visibility of library services and strengthen the strategic role of librarians in supporting organisational learning and knowledge dissemination.

Equally important are entrepreneurial and innovation skills, which enable librarians to identify new opportunities for service development and sustainability. The increasing demand for value-added information services requires librarians to think creatively, develop innovative solutions, and explore alternative approaches to service delivery. Entrepreneurial competencies support the development of information products, consultancy services, grant acquisition, and strategic partnerships that can enhance the sustainability and visibility of libraries in Nigeria's rapidly evolving information landscape (Onah and Irenoa, 2025).

In the Nigerian context, where libraries often compete for limited resources, the ability of librarians to demonstrate impact and build strategic partnerships is crucial for institutional recognition and support. Strong interpersonal skills also enhance user satisfaction and strengthen the professional image of librarianship. Overall, the emerging skills required of contemporary Nigerian librarians reflect a shift towards a more flexible, innovative, and user-centred profession. Developing these competencies through continuous professional development, training, and curriculum reform is essential for strengthening professional identity and ensuring the future relevance of librarianship in Nigeria.

5. Professional Identity and Relevance of Librarians in Nigeria

Professional identity of librarians therefore connotes how people recognize, describe and label them. Professional identity influences how librarians are perceived within institutions and society. Rubin and Rubin (2020) note that given the shifting

nature of library and information science graduates' work, both within and outside of libraries, the platform is now suitable to examine how library practitioners decide to brand themselves. Therefore, professional identity is measured by social categorization, social identity and social comparison of individuals on their jobs. Employees perform better and get satisfaction on their jobs when the work environment is conducive. However, many university libraries in Nigeria are faced with environment conditions that are not conducive, inadequate library facilities and some of the libraries seem to be neglected and in deplorable states, while others seem to be inadequately managed. In Nigeria, issues of visibility and recognition continue to challenge librarians, particularly in academic settings (Ezema *et al*., 2024).

Professional identity plays a crucial role in shaping how librarians perceive themselves and how they are perceived by others within their institutions and society at large (Pierson, 2024). In Nigeria, the question of professional identity has become increasingly important as the role of librarians continues to evolve in response to technological and educational changes (Ogunjimi *et al*., 2025). Traditionally, librarians were viewed primarily as custodians of books and managers of information resources. While this perception still exists in some quarters, it no longer reflects the full scope of contemporary librarianship. In many Nigerian institutions, librarians often face challenges related to visibility, recognition, and status. Compared to academic staff engaged in teaching and research, librarians are sometimes perceived as playing a supporting rather than a central role in knowledge production (Ogunjimi *et al*., 2025). This perception can limit opportunities for professional advancement and reduce the overall impact of library services within institutions. As a result, there is a growing need for librarians to redefine and assert their professional identity in ways that reflect their evolving contributions.

The changing nature of library services presents an opportunity for librarians in Nigeria to strengthen their relevance. By actively engaging in teaching information literacy, supporting research activities, managing digital resources, and contributing to scholarly communication, librarians can reposition themselves as key partners in the academic and research process. Such involvement not only enhances their visibility but also demonstrates their value within the knowledge ecosystem (Cox, 2021). However, redefining professional identity requires more than role expansion; it also demands a shift in mindset. Librarians must embrace innovation, continuous learning, and proactive engagement with users and stakeholders. Developing confidence in their expertise and effectively communicating their contributions are essential for strengthening professional identity. Advocacy and collaboration, both within and beyond the library, are also critical in promoting recognition of the profession.

Furthermore, the relevance of librarianship in Nigeria is closely tied to its ability to respond to societal needs. Libraries are increasingly expected to support national development goals by promoting literacy, facilitating access to information, and supporting education and research. In this context, librarians who adapt to changing demands and demonstrate measurable impact are more likely to be recognised as relevant and indispensable. Despite ongoing challenges, there is considerable potential for strengthening the professional identity of librarians in Nigeria. Through continuous professional development, improved institutional support, and strategic engagement, librarians can redefine their roles and enhance their visibility. Ultimately, a strong professional identity will not only benefit individual librarians but also contribute to the sustainability and future relevance of librarianship in Nigeria.

6. Implications for the Future of Librarianship in Nigeria

The future of librarianship in Nigeria depends on adaptability and alignment with national development goals. Libraries can support education, research, and innovation if librarians are empowered and supported. The ongoing transformation of librarianship in Nigeria carries significant implications for the future of the profession. As libraries continue to evolve in response to technological advancement and changing user expectations, the ability of librarians to adapt and remain relevant will determine the sustainability of the profession. The shift towards digital information environments, research support services, and user-centred practices signals a future in which librarianship is more dynamic, interdisciplinary, and impact-driven.

One key implication is the need for a proactive and adaptive professional approach. Librarians in Nigeria can no longer rely solely on traditional practices but must continuously update their skills and knowledge to remain effective. This includes embracing emerging areas such as research data management, digital scholarship, and information technology. Failure to adapt to these changes may lead to reduced relevance and marginalisation within the broader academic and information landscape (IFLA, 2019). Another important implication is the growing importance of education and training in shaping the future of librarianship. Library and Information Science programmes in Nigerian institutions must be responsive to current trends by incorporating practical, technology-driven, and user-focused content into their curricula. Preparing future librarians with the right competencies will ensure that the profession remains competitive and aligned with global standards (Oladokun, 2024).

The future of librarianship in Nigeria is also closely linked to institutional and policy support. Adequate funding, access to modern technologies, and supportive organisational structures are essential for enabling librarians to perform their roles effectively. Without such support, efforts to modernise library services and enhance professional relevance may be constrained. In addition, the profession must place greater emphasis on advocacy and visibility. Demonstrating the value of

library services to institutional leaders, policymakers, and the wider community is critical for securing support and recognition. Librarians must actively communicate their contributions to teaching, research, and community development in order to strengthen their position within the knowledge economy.

Finally, the future of librarianship in Nigeria presents opportunities for innovation and collaboration. By partnering with academics, researchers, technology experts, and community organisations, librarians can expand their roles and contribute more meaningfully to national development. Such collaborations will not only enhance service delivery but also reinforce the relevance of libraries as centres of knowledge, learning, and innovation. In summary, the future of librarianship in Nigeria depends on the profession's ability to adapt to change, invest in capacity building, and strategically reposition itself within the evolving information landscape. With the right combination of skills, support, and vision, librarianship in Nigeria can remain a vital and forward-looking profession.

7. Conclusion

Librarianship in Nigeria is undergoing a significant transformation driven by rapid technological advancement, evolving educational practices, and increasing expectations within the knowledge society. This paper has shown that the profession has moved beyond its traditional custodial role to embrace more dynamic, technology-driven, and user-centred responsibilities. Contemporary librarians are now expected to support teaching, learning, and research, while also engaging in emerging areas such as digital services, scholarly communication, and research data management. The study has also highlighted the challenges associated with professional identity, visibility, and recognition, which continue to affect the perceived value of librarians within institutions and society. Despite these challenges, there are clear opportunities for librarians in Nigeria to redefine their roles and strengthen their relevance by embracing innovation, continuous learning, and proactive engagement. In conclusion, the future of librarianship in Nigeria depends largely on the ability of the profession to adapt to change, develop relevant competencies, and strategically reposition itself within the evolving information landscape. By doing so, librarians can remain key contributors to knowledge creation, access, and national development, thereby sustaining the profession in line with emerging global and local realities.

8. Recommendations

The following recommendations are made:

- **Promote Continuous Professional Development (CPD)**
  Librarians should be encouraged to participate in regular training and capacity-building programmes focused on emerging areas such as digital literacy, research data management, and information technologies to remain professionally relevant.
- **Review and Update LIS Curricula**
  Library and Information Science programmes in Nigerian institutions should be revised to reflect current trends in librarianship, with greater emphasis on practical skills, technology integration, and user-centred service delivery.
- **Strengthen Institutional Support**
  Universities and parent organisations should provide adequate funding, infrastructure, and policy support to enable libraries to adopt modern technologies and deliver innovative services.
- **Enhance Professional Visibility and Advocacy**
  Librarians should actively promote their roles and contributions through advocacy, collaboration, and engagement with stakeholders in order to improve recognition and professional standing.
- **Encourage Adoption of Emerging Technologies**
  Libraries should embrace digital tools and innovative technologies to improve service delivery and meet the evolving needs of users in both physical and virtual environments.
- **Foster Collaboration and Partnerships**
  Librarians should collaborate with academics, researchers, IT professionals, and policymakers to strengthen service delivery and contribute more effectively to institutional and national development goals

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The Role of Library Outreach Programmes in addressing Climate- Driving Security Challenges in Nigeria

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Abstract:

Climate change has become a critical driver of insecurity and developmental challenges in Nigeria, contributing to flooding, desertification, food insecurity, population displacement, and resource-based conflicts across different regions of the country. Despite the growing importance of climate information in mitigating these challenges, limited empirical evidence exists on the contribution of libraries to climate change awareness and security for development in Nigeria. This study empirically investigates the role of library outreach programmes in addressing climate-driven security challenges in Nigeria. A mixed-methods research design was adopted, combining a structured questionnaire administered to librarians and library users in selected public and academic libraries across three geopolitical zones, with key informant interviews involving library administrators and community leaders. Quantitative data were analyzed using descriptive statistics, while qualitative data were thematically analyzed to provide contextual insights. Findings reveal that library outreach programmes—such as mobile library services, community sensitization workshops, climate literacy campaigns, and digital information dissemination—significantly enhance public awareness of climate risks and adaptation strategies. The study further indicates a positive relationship between access to climate-related information through libraries and community preparedness for climate-induced security threats, including displacement and livelihood disruption. However, challenges such as inadequate funding, limited digital infrastructure, insufficient staff training, and weak policy integration constrain the effectiveness of these initiatives. The study concludes that libraries possess untapped potential as knowledge hubs for climate security and sustainable development in Nigeria. It recommends increased policy recognition, capacity building for librarians, strategic partnerships with environmental and security agencies, and the integration of climate security education into national library service frameworks to strengthen Nigeria's climate resilience and development agenda.

Keywords: Climate Change; Security; Library Outreach Programmes; Sustainable Development; Climate Information Services; Nigeria.

Introduction:

Climate change is increasingly recognized as a critical driver of insecurity in Nigeria. Rising temperatures, desertification, flooding, and unpredictable rainfall patterns have contributed to displacement, resource conflicts, and threats to food security (Okoli & Atelhe, 2023). These challenges are particularly acute in rural communities where livelihoods depend heavily on natural resources. The farmer–herder conflicts in the Middle Belt, for instance, illustrate how climate-induced scarcity exacerbates tensions and undermines national security (Adetula, 2022). Climate change is a global crisis that poses significant challenges to societies worldwide. The effects of climate change, including rising temperatures, extreme weather events, sea-level rise, and changing precipitation patterns, have far-reaching consequences for various

sectors, including libraries (Ajani et al., 2024). As information institutions, libraries play a crucial role in the preservation, dissemination, and accessibility of knowledge and information resources.

However, the impacts of climate change pose serious risks to library collections, both physical and digital, if adequate preparedness measures are not in place (Akhshik & Beglou, 2023). Nigeria, as a country located in the Western Region of Africa, is vulnerable to the effects of climate change (Jellason et al., 2023). It experiences diverse climate-related risks, including increased flooding, heatwaves, and changing rainfall patterns which span across various states of the country. These risks have the potential to affect the infrastructure and operations of libraries, as well as the preservation and availability of information resources (Ozoadibe & Obi, 2023). Despite these realities, public awareness and institutional responses remain limited. Many communities lack access to reliable information about climate risks and adaptive strategies. Libraries, traditionally viewed as repositories of knowledge, are increasingly recognized as agents of social change and civic education (Aina, 2021). Through outreach programmes, libraries can disseminate critical information, foster dialogue, and empower citizens to engage in resilience-building activities.

Climate change has become one of the most pressing global challenges, with profound implications for human security, particularly in developing countries like Nigeria. Issues such as desertification in the North, flooding in coastal regions, and irregular rainfall patterns have intensified socio-economic vulnerabilities and triggered conflicts over scarce resources. Security challenges linked to climate change—such as farmer–herder conflicts, migration, and food insecurity—require not only policy interventions but also access to timely and accurate information. Libraries, traditionally seen as repositories of knowledge, are increasingly evolving into active agents of community engagement through outreach programmes.

Libraries of all categories which include academic, public and special in Nigeria house valuable collections, including books, manuscripts, archival materials, and digital resources, which are susceptible to damage from moisture, mould, temperature fluctuations, and other climate-related hazards (Ejiwoye & Abioye, 2016). The loss or damage to information resources due to climate change can have significant implications for the ability of libraries to fulfil their core functions. Therefore, libraries serve as repositories of knowledge, supporting education, research, and community development. They provide access to information resources that are vital for learning, decision-making, and cultural preservation (Korro Bañuelos et al, 2021). If libraries are not adequately prepared to mitigate the risks posed by climate change, the loss or damage to their collections could result in a loss of valuable cultural heritage, hinder access to information, and limit the capacity of libraries to support sustainable development in Nigeria. In recent years back, there has been a growing recognition of the need for climate change preparedness in libraries.

Statement of the problem:

Nigeria faces mounting climate-driven security challenges such as desertification, flooding, food insecurity, forced migration, and resource conflicts. These environmental stresses exacerbate existing social tensions, fuel violent clashes between farmers and herders, and undermine national stability. Despite the urgency, public awareness and community resilience remain limited, particularly in rural and vulnerable populations where access to timely information is scarce. Libraries, traditionally seen as repositories of knowledge, have evolved into proactive agents of social change through outreach programmes. However, in Nigeria, their potential role in addressing climate-induced insecurity is underexplored. Many communities lack structured platforms for climate education, conflict resolution, and disaster preparedness. Outreach initiatives that could disseminate critical information, foster dialogue, and build adaptive capacity are either underfunded, poorly coordinated, or absent altogether. The problem, therefore, is the **gap between the escalating climate-driven security threats and the underutilization of library outreach programmes as tools for awareness, education, and community resilience in Nigeria.** Without deliberate integration of libraries into national and local strategies for climate security, communities remain vulnerable, uninformed, and ill-equipped to mitigate or adapt to these challenges.

The objectives of this study are:

1. Examine the extent to which library outreach programmes incorporate climate-security education.
2. Assess community perceptions of libraries as agents of resilience and adaptation.
3. Recommend strategies for strengthening library-based interventions in the face of climate-induced insecurity.

Literature Review:

Nigeria faces escalating climate-related threats including flooding, desertification, and erratic rainfall patterns. These environmental changes have intensified food insecurity, displacement, and violent resource conflicts, particularly between farmers and herders in the Middle Belt (Adetula, 2022). UNICEF (2021) highlights Nigeria as one of the most climate-vulnerable countries globally, with children disproportionately exposed to health and security risks. The nexus between climate change and insecurity underscores the urgency of community-based resilience strategies. Libraries are increasingly recognized as hubs for climate literacy and civic education. Olatoye (2025) argues that Nigerian libraries can transition "from bookshelves to green shelves," curating climate-focused resources and hosting outreach programmes such as workshops and exhibitions. Such initiatives foster environmental awareness and empower communities to adopt

sustainable practices. Similarly, Anabaraonye et al. (2024) emphasize the role of libraries in promoting climate literacy and plastic pollution education, citing the Nnamdi Azikiwe Library in Nsukka as a model for integrating environmental advocacy into library services.

Library Outreach Programmes Incorporate Climate-Security Education.

The impacts of climate change are increasingly recognized as critical factors influencing global security dynamics. While researchers may debate the precise role of climate-induced risk in any crisis, there is, however, a broad consensus that climate change can shape conflict. Climate-induced stressors have been found to exacerbate existing vulnerabilities, contribute to resource scarcity and amplify socio-economic inequalities, leading to heightened insecurity (Brown, Hammill, & McLeman, 2007; Busby, Smith,White, & Strange, 2018).

The most significant manifestation of this phenomenon is the way changes in climate alter competition over increasingly scarce resources. Studies on the ''heat-aggression relationship" suggest that there is a 10-20% increase in the risk of armed conflict associated with each 0.5°C increase in local temperatures (Hsiang, Burke, & Miguel, 2013) and some authors have argued that this may be very conservative. This hypothesis has been further expanded with evidence indicating that from 1970 to 2015, local temperature increases in 159 countries also correlated with a higher number of terrorist attacks and subsequent fatalities (Craig, Overbeek, & Niedbala 2021). This is further confirmed by Eberle, Rohner and Thoenig (2020), who investigated the impact of climate shocks on the level of violence between herders and farmers for all countries in Africa over a 21-year period between 1997-2014. They find that a +1°C increase in temperature leads to a +54% increase in conflict probability in mixed areas populated by both farmers and herders; the study also found conflict probability for non-mixed areas to be +17% increase. This result is consistent with a large body of research on the effect of climate on conflict and are of practical concern given increasing average global temperatures. The 2017 Security Council Resolution 2349 recognized "the adverse effects of climate change and ecological changes among other factors on the stability of the African region, including water scarcity, drought, desertification, land degradation and food insecurity" (United Nations Security Council, 2017).

Assess community perceptions of libraries as agents of resilience and adaptation:

Outreach programmes extend the library's impact beyond its physical space, enabling engagement with rural and marginalized communities. Adepoju and Akobe (2023) demonstrate how Nigerian public libraries contribute to achieving Sustainable Development Goals (SDGs) by providing survival information on health, agriculture, and livelihoods. These efforts align with broader resilience-building strategies, positioning libraries as inclusive institutions that support adaptation to climate-driven challenges. However, studies reveal gaps in policy support and funding, limiting libraries' ability to fully integrate climate-security education into outreach activities (Adegbore et al., 2024). While existing literature acknowledges the potential of libraries in climate education and resilience, few empirical studies directly examine their role in addressing climate-driven security challenges. Most research focuses on environmental awareness or SDGs, with limited attention to the intersection of climate change, insecurity, and library outreach. This study seeks to fill that gap by empirically investigating how Nigerian libraries can serve as platforms for mitigating climate-induced security risks.

Strategies for strengthening library-based interventions

Libraries play an important part in democratising knowledge, by promoting literacy skills (Chowdhury et al, 2025). Librarians from all sectors – public, academic, health, etc – can support climate literacy through all stages of life, by providing the knowledge, skills, and attitudes to understand and address how human activity can impact climate change. Particularly when they work in partnership, librarians can empower people to recognise credible information and make informed decisions about their study, career, and health choices, influence their attitudes and beliefs, and communicate accurate information to their peers and families (Chukwuduziem, 2023).

Recent natural and manmade disasters have emphasised how effectively public libraries support their community's resiliency and recovery efforts (Stricker, 2019). During times of crisis, communities have basic psychological, physical, safety, and informational needs, all of which can be provided by (Laposka, 2025). Libraries have always had a good relationship with the communities they are part of (Young, 2020). They are an essential community service who can help people get back on their feet more quickly, by getting them back to their regular lives, and this also helps with the community's economic recovery (Striker, 2019). In South Carolina, U.S. several counties experienced catastrophic flooding, causing extensive damage to the communities. Libraries created disaster-recovery centres which highlighted their value in supporting emergency response and recovery (Lopatovska, 2025).

More and more, librarians are being recognized as "Information First Responders", and libraries as disaster recovery and technology communication centres, because of their: ability to adapt quickly to new situations; trusted, local connections; physical resources, such as buildings, telecommunications, etc (Striker, 2019). Librarians are leading in the field of environmentally friendly and sustainable practices and policies (Tu-keefer, 2020). Librarians are seen not only as custodians of information but also as active participants and essential stakeholders in the climate change agenda because they: disseminate unbiased knowledge; lead sustainability projects; demonstrate social responsibility by incorporating green/sustainable activities into library operations; work with local advocacy groups to improve community engagement;

raise awareness; support social change; and provide invaluable resilience-boosting community services (Lu,2024, Koronfeind,2022) Durodolu,2024 & Logsden, 2025)

Methodology:

A mixed-methods research design was adopted, combining a structured questionnaire administered to librarians and library users in selected public and academic libraries across three geopolitical zones, with key informant interviews involving library administrators and community leaders. Quantitative data were analyzed using descriptive statistics, while qualitative data were thematically analyzed to provide contextual insights. Mixed methods are particularly suited for social research where both breadth and depth of understanding are required (Creswell & Plano Clark, 2018).

Purposeful sampling method was used in selecting the three states from the six geo-political zones because of their peculiarities to the research study area. Coupled with the fact that the selected Nigerian states representing diverse ecological zones such as Lagos (coastal, flood-prone), Abuja (urban center), and Benue (Middle Belt, conflict-prone). The total population of 200 members of the community included: Librarians and library administrators in public libraries. Community members who regularly participate in library outreach programmes. Local leaders engaged in climate adaptation initiatives.

The total response was 100% (200) from the members of the community, a purposive sampling strategy was employed to select libraries actively engaged in outreach activities. Within each library, participants were recruited using stratified random sampling to ensure representation across age, gender, and occupation. For the survey sample it was made up of 200 community members and for the interview sample, 20 librarians and local leaders.

Questionnaires was a structured surveys that captured quantitative data on community perceptions of library outreach, awareness of climate-security issues, and participation in resilience activities. The interviews were semi-structured interviews explored librarians' experiences, challenges, and strategies in integrating climate-security education into outreach programmes. Document review were captured for library reports and outreach records were analyzed to triangulate findings. Quantitative data were analyzed using descriptive statistics (frequency distributions, percentages, and mean scores) with SPSS software. Qualitative data were subjected to thematic analysis, identifying recurring themes such as trust in libraries, perceived relevance of outreach, and barriers to implementation. Triangulation of methods enhanced the validity and reliability of findings. Ethical approval was obtained from the relevant institutional review board. Informed consent was secured from all participants, and confidentiality was maintained. Participation was voluntary, with respondents free to withdraw at any stage.

Findings:

Quantitative Results: The survey of 200 community members revealed the following: That the awareness of climate-security issues revealed a 68% of respondents reported limited knowledge of how climate change contributes to insecurity, while 32% indicated moderate to high awareness. Library outreach participation resulted in 74% who had attended at least one outreach programme in the past year, but only 21% recalled climate-related content being included. For those that were perceived as relevance scored 82% who also agreed that libraries could play a meaningful role in educating communities about climate risks and resilience strategies. Trust in libraries**:** 89% expressed confidence in libraries as reliable sources of information compared to other local institutions.

Qualitative Insights: Interviews with librarians and community leaders highlighted several themes: Libraries as trusted mediators**,** Librarians emphasized that communities view libraries as neutral spaces, making them effective platforms for dialogue on sensitive issues such as resource conflicts. One of the outcomes of the interview was emerging initiatives, where **s**ome Libraries had piloted climate-awareness workshops, disaster preparedness training, and exhibitions on sustainable farming practices. These were well received by participants. Some challenges in implementation were revealed such as Librarians cited inadequate funding, lack of specialized training, and limited policy support as barriers to integrating climate-security education into outreach programmes. The kind of expression from the community expectations**,** was that local leaders expressed a desire for libraries to expand their role in resilience-building, particularly in rural areas where climate impacts are most severe.

Apparently, the document review of the qualitative analysis of library outreach records revealed that most programmes focused on literacy, ICT training, and health awareness. Climate-security topics were rarely prioritized, though a few libraries documented partnerships with NGOs to deliver environmental education. Key challenges in the area of insufficient funding and resources. Limited staff expertise in climate-security issues. Weak integration of library outreach into national climate adaptation policies. There were opportunities with strong community trust in libraries that provides a foundation for scaling climate-security education. The influence of civil societies in partnerships with NGOs, universities, and local councils can enhance programme delivery.

Discussion:

Findings in the area of Libraries as mediators of climate-security awareness, has confirm that libraries are trusted institutions within Nigerian communities, with nearly 90% of survey respondents expressing confidence in their reliability.

This aligns with Aina (2021), who emphasized the evolving role of libraries as agents of civic education. In contexts where misinformation about climate change and insecurity is prevalent, libraries can serve as neutral mediators, bridging the gap between government agencies, NGOs, and citizens. The pilot initiatives documented — such as climate-awareness workshops and disaster preparedness training — illustrate the potential of libraries to foster informed dialogue and reduce tensions around resource conflicts.

Subsequently, the outreach programmes and community resilience, has its own contribution, although most outreach programmes currently focus on literacy and ICT, the study reveals strong community demand for climate-security education. This resonates with Adepoju and Akobe (2023), who argued that libraries contribute to achieving the Sustainable Development Goals by disseminating survival information. By embedding climate modules into existing outreach activities, libraries can enhance community resilience without requiring entirely new infrastructures. For example, literacy workshops could integrate content on sustainable farming practices, while ICT training could include modules on accessing climate adaptation resources online.

In the area of implementation, some challenges were identified. The study highlights persistent challenges: inadequate funding, limited staff expertise, and weak policy integration. These findings echo Adegbore et al. (2024), who noted that Nigerian libraries lack anticipatory strategies for climate preparedness. Without sufficient resources, libraries struggle to sustain climate-focused outreach. Moreover, the absence of national policy frameworks linking libraries to climate adaptation undermines their potential impact. Addressing these challenges requires coordinated efforts between the National Library Board, local councils, and international development partners.

Moreover, opportunities for scaling impact were obvious, despite these constraints, opportunities abound. The strong trust communities place in libraries provides a foundation for scaling climate-security education. Partnerships with NGOs and universities can supply technical expertise and funding, while collaborations with local councils can ensure outreach programmes are tailored to community needs. Furthermore, libraries can leverage digital platforms to extend their reach, particularly in rural areas where climate impacts are most severe. Olatoye (2025) advocates for "green shelves" — curated collections of climate resources — which could be expanded into mobile outreach units serving vulnerable communities.

In this course of research, contribution to scholarship and policy were highlighted. This study contributes to scholarship by empirically linking library outreach to climate-driven security challenges, a nexus rarely explored in Nigerian research. It demonstrates that libraries are not merely passive repositories but active agents of resilience. For policymakers, the findings underscore the need to integrate libraries into national climate adaptation strategies. Doing so would not only strengthen community resilience but also advance Nigeria's commitments under the Paris Agreement and the Sustainable Development Goals. Incorporating climate modules into existing literacy and ICT outreach can broaden impact without requiring entirely new programmes.

Conclusion:

This study has demonstrated that climate change is a significant driver of insecurity in Nigeria, manifesting through displacement, food insecurity, and resource conflicts. While libraries in Nigeria have traditionally focused on literacy and ICT outreach, findings reveal that communities trust libraries as reliable sources of information and expect them to play a greater role in resilience-building. The empirical evidence shows that integrating climate-security education into library outreach programmes can enhance community preparedness, reduce vulnerability, and foster dialogue on sensitive issues. However, challenges such as inadequate funding, limited staff expertise, and weak policy integration hinder libraries from fully realizing this potential. Overall, libraries are underutilized assets in Nigeria's climate adaptation and security strategies. By leveraging their trusted status and outreach capacity, libraries can become pivotal agents of resilience in the face of climate-driven challenges.

Recommendations:

Most of the recommendations for this study are hinges on policy, institution, community and research for further study for the purpose of bringing the gaps that this research is not able to cover. Some of these recommendations are as follows:

- The National Library Board should embed climate-security modules into library outreach frameworks.
- Government agencies should formally recognize libraries as partners in climate adaptation and resilience strategies.
- Funding allocations for libraries should include provisions for climate education and outreach activities.
- Libraries should integrate climate-security content into existing literacy and ICT programmes to maximize reach.
- Librarians require specialized training on climate change, security, and resilience to effectively deliver outreach.
- Partnerships with NGOs, universities, and local councils should be strengthened to provide technical expertise and resources.

- Libraries should expand outreach to rural and marginalized communities most affected by climate impacts.
- Mobile library units and digital platforms can be leveraged to disseminate climate information widely.
- Community leaders should collaborate with libraries to co-design outreach programmes tailored to local needs.
- Future studies should explore longitudinal impacts of library-led climate-security education on community resilience.
- Comparative research across African countries could provide insights into best practices for library outreach in climate adaptation.

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The Role of Professional Associations and Regulatory Bodies in Shaping Librarians and promoting Professional identity in Nigeria

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Abstract

Professional associations and regulatory bodies are essential pillars in strengthening, standardizing, and elevating the prestige of every profession worldwide. In Nigeria, the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) play central roles in shaping professional identity, enforcing standards, and promoting capacity building, and enhancing the visibility of librarians. This paper examines how these institutions influence professional development and prestige in Nigerian institutions of higher learning. It argues that the sustainability of librarianship as a respected knowledge profession depends largely on strengthened regulation, advocacy, continuous professional development, ethical enforcement, and strategic engagement with national and global information ecosystems. The central argument of this paper is that these institutions significantly shape the professionalism, visibility, and societal prestige of librarians. Their ability to enforce standards, advance knowledge, and influence policy directly determines how librarians are perceived and valued in Nigeria's information landscape. The relevance and prestige of librarianship in Nigeria have become topics of increasing debate in recent years. Despite the centrality of information in contemporary society, librarians still struggle with issues relating to recognition, professional identity, and the enforcement of standards. Professional recognition requires not only academic preparation but also well-coordinated policies, ethical standards, and strong leadership from professional bodies. The LRCN should form the key players in accreditation exercise, ensuring that professionalism is maintained by rejecting ghost worker, borrowed equipment, regulating the number of students admitted per session and scrutinizing the papers of the educators available in the department.

Introduction

No discipline is more professional than another, but practitioners decide each discipline's degree of professionalism. The collective sense of values, roles, abilities, and self-perception that characterise a profession is referred to as professional identity. A person's associated occupation defines their professional identity in a unique way. The profession of librarianship is tasked with choosing, obtaining, processing, and efficiently distributing pertinent information resources to information searchers in order to meet their information needs and enable them to make well-informed decisions. Social attitudes and the changing needs of the information society have long shaped the standing and reputation of librarianship in Nigeria (Ogunmodede & Nwalo, 2015). Academic preparation, coordinated policies, ethical standards, and strong leadership from organisations like the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN), which cultivate professional identity and encourage ethical behaviour worldwide, are all necessary for professional recognition.

The Nigerian Library Association started operating under its new name in 1962, according to Alonge (2015). The organization was a part of the West Africa Library Association (WALA) until 1962. Jegede (2015) asserts that NLA should assess its operations based on their substance and applicability to the advancement of librarianship. It should keep an eye on how the program of activities is being carried out by sending sponsors to the project's actual execution. It should also create a nationally recognised schedule for each activity, taking into account the country's geographic dispersion, financial resources, subject matter, and coverage. Guidelines for the types of participants who can benefit from the courses should be provided. The Librarians Registration Council of Nigeria Act, which was passed on June 12, 1995, established the Librarians Registration Council of Nigeria. With the exception of the Nigerian Library Association in 1962, members of the

librarianship profession have been agitating for a long time, which resulted in the Act. The Council is tasked with regulating the practice of librarianship in Nigeria as a parasternal under the Federal Ministry of Education (L.R.C. N, 1995).

The study makes the case that Nigerian librarians' professionalism, visibility, and social standing are shaped by their institutions. Librarians' value is influenced by their capacity to uphold norms and shape policy. Even if information is crucial to society, problems with professional identity and recognition still exist. The Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) are essential to the long-term viability of librarianship as a respectable profession (Ukwoma, Ojobor, Okafor & Njoku, 2025). These organisations continue to be the guardians of professional ideals, the gatekeepers of practice, and the key forces behind the profession's increased prominence. The expertise, identity, and status of librarians in the nation are shaped by their collective efforts.

In order to set standards, direct practice, and help librarians develop their professional identities, the Nigerian Library Association and the Librarians' Registration Council of Nigeria are essential. Concerns regarding the worth and recognition of librarians in Nigeria persist despite these efforts (Sambo, Igiamoh & Abu-Udenyi, 2014). According to preliminary findings, the regulating authority has little influence over people entering the field, making librarianship a last resort for students who are not qualified. Policymakers, educators, and practitioners cannot make well-informed decisions to improve professional structures and practices because there is a dearth of synthesised evidence evaluating the collective impact of regulatory bodies on professional identity formation, despite the fact that earlier studies have examined some aspects of librarianship in Nigeria.

To evaluate the contributions of professional organisations and regulatory organisations to the development of librarianship and the advancement of professional identity in Nigeria, a thorough assessment of the literature is required. The purpose of this study is to improve professional participation in library and information science and offer evidence-based insights to guide policy improvements. In particular, it will look at the functions of professional associations, the impact of regulatory authorities on professional identity, and the elements influencing the professional identity of Nigerian librarians.

GROWTH OF REGULATORY BODIES AND LIBRARY PROFESSIONAL ASSOCIATIONS IN NIGERIA

The Advocacy Pillar: The NLA's Function:

The West African Library Association (WALA), which served as the umbrella organization for librarians in the former British territories in West Africa, gave rise to the Nigerian Library Association in 1962 (NLA, 2025). According to Okon (2015) and Bhuhari and Egunjobi (2024), as countries gained independence, there was a growing demand for national associations. As a result, the profession's pioneers in Nigeria decided to establish a national association for librarians and information service providers with the following goals, among others:

1. To bring together all Nigerians working in the library and information professions.
2. To organise workshops, seminars, roundtables, colloquia, conferences, meetings, and any other events the Association deems appropriate in order to support members' capacity building and foster overall interaction among them.
3. To publish a range of articles about knowledge management, education, library and information science, and any other relevant field.
4. To protect and advance members' welfare and professional interests
5. To work toward the creation and growth of information and resource centers and libraries, particularly public, community, and school libraries
6. To assist the creation and upkeep of standards for librarian training and certification.

The Nigerian Library Association (NLA), which focuses on defending professional interests and advocating for legislative support and library reforms, is a major advocate for librarians and information scientists in Nigeria. It ensures the profession's visibility and relevance in a shifting information landscape by representing librarians both domestically and abroad. Tsagem and Saleh (2019). The NLA's proactive interaction with government entities to affect laws pertaining to libraries is a crucial component of its advocacy. The organization supports state-level support for national efforts, which are essential for the creation and upkeep of public, community, and school libraries that are frequently endangered by insufficient funding and government indifference, and it praises library reforms in states like Niger. (Ugbah-Ossai, 2013). Through a network of thirteen state chapters and particular speciality groups, including the Cataloguing, Classification, and Indexing Section, the NLA strengthens professional identity. It offers forums for professional standards, mentoring, and advocacy. The association fosters a strong community for practitioners to share research and align with worldwide trends through yearly conferences, workshops, and seminars (Alonge, 2015).

In order to stay socially relevant in the digital age, the NLA is pushing librarians to embrace innovation and artificial intelligence (AI). To help librarians become modern information scientists, it collaborates with international organisations like IFLA and hosts webinars on new IT skills. Additionally, the NLA uses a system of honours and recognition to raise the status of the profession. (Olaife & Olarenwaju, 2021). The designation of brand ambassadors and the awarding of the Fellow

of the Nigerian Library Association (FNLA) title are advocacy actions that emphasise quality in librarianship and improve the public's image of it as an essential profession for lifelong learning and national development (Jegede, 2015).

The LRCN's Function in the Regulatory Pillar

The main statutory entity that offers a legal foundation for librarianship in Nigeria is the Librarians' Registration Council of Nigeria (LRCN), which was founded by Act No. 12 of 1995 (LRCN, 2025). Its principal responsibility is to maintain a national registration of competent librarians and set standards for practitioners' knowledge and abilities. In order to safeguard the integrity of the profession from non-professionals, the LRCN grants professional licenses to only individuals who satisfy certain intellectual and ethical requirements (Umar, 2025).

Standardising Library and Information Science (LIS) education through Minimum Academic Standards (MAS) is the LRCN's primary responsibility. With an emphasis on incorporating ICT and digital literacy into the curriculum for a technology-driven information economy, the Council, in collaboration with the National Universities Commission (NUC), accredits LIS programs to match international standards (Opele & Adigun, 2023). The Council recently implemented a tech-enabled registration process with digital portals for licence renewal, and it oversees professional admission through induction and certification ceremonies. By recognising librarians as recognised specialists, this qualification acts as a "license to practise," transcending the function of custodial personnel (LRCN, 2025).

The LRCN mandates Continuous Professional Development (CPD) for license renewal in order to stay relevant in a rapidly evolving economy. To close the skill gap for contemporary librarians, it has arranged training on themes like digital curation and artificial intelligence. This guarantees the continued competitiveness of Nigerian librarians worldwide. The LRCN also upholds professional ethics among its members. (Nwalo & Ogunmodede, 2015). In order to promote public trust and preserve the integrity of the "Librarian" title in Nigeria in the face of competition and structural difficulties, the LRCN is empowered to look into professional misconduct and remove offending practitioners from the national register. Umar (2025).

The Evolving Landscape of Nigerian Library and Information Professions and Careers

In Nigeria, the field of library and information science (LIS) is changing from a collection-centric to a service-oriented digital model due to changes in user expectations, economic challenges, and technical improvements. These factors include:

1. *Transition from Physical Custodianship to Digital Curation:* Nigerian librarians are clearly changing from being "keepers of books" to "curators of digital content," with libraries investing more in electronic databases and institutional repositories than in conventional physical collections (Opele & Adigun, 2023). The embrace of automation and digital transformation techniques by university libraries, which prioritise remote access and the administration of born-digital assets over conventional print purchases, reflects this change.

2. ***Integration of Emerging Technologies (AI and Metaverse):*** Nigerian LIS practice is moving beyond basic ICT to incorporate cutting-edge technologies like the Metaverse and artificial intelligence. In order to develop immersive learning experiences, the profession evaluates its readiness for the Metaverse. Librarians must acquire new technical skills that are not often included in their curricula in order to use AI for automated cataloguing, reference services, and predictive analytics (Odunlade & Ojo, 2023).

3. Extension of Career Pathways Outside of Conventional Libraries: LIS graduates now have more options for employment in the business sector, including positions as data analysts, knowledge managers, and information brokers. The emergence of infopreneurship has transformed the traditional perception of librarianship and fostered a new identity as "information scientists" skilled in data-intensive environments by allowing librarians to serve as independent consultants for government and non-governmental organisations (Okon, 2015).

4. ***Acceleration of Virtual Services Following the Pandemic:*** In Nigeria, the COVID-19 pandemic accelerated the transition to virtual library services, leading academic libraries to provide 24-hour access and instant messaging for reference enquiries. In order for conservative institutions to stay relevant, this shift highlighted the significance of social media and mobile technology for user engagement (Odunlade & Ojo, 2023).

5. Modernization of curricula and competency gaps: It is a serious concern that LIS departments in Nigeria should revise the existing curricula so as to adequately cater to the demands of the labor market. While effort is being made toward information and communication technology integration, subject specialization, and entrepreneurship, the gap between what is taught in the lecture rooms and high-tech library practice continues. This has consequently resulted in the growing focus on professional certificates and internships in LIS training (Odunlade & Ojo, 2023).

6. Increased focus on research support and scholarly communication: Librarians in Nigeria have continued to take on active roles in the research life cycle focusing on scholarly communication and open access publication. They have become agents that render digital publishing services, and also manage open-journal systems in order to make research done in Nigeria more prominent and visible in the global environment. Librarians work closely with faculty members and researchers on the issues of copyright, impact factors and indexing of local researches (Olanrewaju & Olaife, 2021).

7. ***Regulatory and professional compulsory transition:*** For the past twenty years, mandatory, legal, licensing and certification of librarians by the Librarians' Registration Council of Nigeria (LRCN) has evolved, replacing voluntary certification that was previously the order of practice. The purpose was to promote professionalism and to make it difficult for the role of the librarian to be encroached upon by non-professionals (LRCN, 2025).

8. In spite of the development so far, infrastructural and funding challenges have remained intractable obstacles for digital development. Challenges of inconsistent power supply and high costs of Internet access persist, thereby creating a "dual-speed" reality where well-resourced libraries advance while public and school libraries lag behind due to lack of basic infrastructure (Saleh & Tsagem, 2019).

THE NEED FOR SHAPING LIBRARIANS AND PROMOTING PROFESSIONAL IDENTITY IN NIGERIA ESPECIALLY IN FACE OF THE CURRENT EVOLVING ECONOMY

Shaping librarians and promoting a strong professional identity in Nigeria is crucial for the sector's sustainability amid a complex economy and challenges such as digital transformation and inter-professional competition. This emphasis on professional fortification is essential for the following reasons:

1. Driving Economic Growth and National Development: Libraries and informed professionals drive economic growth by democratizing information access. In Nigeria, librarians aid human capital development and innovation by offering entrepreneurial and educational resources. By training librarians as proactive information managers, professional bodies help them support national development goals and promote sustainable economic growth through market efficiency and information parity (Umar, 2025).

2. **Minimizing and closing the digital divide as global economy becomes knowledge driven:** As global economy become more knowledge-based, librarians in Nigeria have responsibility for acquiring updated ICT skills, in order to carry out digital literacy programs and managing electronic databases to serve users effectively in a digital information world (Opele & Adigun, 2023).

3. **Mitigating information asymmetry and inequality:** In developing countries like Nigeria, information asymmetry causes reduced productivity and innovation. Strong professional identity is indispensable for librarians to be able to compete and work effectively with users, librarians are central to distribution of information, and inclusive development and empowerment for economic growth, which would make the economy become more resistant and productive (Tella, 2016).

4. Providing continuing professional development amidst rapidly changing technological world: Information growth, adoption of new information technologies such as AI and robots means librarians have to upgrade skills continually. This process is crucial especially when libraries are rapidly becoming electronic resource centers, it provides the needed professional identity which has the features of flexibility and adaptivity to meet these changes (Saleh & Tsagem, 2019).

5. Improving professional pride and job satisfaction: There is a strong correlation between having a well-formed professional identity and job satisfaction of Nigerian librarians; low remuneration and recognition compared to other professions have resulted in diminished sense of self worth of most librarians, hence positive changes in attitudes and professional self-esteem will lead to better work output (Opele & Adigun, 2023).

6. Maintaining ethical standards and professional accountability: The Nigerian Library Association (NLA) and professional bodies such as the Librarian's Registration Council of Nigeria (LRCN) have professional codes of conduct which must be upheld so as to protect the profession from misconduct and ultimately safeguard the interests of the practitioners and the users; a strong professional identity ensures this commitment to the established ethics and practices in a very competitive professional environment (LRCN, 2025; Umar, 2023).

7. Strategic advocacy for funding and policy support: A well developed professional identity is critical for effective advocacy as associations and profession can champion key issues. As Nigerian economy faces numerous challenges, a strong professional identity could help librarian advocate effectively for relevant library policies and increased support for public library funding; without this there will be challenges with resources for facilities and service quality in response to information demand (Saleh & Tsagem, 2019).

8. Developing inter-professional competition and Networking: Developing the profession helps in carving out a niche for librarians and compete well with other specialized professionals. Association provides opportunity for interaction and the sharing of best practices and that is critical to succeeding in the current globalized knowledge driven economy. Nigerian librarians can display their inherent worth when aligned with global standards of practice (Olanrewaju & Olaife, 2021).

CRITICAL ISSUES & CONTEMPORARY CHALLENGES OF LIBRARIANSHIP IN NIGERIA

The landscape of librarianship in Nigeria is influenced by various systemic, technological, and socio-economic factors, showing progress in regulation and digital adoption, yet still facing challenges that could hinder its growth and public significance. The following some critical factors that have emerged as the most significant challenges facing the sector.

1. Inadequate Funding and Budgetary Constraints: The chronic underfunding of library systems at all government levels presents a significant challenge. Public and academic libraries often operate on minimal budgets sufficient only for essential overhead, restricting funds for new books, electronic resources, and maintenance. This financial constraint hinders libraries' roles as information hubs and their capacity to adopt modern services (Ukwoma, Ojobor, Okafor & Njoku, 2025).

2. Chronic Power Supply and ICT Infrastructural Decay: The transition to digital librarianship in Nigeria is obstructed by unreliable power and costly internet. Libraries struggle with unstable electricity and outdated hardware, which contributes to a "digital divide" and hampers their ability to maintain e-resource centers and provide 24-hour virtual services essential in the modern information economy (Ramzan, Hussain, & Ahmad, 2019).

3. Professional Identity Crisis and Public Perception: Librarianship in Nigeria is perceived to have a low social status, often compared to more esteemed professions like Law and Engineering. Librarians are commonly seen as just "bookkeepers," which contributes to an identity crisis in the profession. The limited visibility of library services in everyday life fosters public indifference and a lack of attention from policymakers towards library development (Ossai-Ugbah, 2013).

4. Encroachment by Non-Professionals and "Quackery": Many institutions still hire unqualified individuals to lead library departments, despite regulatory efforts by the LRCN. The influx of non-certified personnel, particularly IT specialists, compromises service quality and undermines professional standards set by the Council. Additionally, the absence of stringent legal measures to prevent such practices poses a significant threat to the integrity of the profession (Okiy, 2024).

5. Curriculum-Market Mismatch in LIS Education: There is growing concern that Nigerian Library and Information Science (LIS) curricula are misaligned with market demands, as they focus heavily on traditional theory despite the industry's shift towards big data, AI, and digital curation. This results in a competency gap, with graduates possessing strong theoretical knowledge but lacking the practical skills needed for modern automated libraries (Tella, 2016).

6. Poor Reading Culture and Declining Patronage: The decline of the "reading culture" in Nigeria is attributed to social media distractions and insufficient access to community libraries. Students often perceive libraries merely as exam study areas rather than as resources for ongoing education and leisure reading. This trend hampers librarians' efforts to advocate for necessary funding and facility improvements from government officials (Alonge, 2015; Ajist, 2024).

7. Brain Drain and Lack of Career Motivation: Poor remuneration and unclear career progression have caused a "brain drain" among LIS professionals, who often leave for better opportunities in the private sector or abroad. Those who stay encounter low morale due to inadequate recognition and challenging working conditions in state-owned library system (Ajist, 2024).

8. Security Challenges and Vandalism: In recent years, libraries have faced significant security issues, including book theft, resource mutilation, and vandalism of buildings. Some libraries are vulnerable during civil unrest or insufficient security staff to safeguard costly ICT equipment, leading to the loss of irreplaceable archival materials and valuable digital hardware, which hinders sector development (Buhari & Egunjobi, 2024).

9. **Corruption Factors in Nigerian Librarianship**: Corruption in Nigeria's educational and library sectors manifests as a significant impediment, diverting resources and undermining professional standards. Key factors include the mismanagement of library funds, where budgeted amounts are often inadequately released or misappropriated; systemic nepotism and bribery affecting promotions and contracts; academic dishonesty, such as the embezzlement of funds for teaching materials; and weak enforcement due to greed and low living standards, all of which compromise academic integrity and knowledge dissemination (Ojukwu & Omeluzo (2025).

9. Inter-Professional Competition: Librarians in Nigeria face significant competition from information-related fields, particularly from IT professionals managing digital repositories. This encroachment is compounded by a perceived "competency gap," as many librarians lack the necessary ICT skills for a technology-driven society (Olanrewaju & Olaife, 2021).

THE ROLE OF PROFESSIONAL ASSOCIATIONS AND REGULATORY BODIES IN SHAPING LIBRARIANS AND PROMOTING PROFESSIONAL IDENTITY

A**ccreditation, Professionalization and enforcement of Standards:** Accreditation assesses the quality of higher education institutions, guiding stakeholders on the validity of programs (Okon, 2015). Professionalization requires defined education and licensing standards, as exemplified by Nigeria's LRCN, which, under Act 12 of 1995, regulates librarianship and ensures minimum qualifications (Cruess et al., 2019). Maintaining such standards is essential for public confidence, similar to sectors like medicine and pharmacy, where professional identity development is vital. Approval of non-existent entities undermines professional integrity and identity. The LRCN is urged to spearhead the accreditation process to ensure professionalism by rejecting fraudulent practices and thoroughly vetting educator qualifications (Opele & Adigun, 2013).

Training and development of librarians: In Nigeria, the NLA holds annual conferences and workshops on emerging technologies to update librarians. However, professional librarian training requires greater focus, as studies show that many librarians in developing countries, including Nigeria, lack digital skills due to insufficient access to necessary resources (Nkebukwa, 2020). Admission requirements for library schools are influenced by the available manpower and infrastructure, highlighting the need for professional bodies to play a crucial role in training through digital transformation from the outset of the education process.

Regulation of ethical standards in librarianship is essential for professionalism and accountability in managing information resources. Librarians face complex environments where intellectual freedom and user confidentiality are crucial. Ethical guidelines promote responsible information service delivery and professional conduct, emphasizing fairness, confidentiality, and equitable access, as endorsed by the International Federation of Library Associations and Institutions (IFLA, 2012), which advocates for unrestricted information access while respecting user privacy and rights.

American Library Association established a Code of Ethics emphasizing librarians' duty to provide excellent service, protect intellectual freedom, and resist censorship. It highlights the significance of ethical frameworks, respect for intellectual property, and professional competence. Professional associations, statutory bodies, and education regulate these ethical practices. In Nigeria, the Librarians' Registration Council of Nigeria (LRCN) oversees the registration of librarians and the enforcement of professional standards and ethical principles.

Through conferences, workshops, and training programs, NLA is helping to disseminate professional ethics among librarians by advocating for ethical conduct (NLA, 2018). Professional bodies and organizational policies for librarians serve to enforce ethical awareness and discipline in libraries. Users' privacy, good practice in the use of information, and ethical professional conduct are areas where rules of practice guide librarians' behavior, which are largely synonymous with ethical codes of conduct. Preservation of personal information obtained via several services is essential in user privacy. Professional expertise and competence, and integrity are among the ethical code of conduct. Maintaining professional skills is a prerequisite for continued librarians' training as information needs, technologies are changing.

Advocacy, Visibility, and Public Image: Librarianship's professional identity relies on standards, ethics, and visibility, which are currently lacking compared to fields like law and medicine. The Nigerian Library Association (NLA) can enhance members' practices by translating research findings into action. Saleh and Tsagem (2019) mention that NLA's role could bolster advocacy and development within the LIS profession. Kargbo (2017) emphasizes the need for NLA to engage members in discussions on digital literacy and information ethics. Effective advocacy can improve societal perceptions and confidence in librarians. Ethical codes from NLA and the LRCN set essential guidelines for librarians, but violations, including inefficiency and political interference, threaten public trust, highlighting the need for regulatory enforcement of standards.

Strengthening Professional Identity among young Librarians: Professional identity is crucial for the long-term prestige and sustainability of the library profession. Younger librarians, facing challenges like limited mentorship and inadequate exposure (Olanrewaju & Olaifa, 2021), benefit greatly from professional associations that offer mentorship and career development. Initiatives such as the NLA Young Professionals Forum and LRCN internship programs are significant yet require expansion. Investment in youth development is vital for the profession's continuity. Members join these associations to define themselves as library professionals and to enhance librarianship (Sullivan, 1976). Additionally, ethical principles guiding librarianship are codified in the Code of Conduct, which sets expected standards for behavior and responsibilities.

Challenges affecting Professional identity of Librarians in Nigeria

Low Public Awareness and Misconceptions about Librarianship: Adequate publicity is vital for the growth of organizations, yet library associations struggle with visibility in contrast to the well-publicized Nigerian Medical Association and Nigerian Bar Association, which attract high-level officials, including the President of Nigeria (Ogunmodede & Nwalo, 2015). This lack of outreach affects member engagement and public awareness of programs. Additionally, societal misconceptions about librarians, seen merely as bookkeepers rather than key figures in digital curation and research support, hinder the profession's perceived value compared to law, medicine, or ICT fields (Ramzan, Hussain & Ahmad, 2019).

Weak Enforcement of Professional Standards: Regulation of the librarianship profession by the Librarians' Registration Council of Nigeria (LRCN) is often ineffective, leading to weak compliance with licensing and qualification standards. Many institutions hire unqualified personnel as "librarians," which dilutes professional boundaries, undermines the identity of trained librarians, and reduces the prestige of formal qualifications (Allahde & Kasa, 2019).

Limited Advocacy and Poor Visibility: Professional identity in librarianship is hindered in Nigeria due to a lack of visibility and advocacy in key discussions such as digital literacy and educational policy. As a result, librarians are often under-recognized in their crucial roles in knowledge management and societal development (Ossai-Ugbah, 2013; Allahde & Kasa, 2019).

Rapid Technological Change and Skill Gaps: As libraries implement new technologies like AI-driven search systems and data analytics, many librarians face challenges due to insufficient training and ICT background, leading to a crisis of confidence and identity as they struggle to meet 21st-century professional expectations (Allahde & Kasa, 2019; Ramzan, Hussain & Ahmad, 2019).

Low Research Output and Scholarly Visibility: Active contributions to research enhance the professional identity of librarians. In Nigeria, librarians encounter challenges including heavy workloads, insufficient mentorship, limited journal access, and low motivation to research, diminishing their intellectual presence in scholarly communities (Sambo, A. S., Igiamoh & Abu-Udenyi, 2014; Uchendu, Aniche & Ezebuiro, 2016).

Lack of Clear Career Progression and Recognition: Ambiguous career pathways diminish morale and weaken the perceived status of the profession (Ezeani, Eke &Ugwu, 2015).

STRATEGIES FOR PROMOTING PROFESSIONAL IDENTITY

1. The activities of the association should be given a wide publicity. Adequate publicity is an essential ingredient that enhances growth and development of any profession (Uchendu, Aniche & Ezebuiro, 2016).
2. People should recognize the Nigerian Library Association (NLA) similarly to other esteemed organizations in Nigeria. The NLA should utilize various channels, including printed, non-printed media, and social media, to promote its activities to the public (Sambo, A. S., Igiamoh & Abu-Udenyi, 2014).
3. Membership in the NLA should demonstrate financial commitment similar to other associations. The government should avoid funding associations due to greater financial obligations elsewhere, as it risks compromising the association's identity, reflecting the adage, 'he who pays the piper dictates the tune (Allahde & Kasa, 2019).
4. Government officials need to adopt a positive attitude towards libraries and the associations representing librarians. Their reports should inform the formulation of information policies that support the development of various economic sectors. Recognizing that information is fundamental for sustainable development, officials must appreciate libraries as key information custodians and allocate sufficient funding for acquiring relevant educational resources (Allahde & Kasa, 2019).

Future Innovative Strategies for Identity Promotion in Librarianship by Professional Bodies in Nigeria

The future of librarianship in Nigeria hinges on transitioning from traditional roles to technology-driven strategies. The Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) need to embrace innovative methods that resonate with the global digital economy and tackle local challenges to strengthen professional identity.

1. **Implementation of Blockchain for Professional Credentialing:** To combat certificate racketeering and quackery, a strategy leveraging blockchain technology for professional license verification is proposed. The LRCN aims to establish an immutable digital ledger of registered librarians, allowing employers to verify a practitioner's status in a tamper-proof manner. This initiative would elevate the prestige of the "Certified Librarian" title and ensure that only qualified individuals occupy critical information roles (Ramzan, Hussain & Ahmad, 2019).
2. **AI-Driven Personal Branding:** To survive in an age of automated search functions, Nigerian librarians will need to become AI-driven information consultants. This means that they need to gain skills in using AI tools such as predictive cataloging, personalized user experience, and data analytics. They can remain in the "Human-in-the-Loop" to assure ethical use of AI and counter any algorithmic bias and thereby present themselves as "Information Engineers" indispensable in a "War on Misinformation" (Ajist, 2024).
3. **Infopreneurship Incubators:** The NLA ought to pioneer "Infopreneurship Incubators" in which librarians will be trained to monetize their information management expertise. The aim of training librarians to work as freelance data auditors, digital archiving consultants, or independent information brokers will allow them to enjoy economic autonomy and the prestige associated with being information entrepreneurs and vital participants in the corporate economy (Ajist, 2024).
4. **Metaverse-Ready Library Spaces:** Librarians in Nigeria ought to prepare their organizations to embrace the Metaverse. This can be done by developing a "virtual library twin" or a VR version of their libraries in which the heritage of Nigeria could be shared with people across the world. The librarians will act as "Virtual Reality Navigators", showcasing their skills beyond that of being mere "book keepers". This change will offer a new identity for the librarians. (Kargbo, 2017).
5. **Strategic Inter-Professional Convergence:** Librarians can enhance their professional image and employment opportunities by linking with and collaborating with other professions like cybersecurity, law, and data science. Through the creation of "hybrid certifications" in the specializations of legal informatics or health data management,

librarians will become integral part of important sectors and indispensable to other professions (Ukwoma, Ojobor, Okafor, & Njoku, 2025).

6. **Aggressive Digital Visibility and Influence Marketing:** The NLA should use influence marketing on social networks such as LinkedIn and X to highlight success stories and how librarians are driving digital innovation in companies. This practice is aimed at achieving "perception engineering" which is essential in making policy makers and the general public view librarians positively and appreciate the roles they play in national progress (Odunlade & Ojo, 2023).
7. **Globalized Competency Frameworks:** In order for professional identity to be promoted, there must be uniformity in the Library and Information Science (LIS) standards in Nigeria and internationally. The LRCN must implement "Global Practice Passes" which will grant the recognition of competencies and qualifications of Nigerian-certified librarians globally, making the local licenses more valuable and fostering professional self-pride and internationalism (Umar, 2025).
8. **Gamification of Continuous Professional Development (CPD):** Mandatory CPD activities for Nigerian librarians can be made more engaging through gamification strategies. Librarians can achieve a sense of accomplishment in areas such as acquiring knowledge in Python and digital curation by earning badges and gaining ranks in leadership boards. This modern approach appeals to younger professionals and reinforces a professional outlook that is up to date and forward thinking (IFLA, 2016).
9. **Community-Centric 'Living Libraries:** Ultimately, the profession must forge a distinct identity through Community-Centric Advocacy with the library transformed to the "Living Room" for societal advancement and problem-solving. The profession's potential in areas of social cohesion will be showcased by librarians who take on the role of facilitators of "Human Library" events and coding boot camps for communities (Uchendu, Aniche, & Ezebuiro, 2016; Ajist, 2024).

Conclusion

Professional associations and regulatory bodies are vital for the advancement of librarianship in Nigeria, with the NLA and LRCN playing key roles in regulation, ethics, and advocacy. The future influence of the profession hinges on strengthened institutions and active participation from librarians. To elevate their status, Nigerian librarianship requires sustained advocacy, improved regulations, expanded training, and global cooperation. Both associations and librarians must commit to proactive engagement and uphold professional standards to secure the profession's prestige in the 21st century.

Recommendations

To enhance the professional status and operational efficiency of librarianship in Nigeria, a series of recommendations are suggested to guide the profession in addressing modern challenges.

1. To combat professional encroachment, the LRCN should leverage its powers to prosecute institutions violating the LRCN Act of 1995 by employing uncertified personnel. Shifting from advisory oversight to a more legal approach will deter "quackery" and ensure that only licensed practitioners occupy professional roles, thereby enhancing the value of professional licenses.

2. Mandatory integration of professional ethics, the LRCN Act, and NLA history into undergraduate LIS curricula should be advocated. Collaboration between the NLA, LRCN, and the National Universities Commission (NUC) is essential to instill professional heritage in graduates, ensuring they understand their societal value and identity upon entering the workforce.

3. Transitioning to a tech-driven Mandatory Continuous Professional Development (MCPD) framework requires a restructured focus on emerging technologies, particularly Artificial Intelligence (AI) and Data Management. Programs should be delivered via mobile-friendly digital platforms, enabling librarians to remain globally competitive, irrespective of their geographical location.

4. Aggressive rebranding efforts are required to redefine the role of "Librarian" to "Information Scientist." Through a sustained publicity campaign that leverages modern media and highlights digital library innovations, the NLA can counter outdated perceptions and position librarians as essential data guides and valuable research partners.

5. Professional bodies should create "business incubation units" to train librarians in infopreneurship, enabling them to monetize information management and digital archiving services. This initiative will decrease dependence on diminishing government funding and supports librarians in becoming independent consultants in the private sector

6. The LRCN adopt a blockchain-based system for its national register to prevent certificate forgery. This system would offer employers a tamper-proof, real-time verification portal for professional licenses, enhancing institutional trust and streamlining the hiring process for certified professionals in public and private sectors.

7. Strategic alliances with organizations like the Computer Professionals Registration Council of Nigeria are recommended for the NLA. These partnerships could facilitate collaborative certifications in areas such as Cybersecurity Information Management, helping librarians to establish their identity and gain respect in prestigious professional domains..

8. To improve scholarly visibility, the NLA and LRCN are encouraged to offer grants and awards to librarians leading digital publishing initiatives or overseeing open-access repositories, thereby fostering their role as essential researchers in the global knowledge economy.

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THE ROLE OF PROFESSIONAL ASSOCIATIONS IN SHAPING LIBRARIANS AND INFORMATION SERVICES PROFESSIONALS: A CASE STUDY OF NIGERIAN LIBRARY ASSOCIATION RIVERS STATE CHAPTER

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Abstract

This study examined the state of libraries and librarianship in Nigeria, focusing on the role of Professional Associations in the training and development of librarians. The study adopted a descriptive survey research design and was conducted in Rivers State, Nigeria, focusing on members of the Nigerian Library Association (NLA), Rivers State Chapter. The population of the study consisted of 172 members, while a sample size of 120 respondents was selected using a simple random sampling technique. Data were collected using a structured questionnaire titled *"Professional Associations and Librarianship Development Questionnaire (PALDQ)"*. The questionnaire was administered directly to respondents and retrieved upon completion. Data collected were analyzed using frequency counts and percentages. Findings revealed that professional associations play a significant role in librarians' training and development through workshops, seminars, and continuous professional development programmes. The study also showed that professional associations positively influence the quality of information services by enhancing ICT skills, promoting modern technologies, and improving service delivery. Furthermore, librarians benefit from association activities through improved career advancement opportunities, access to updated information, and exposure to global best practices. The study concluded that professional associations are essential in strengthening librarianship and improving information service delivery in Nigeria. It recommended increased training opportunities, wider use of ICT-based programmes, and improved accessibility to association activities for all librarians.

Keywords: Professional associations, librarians, information services professionals, professional development, information services

Introduction

Libraries are important knowledge institutions that support education, research, innovation, and lifelong learning. In Nigeria, libraries exist in different forms such as academic, public, school, and special libraries, and they serve as key access points to information for students, researchers, and the general public. Through their collections and services, libraries contribute to national development by improving literacy, supporting academic success, and promoting informed citizenship. However, despite their importance, the state of libraries and librarianship in Nigeria is still developing and continues to face structural and operational challenges. These challenges include inadequate funding, poor infrastructure, low staff capacity in some areas, and limited integration of modern technologies into library services (Ike et al., 2025; Yusuf et al., 2025).

In recent years, the rapid growth of information and communication technologies (ICTs) and digital resources has changed how libraries operate globally. Nigerian libraries are gradually adapting to these changes, but progress remains uneven across institutions. Many libraries still struggle with automation, digital cataloguing systems, internet access, and the provision of up-to-date electronic resources. These limitations affect the quality of information services available to users and reduce the efficiency of library operations. As a result, librarians are required to develop new skills and competencies to remain relevant in a fast-changing information environment (Akin-Fakorede et al., 2026).

In addressing these challenges, professional associations play a very important role in shaping librarianship and improving information services in Nigeria. Key bodies such as the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) provide leadership in setting professional standards, regulating practice, and promoting ethical

conduct among librarians (Ogunjimi, et al, 2026). These associations also organize workshops, conferences, and training programmes aimed at improving the skills and knowledge of librarians and information professionals. Through these activities, they help to bridge the gap between traditional librarianship and modern information service delivery (Iwuchukwu & Emuchay, 2023).

Professional associations support capacity building and continuous professional development, which are essential in ensuring that librarians can effectively respond to emerging trends such as digital libraries, artificial intelligence, and knowledge management systems. Studies have shown that librarians who participate in professional association activities tend to demonstrate higher levels of competence, adaptability, and innovation in service delivery (Sulyman et al., 2022; Yusuf et al., 2025). These associations also advocate for better working conditions, improved funding, and policy support for libraries in Nigeria, thereby strengthening the overall library system.

Despite these efforts, gaps still exist between policy intentions and actual implementation in many libraries across the country. Issues such as irregular training opportunities, limited institutional support, and inadequate collaboration among stakeholders continue to affect the effectiveness of professional associations. Therefore, it is important to examine how these associations influence the development of librarianship and information services in Nigeria, especially in the context of current technological and educational demands (Abdullahi, et al, 2024).

This study, therefore, explores the state of libraries and librarianship in Nigeria, with a particular focus on the role of professional associations in shaping the competencies of librarians and improving the quality of information services. Understanding this relationship is essential for strengthening library practice and ensuring that libraries continue to meet the needs of users in a dynamic information society.

Statement of the Problem

Libraries in Nigeria are expected to support education, research, and national development by providing access to reliable information. However, many libraries still face challenges such as inadequate funding, poor infrastructure, and limited access to modern technologies. These problems reduce the quality of library services and affect users' satisfaction, In addition, many librarians lack sufficient skills in emerging areas like digital librarianship and information technology. Although professional associations such as the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN) provide training and support, their impact is not consistently felt across all institutions in Nigeria. As a result, there is a gap between the expected standards of library services and the actual performance of many libraries in the country. This study, therefore, examines the state of libraries and librarianship in Nigeria and the role of professional associations in improving librarians' competencies and information services.

Research objectives

The aim of this study is to examine the role of professional associations in shaping librarians and improving information service delivery. The specific objectives of the study are to:

1. Examine the role of professional associations in the training and development of librarians in Nigeria.
2. Investigate how professional associations influence the quality of information services provided in Nigerian libraries.
3. Determine the extent to which librarians benefit from the programmes and activities of professional library associations.

Research Questions

This study is guided by the following research questions:

- What is the role of professional associations in the training and development of librarians in Nigeria?
- How do professional associations influence the quality of information services provided in Nigerian libraries?
- To what extent do librarians benefit from the programmes and activities of professional library associations?

Literature Review

Libraries and Librarianship in Nigeria

Libraries are widely recognized as vital institutions that support education, research, lifelong learning, and national development by providing access to organized and reliable information resources. In Nigeria, librarianship has developed

over time from traditional, manual-based systems to more modern, technology-driven practices. However, this development has not been uniform across all types of libraries and regions in the country.

Iwuchukwu and Emuchay (2023) explain that the Nigerian library and information science profession has evolved significantly since the post-independence era, particularly within academic institutions. Despite this progress, the profession continues to face long-standing challenges such as inadequate funding, poor infrastructure, and inconsistent policy implementation. These challenges affect the ability of libraries to deliver efficient and user-centered services.

Similarly, Ike et al. (2025) observe that many academic libraries in Nigeria still struggle with limited ICT infrastructure, insufficient digital collections, and poor maintenance culture. These issues reduce the effectiveness of library services in supporting teaching, learning, and research. As a result, libraries often operate below international standards, especially in comparison with libraries in more developed countries. The rapid growth of digital information has placed new demands on libraries. Users now expect faster, easier, and remote access to information resources. However, many Nigerian libraries are still transitioning from print-based systems to hybrid or fully digital systems, which creates service gaps and limits user satisfaction.

Professional Associations in Librarianship

Professional associations are organized bodies that regulate, support, and promote the development of a profession. In librarianship, such associations play a critical role in setting standards, promoting ethical practices, and ensuring continuous professional growth. In Nigeria, key professional bodies include the Nigerian Library Association (NLA) and the Librarians' Registration Council of Nigeria (LRCN).

Sulyman et al. (2022) emphasize that professional associations are central to strengthening the professionalism of librarians through advocacy, training, and policy engagement. These associations provide platforms for librarians to interact, share knowledge, and engage in discussions that shape the future of the profession.

The Nigerian Library Association, for instance, organizes annual conferences, workshops, and seminars that bring together librarians from different institutions. These events serve as avenues for capacity building and exposure to emerging trends in librarianship, such as digital librarianship, open access resources, and information literacy development.

The LRCN, on the other hand, regulates the practice of librarianship in Nigeria by ensuring that only qualified individuals are licensed to practice. It also promotes adherence to professional ethics and standards, thereby improving the quality and credibility of library services in the country.

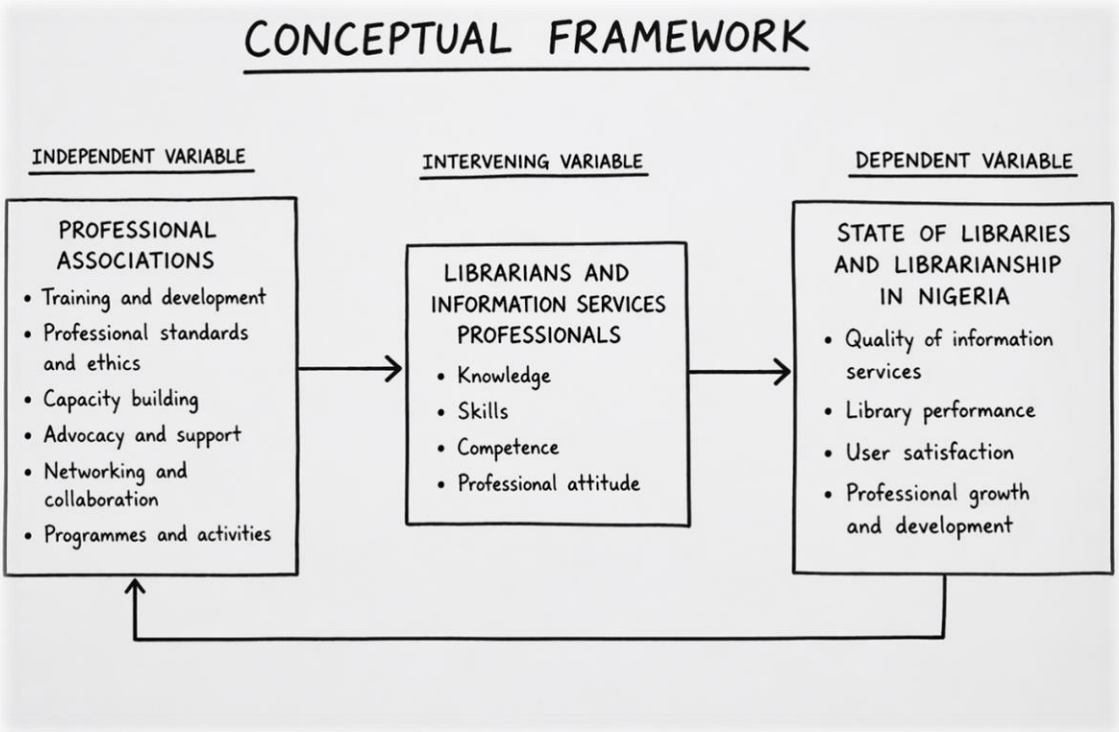
Training and Development of Librarians

Training and development refer to structured efforts aimed at improving the knowledge, skills, and competencies of professionals. In librarianship, continuous training is essential due to the rapidly changing nature of information technologies and user needs. Yusuf et al. (2025) note that librarians today are expected to possess competencies in digital resource management, data analysis, artificial intelligence tools, and knowledge management systems. These new demands make continuous professional development a necessity rather than an option. Professional associations contribute significantly to this process by organizing workshops, refresher courses, conferences, and certification programmes (Oluwole, et al, 2025). These activities help librarians stay updated with global best practices and improve their ability to deliver effective information services. However, access to such training is not always equal, as librarians in rural or underfunded institutions often have fewer opportunities to participate. The effectiveness of training programmes depends on their relevance, quality, and follow-up support. In some cases, training is not fully translated into practice due to lack of institutional support or inadequate infrastructure in libraries.

Quality of Information Services

Quality information service refers to the ability of libraries to provide accurate, timely, relevant, and user-friendly information to their clients. High-quality library services depend on several factors, including staff competence, availability of resources, technological infrastructure, and effective management systems. In Nigeria, the quality of library services is often affected by resource limitations and technological gaps. Iwuchukwu and Emuchay (2023) highlight that many libraries still rely heavily on outdated systems, which affects speed and efficiency in service delivery. This limits user satisfaction and reduces the overall impact of libraries on education and research. However, professional associations contribute to improving service quality by equipping librarians with modern skills and encouraging the adoption of international best practices. Through training and advocacy, they help librarians improve cataloguing systems, reference services, digital resource management, and user support services. Moreover, the integration of ICT into library services has improved access

to information in some institutions. Digital catalogues, online databases, and electronic libraries are gradually being adopted, although not yet fully implemented across the country.



Empirical Studies

Iwuchukwu and Emuchay (2023) conducted an empirical study on the development and future of the academic library and information science profession in Nigeria from 1962 to 2023. The study adopted a historical research design. The population of the study consisted of published literature, archival records, policy documents, and reports relating to librarianship in Nigeria. A purposive sampling technique was used to select relevant documents that provided information on the evolution of the profession. Data were collected through document analysis and content review. The data were analyzed using qualitative content analysis to identify patterns and trends in the development of librarianship over time. The findings revealed that librarianship in Nigeria has experienced significant transformation, especially with the introduction of ICT, but progress remains uneven due to inadequate funding, weak policy implementation, and infrastructural challenges. The study recommended stronger policy support and increased investment in library development.

Ike et al. (2025) conducted an empirical study on empowering academic librarians through continuous professional development in Imo State, Nigeria. The study adopted a descriptive survey research design. The population consisted of academic librarians working in university libraries in Imo State, and a simple random sampling technique was used to select 120 respondents. Data were collected using a structured questionnaire designed on a four-point Likert scale. The data were analyzed using descriptive statistics such as mean and standard deviation. The findings revealed that continuous professional development significantly improves librarians' ICT skills, cataloguing abilities, and user service delivery. However, the study also found that inadequate funding, limited training opportunities, and poor institutional support hinder effective professional development. The study recommended increased funding and regular training programmes for librarians.

Yusuf et al. (2025) conducted an empirical study on the influence of knowledge management practices on librarians' competency in artificial intelligence in tertiary institutions in Kogi State, Nigeria. The study adopted a correlational research design. The population comprised librarians in tertiary institutions, and a stratified sampling technique was used to select 150 respondents. Data were collected using a validated structured questionnaire. The data were analyzed using Pearson Product Moment Correlation and regression analysis to determine relationships between variables. The findings revealed a significant positive relationship between knowledge management practices and librarians' competency in artificial intelligence tools. The study also showed that librarians who participated in training programmes organized by professional associations demonstrated higher digital competence. The study recommended strengthening knowledge management practices and expanding AI-related training for librarians.

Sulyman et al. (2022) conducted an empirical study on investing in the employability of librarians as an impetus for enhancing professionalism in Nigeria. The study adopted a descriptive survey research design. The population consisted of librarians in academic and public libraries across Nigeria, and a purposive sampling technique was used to select 200

respondents. Data were collected using a structured questionnaire. The data were analyzed using descriptive statistics such as frequency counts, percentages, and mean scores. The findings revealed that participation in professional association activities such as conferences, workshops, and seminars enhances librarians' employability and professional competence. However, the study also found that financial constraints and unequal access to training opportunities limit participation. The study recommended improved funding and more inclusive professional association programmes.

Aina (2023) conducted an empirical study on library and information science education and professional development in Africa, with emphasis on Nigeria. The study adopted a qualitative research design. The population consisted of LIS educators, professionals, and curriculum documents across selected African countries. A purposive sampling technique was used to select key informants and relevant documents. Data were collected through semi-structured interviews and document analysis. The data were analyzed using thematic analysis to identify recurring themes in LIS education and professional development. The findings revealed that LIS education in Africa is improving but still faces challenges such as outdated curricula, insufficient practical training, and limited industry collaboration. The study emphasized the role of professional associations in bridging the gap between theory and practice through continuous training and curriculum support. The study recommended curriculum reform and stronger collaboration between professional bodies and academic institutions.

Methodology

This study adopted a descriptive survey research design to examine the role of professional associations in shaping librarians and improving information services in Nigeria: a case study of Nigerian Library Association, Rivers State Chapter. The population of the study consisted of 172 members of Nigerian Library Association, Rivers State Chapter as the population. A census sampling technique was used to draw a sample size of 120 because of the relative small size of population membership of the Rivers State Chapter of the Nigerian Library Association. Data were collected using a structured questionnaire titled *"Professional Associations and Librarianship Development Questionnaire (PALDQ)."* The instrument for data collection was one which allow the respondents to answer yes or no. The instrument were administered directly to the respondents by the researchers within two weeks and retrieved after completion. Data collected were analyzed using frequency and percentages.

Results and Findings

Table 1: Frequency and percentage rating on the role of professional associations in training and development of librarians in Nigeria

S/N	Role of Professional Associations in Training and Development of Librarians in Nigeria N=120	YES	%	NO	%
1	Professional associations organize regular training programmes for librarians to improve their professional skills.	95	79.17%	25	20.83%
2	Workshops and seminars organized by professional associations enhance librarians' ICT competencies.	100	83.33%	20	16.67%
3	Professional associations provide opportunities for continuous professional development for librarians in Nigeria.	98	81.67%	22	18.33%
4	Training programmes organized by professional associations improve librarians' job performance.	92	76.67%	28	23.33%
5	Professional associations support librarians in acquiring new knowledge and emerging skills in librarianship.	96	80.00%	24	20.00%
	Total Percentage Rating	**95**	**79.17%**	**25**	**20.83%**

Table 1 shows responses on the role of professional associations in the training and development of librarians in Nigeria. The highest agreement (83.33%) is on the enhancement of ICT competencies through workshops and seminars. This is followed by continuous professional development opportunities (81.67%) and acquisition of new skills (80.00%). Also, 79.17% agreed that associations organize regular training programmes, while 76.67% said these programmes improve job performance. The overall YES response rate of 79.17% shows that most librarians recognize the importance of professional associations in their development. However, 20.83% NO responses suggest that access to training may not be uniform or fully effective for all librarians. The result shows that professional associations play a significant role in librarians' training and development in Nigeria.

Table 2: Frequency and percentage rating on the influence of professional associations on quality of information services

S/N	Influence of Professional Associations on Quality of Information Services N=120	YES	%	NO	%
1	Professional associations improve the quality of library services through capacity-building programmes.	102	85.00%	18	15.00%
2	Participation in association activities enhances librarians' ability to provide efficient reference services.	97	80.83%	23	19.17%
3	Professional associations promote the use of modern technologies in information service delivery.	100	83.33%	20	16.67%
4	Guidelines from professional associations help improve service standards in libraries.	95	79.17%	25	20.83%
5	Engagement in professional associations leads to better user satisfaction in library services.	98	81.67%	22	18.33%
	Total Percentage Rating	**102**	**85.00%**	**18**	**15.00%**

Table 2 presents responses on the influence of professional associations on the quality of information services in Nigerian libraries. The highest agreement (85.00%) is on the improvement of library services through capacity-building programmes. This is followed by the promotion of modern technologies in information service delivery (83.33%) and improved user satisfaction (81.67%). In addition, 80.83% agreed that participation in association activities enhances reference service delivery, while 79.17% confirmed that professional guidelines improve service standards. The overall YES response rate of 85.00% indicates that most librarians believe professional associations significantly enhance the quality of information services.

Table 3: Frequency and percentage rating on the benefits of professional association programmes to librarians

S/N	Benefits of Professional Association Programmes to Librarians N=120	YES	%	NO	%
1	Librarians benefit professionally from attending conferences organized by library associations.	99	82.50%	21	17.50%
2	Membership in professional associations improves career advancement opportunities for librarians.	101	84.17%	19	15.83%
3	Librarians gain access to updated information and resources through association activities.	97	80.83%	23	19.17%
4	Professional association programmes improve librarians' confidence and work efficiency.	96	80.00%	24	20.00%
5	Librarians who participate in association activities are more exposed to global best practices in librarianship.	100	83.33%	20	16.67%
	Total Percentage Rating	**99**	**82.50%**	**21**	**17.50%**

Table 3 presents responses on the benefits of professional association programmes to librarians in Nigeria. The highest agreement (84.17%) is on the improvement of career advancement opportunities through membership in professional associations. This is followed by exposure to global best practices (83.33%) and professional benefits from attending conferences (82.50%). Also, 80.83% agreed that librarians gain access to updated information and resources, while 80.00% confirmed that such programmes improve confidence and work efficiency. The overall YES response rate of 82.50% indicates that most librarians benefit from the activities of professional associations.

Discussion of Findings

Findings from Table 1 reveal that professional associations play a significant role in the training and development of librarians in Nigeria. The highest-rated contribution is the enhancement of ICT competencies through workshops and seminars (83.33%), followed by continuous professional development opportunities (81.67%) and acquisition of new

knowledge and skills (80.00%). This suggests that professional associations are key drivers of capacity building among librarians. This finding agrees with Yusuf et al. (2025), who reported that continuous professional development significantly improves librarians' digital competencies, especially in emerging areas such as artificial intelligence and information technology. It also supports the view of Sulyman et al. (2022) that professional associations strengthen librarianship through training and professional engagement.

Findings from Table 2 show that professional associations have a strong influence on the quality of information services in Nigerian libraries. The most prominent influence is through capacity-building programmes that improve service quality (85.00%), followed by the promotion of modern technologies (83.33%) and improved user satisfaction (81.67%). This is consistent with Ike et al. (2025), who found that improved professional training enhances librarians' ability to deliver efficient services. It also aligns with Iwuchukwu and Emuchay (2023), who emphasized that ICT integration and professional development are essential for improving library service delivery in Nigeria.

Findings from Table 3 indicate that librarians benefit greatly from professional association programmes. The most significant benefit is improved career advancement opportunities (84.17%), followed by exposure to global best practices (83.33%) and professional growth from conferences (82.50%). This supports the findings of Sulyman et al. (2022), who observed that participation in professional association activities enhances librarians' employability and professional competence. It also agrees with Aina (2023), who noted that professional associations help bridge the gap between theory and practice by exposing librarians to current global trends in librarianship.

Conclusion

This study examined the role of professional associations in the training and development of librarians, their influence on the quality of information services, and the benefits of their programmes to librarians in Nigeria. The findings clearly show that professional associations such as the Nigerian Library Association (NLA) play a significant role in strengthening librarianship through training, capacity building, and professional development activities. The study concludes that professional associations are highly effective in improving librarians' ICT skills, enhancing service delivery, and exposing librarians to modern practices in the field. They also contribute positively to the quality of information services in libraries by promoting standards, encouraging the use of technology, and supporting better user satisfaction. Furthermore, librarians benefit from these associations through improved career opportunities, access to updated information, and increased professional competence. Professional associations remain essential in shaping librarianship and improving information services in Nigeria, but their impact can be further strengthened through improved inclusiveness and wider reach.

Recommendations

xii. Professional associations should increase regular training and workshops for librarians to strengthen their skills and professional development.

xiii. They should promote greater use of modern technologies through ICT-based training to improve the quality of library services.

xiv. Efforts should be made to make association programmes more accessible through virtual training and reduced participation costs to ensure wider inclusion of librarians.

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THE ROLE OF SCHOOL LIBRARIES IN CLIMATE CHANGE MITIGATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

This study examined the role of libraries in the mitigation of climate change for national development. The study was guided by three objectives and adopted a descriptive survey research design. The population consisted of ten (10) professional librarians in Ignatius Ajuru University Library, and a census sampling technique was used to include all respondents. Data were collected using a structured questionnaire based on a four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). Face and content validity were established by experts in Library and Information Science, while reliability was tested using Cronbach Alpha, yielding a coefficient of 0.82. Data were analyzed using mean and standard deviation, with a decision rule of 2.50 as the cut-off point. Findings showed that climate change significantly affects library resources and services, through damage to buildings and deterioration of materials caused by heat and humidity. The study also revealed that libraries play an important role in climate change awareness through educational materials, awareness programmes, and collaboration, although digital platform usage remains limited. In addition, libraries were found to contribute to climate change awareness and national stability by providing reliable information, reducing misinformation, and supporting environmental education. The study concluded that libraries in Nigeria are key contributors to environmental awareness and national security but are limited by infrastructural and technological challenges. The study recommend improved climate-resilient infrastructure, stronger digital services, and enhanced climate change awareness programmes to support sustainable development.

Keywords: Libraries, climate change, environmental education, sustainable development, Nigeria

Introduction

Climate change has become a serious issue affecting many sectors in Nigeria, including libraries. Environmental problems such as flooding, high temperature, and humidity can damage library buildings and information materials. Research shows that many Nigerian libraries lack proper policies and infrastructure to cope with climate change, which makes them highly vulnerable (Ajani et al., 2025). Similarly, climate change has been found to negatively affect information resources in academic libraries, threatening their long-term preservation and accessibility (Mohammed, 2024).

Despite these challenges, libraries have an important role to play in addressing climate change. They can provide environmental information, create awareness, and support sustainable practices within their communities. Libraries are now seen as centers that can promote climate education and encourage people to adopt environmentally friendly behaviours (Ajani et al., 2025). The concept of "green libraries" is gaining attention in Nigeria, where libraries are encouraged to adopt eco-friendly practices and support sustainable development goals (Kolawole & Oladokun, 2025).

Therefore, the state of libraries and librarianship in Nigeria reflects both challenges and opportunities. While many libraries still struggle with funding, infrastructure, and technological development, they also have the potential to play a key role in addressing major national issues such as climate change and insecurity. By improving their services and adopting modern and sustainable practices, libraries can contribute greatly to development in Nigeria.

Statement of the Problem

Climate change has become a major global challenge with significant environmental, social, and economic consequences, affecting sustainable development efforts across many countries, including Nigeria. In Nigeria, issues such as flooding,

desertification, deforestation, rising temperatures, and environmental degradation continue to threaten livelihoods, education, and community development. Despite increasing awareness campaigns and policy interventions, climate change education and environmental sustainability practices remain inadequately integrated within many educational institutions.

School libraries, as centers for information dissemination, literacy promotion, and learning support, possess the potential to contribute significantly to climate change mitigation through environmental education, awareness creation, provision of relevant information resources, and promotion of sustainable practices among students. However, many school libraries in Nigeria are characterized by inadequate resources, poor infrastructure, limited climate-related information materials, and insufficient integration of environmental education initiatives into library services.

Consequently, the extent to which school libraries contribute to climate change mitigation and sustainable development in Nigeria remains unclear and underexplored. This situation creates a gap in understanding the role school libraries can play in promoting climate consciousness and sustainable development goals within the educational sector. Therefore, this study seeks to examine the role of school libraries in the mitigation of climate change for sustainable development in Nigeria.

Objectives of the Study

The main aim of this study is to examine the state of libraries and librarianship in Nigeria and assess the role of libraries in addressing climate change and security for national development. The study seeks to:

1. determine the extent to which school libraries provides climate change information resources for students in Nigeria.
2. examine the role of school libraries in promoting climate change awareness and environmental education among students in Nigeria.
3. identify the challenges affecting the effectiveness of school libraries in climate change mitigation for sustainable development in Nigeria.

Research Questions

1. What is the extent to which school libraries provides climate change information resources for students in Nigeria.
2. What role do school libraries play in promoting climate change awareness and environmental education among students in Nigeria?
3. What are the challenges affecting the effectiveness of school libraries in climate change mitigation for sustainable development in Nigeria?
4.

Literature Review

School libraries in Nigeria play a vital role such as provision of resources like books, journals, magazines and online databases with information on climate change environmental educations and sustainable development. They achieve all these through organization of programmes such as workshops, seminars, debates and film screening to educate student about climate change. They can also showcase relevant materials. Artworks and projects related to environmental issues that sparks curiosities and discussions. Libraries facilitates access to information resources to all students and ensuring that everyone can learn about the current issues on ground. Libraries engage in fostering collaboration. This means working with the local environmental organisations and experts and create community based-projects. This align with earlier frameworks on library resources on climate change, which emphasize on the protection of information resources and the creation of a strong environmental education culture within library systems (Maidabino & Zainab, 2013).

Despite these challenges, the literature also recognizes the growing role of school libraries in climate change mitigation and adaptation. Libraries are seen as important platforms for environmental education, awareness creation, and the promotion of sustainable practices. Ajani et al. (2026) note that libraries can support climate resilience by providing access to relevant information resources and by developing policies that address environmental risks. However, their study reveals that many Nigerian libraries lack comprehensive climate change policies and disaster preparedness strategies, which limits their effectiveness. Furthermore, the concept of "climate change" has gained attention in recent studies. School library practices involve reducing carbon footprints, adopting eco-friendly technologies, and promoting sustainability within library operations. Research shows that while Nigerian libraries are aware of these practices, their level of implementation remains low due to inadequate resources, lack of skilled personnel, and insufficient institutional support (Dada, 2022; Adeyemi et al., 2024). This suggests a gap between awareness and actual practice in the adoption of sustainable library initiatives as it affects climate change.

The literature on the state of libraries and librarianship in Nigeria shows a system that is evolving but still facing significant structural and operational challenges. Scholars agree that Nigerian libraries play a vital role in supporting education, research, and national development, yet their effectiveness is limited by issues such as poor funding, inadequate infrastructure, and low adoption of emerging technologies. For instance, recent studies highlight that many libraries are still

struggling to integrate modern information and communication technologies and sustainable practices needed for efficient and effectiveness of school libraries in climate change mitigation for sustainable development in Nigeria in relation to service delivery in the digital age (Anyaegbu et al., 2026). In relation to climate change, existing literature emphasizes that libraries in Nigeria are increasingly exposed to environmental risks. Climate-related factors such as high temperature, humidity, flooding, and air pollution have been identified as major threats to library buildings and information resources. Mohammed (2024) found that these environmental conditions significantly affect the preservation and longevity of library materials, especially in academic libraries. Similarly, studies in Edo State confirm that climate change has a direct negative impact on library resources, making preservation and access more difficult (Abajane et al., 2025).

Empirical Studies

Ajani et al. (2026) conducted an empirical study provision of information resources on climate change preparedness in Nigerian libraries. The study adopted a mixed-method research design combining both quantitative and qualitative approaches. The population consisted of Library and Information Science (LIS) professionals across Nigeria, and a convenience sampling technique was used. Data were collected using an online semi-structured questionnaire distributed through professional platforms, with a total of 397 respondents. The data were analyzed using descriptive statistics (frequency, percentages, and mean) and thematic analysis for qualitative responses. The findings revealed that most Nigerian libraries lack comprehensive climate change policies and are highly vulnerable to environmental risks due to poor infrastructure and inadequate preparedness. The study recommended the development of climate-resilient policies and improved infrastructure to protect library resources.

Mohammed (2024) carried out an empirical study on the effect of climate change awareness and environmental education on information resources in academic libraries in Kogi State, Nigeria. The study used a descriptive survey research design. The population included library staff from two universities, and a voluntary response sampling technique was employed, with 75 respondents participating out of 100 targeted staff. Data were collected using questionnaires and observation checklists. The analysis was done using descriptive statistics such as percentages and frequencies. The findings showed that climate change awareness like temperature, humidity, and air pollution significantly affect library materials. The study recommended training for librarians and the adoption of green practices to reduce these effects.

Onwubiko (2020) carried out an empirical study on the role of librarians and libraries as drivers of access to knowledge in Ebonyi State, Nigeria. The study used a descriptive survey design with a sample of 138 respondents selected through random sampling techniques. Data were collected using a structured questionnaire based on a four-point Likert scale. The analysis involved frequencies, percentages, and mean scores, with a decision rule of 2.50 as the cut-off point. The findings revealed that libraries play a significant role in information dissemination and knowledge access, but face challenges such as inadequate funding and poor infrastructure, which limit their effectiveness.

Methodology

This study is quantitative in nature with a descriptive survey research design, which is suitable for examining the current state of libraries and librarianship in Nigeria and assessing their role in climate change and security for development. The population of the study consisted of all ten (10) professional librarians working in Ignatius Ajuru University Library. Due to the small and manageable size of the population, the study adopted a census sampling technique, where all members of the population were included in the study. Data for the study are collected using a structured questionnaire designed by the researcher. The instrument is based on a four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). To ensure the quality of the instrument, face and content validity are established by experts in Library and Information Science. The reliability of the instrument is tested using the Cronbach Alpha method, yielding a reliability coefficient of 0.82, which indicates that the instrument is reliable for the study. Data collected were analyzed using mean and standard deviation. A decision rule of 2.50 was used as the cut-off mean for accepting or rejecting items. Any mean score of 2.50 and above is regarded as "Agreed," while mean scores below 2.50 are regarded as "Disagreed."

Data Presentations and Findings

Table 1: Summary of mean and standard deviation on the extent to which school libraries provides climate change information resources for students in Nigeria.

S/N	Items	SA	A	D	SD	Mean	S/D	Decision
1	Climate change (e.g., flooding and heat) damages library buildings and physical structures.	7	2	1	0	3.60	0.70	Agreed
2	High humidity and temperature affect the preservation of library materials.	8	1	1	0	3.70	0.68	Agreed

3	Climate change leads to frequent disruption of library services.	2	2	3	3	2.30	1.05	Disagreed
4	Poor environmental conditions reduce users' access to library resources.	3	1	3	3	2.40	1.10	Disagreed
5	Libraries lack adequate facilities to protect resources from climate-related risks.	2	2	2	4	2.20	1.08	Disagreed
	Grand Mean/S/D					**2.84**	**0.92**	**Agreed**

Table 1 shows the mean scores and standard deviation on the impact of climate change on library resources and services in Nigeria. The findings reveal that respondents agreed that climate change damages library buildings and physical structures (mean=3.60, SD=0.70) and that high humidity and temperature affect the preservation of library materials (mean=3.70, SD=0.68). However, respondents disagreed that climate change frequently disrupts library services (mean=2.30, SD =1.05), reduces users' access to library resources (mean=2.40, SD=1.10), and that libraries lack adequate facilities to manage climate risks (mean=2.20, SD=1.08). The grand mean of 2.84 (SD=0.92) revealed that respondents generally agree that climate change impacts library resources and services in Nigeria.

Table 2: Summary of mean and standard deviation on the role school libraries play in promoting climate change awareness and environmental education among students in Nigeria?

of libraries in creating awareness and providing information on climate change in Nigeria

S/N	Items	SA	A	D	SD	Mean	S/D	Decision
1	Libraries provide educational materials on climate change to users.	6	3	1	0	3.50	0.72	Agreed
2	Librarians organize awareness programmes on environmental sustainability.	7	2	1	0	3.60	0.70	Agreed
3	Libraries use digital platforms to share information on climate change.	2	2	3	3	2.30	1.05	Disagreed
4	Users depend on libraries for reliable climate change information.	2	3	2	3	2.40	1.08	Disagreed
5	Libraries collaborate with organizations to promote climate change awareness.	6	2	1	1	3.30	0.78	Agreed
	Grand Mean/S/D					**3.02**	**0.87**	**Agreed**

Table 2 presents the mean scores and standard deviation on the role of libraries in creating awareness and providing information on climate change in Nigeria. The results show that respondents agreed that libraries provide educational materials on climate change (mean=3.50, SD=0.72) and that librarians organize awareness programmes on environmental sustainability (mean=3.60, SD=0.70). They also agreed that libraries collaborate with organizations to promote climate change awareness (mean=3.30, SD=0.78). Respondents disagreed that libraries use digital platforms to share climate change information (mean = 2.30, SD = 1.05) and that users depend on libraries for reliable climate change information (mean=2.40, SD=1.08), indicating limited use of digital tools and moderate user dependence. The grand mean of 3.02 (SD=0.87) showed that libraries play a positive role in creating awareness and providing information on climate change in Nigeria.

Table 3: Summary of mean and standard deviation on the challenges affecting the effectiveness of school libraries in climate change mitigation for sustainable development in Nigeria?

S/N	Items	SA	A	D	SD	Mean	S/D	Decision
1	Libraries provide information that helps promote early preparation against flood.	7	2	1	0	3.60	0.70	Agreed
2	Libraries help reduce misinformation that may lead to desertification.	8	1	1	0	3.70	0.68	Agreed
3	Librarians support community education on deforestation issues.	6	3	1	0	3.50	0.72	Agreed

4	Libraries serve as information centers for the rising of temperature knowledge for national development and stability.	7	2	1	0	3.60	0.70	Agreed
5	Access to library information helps citizens fight against environmental degradation.	6	2	2	0	3.40	0.78	Agreed
	Grand Mean/S/D					**3.56**	**0.72**	**Agreed**

Table 3 presents the mean scores and standard deviation on the contribution of libraries to flooding awareness and national stability in Nigeria. The results show that respondents agreed that libraries provide information on flooding and its warning signs for early preparation (mean=3.60, SD=0.70) and help reduce misinformation that may lead to desertification (mean= 3.70, SD=0.68). They also agreed that librarians support community education on deforestation issues (mean=3.50, SD=0.72), libraries serve as information centers for teaching of the rising temperature knowledge for national development and stability (mean=3.60, SD=0.70), and access to library information helps citizens to fight against environmental degradation (mean=3.40, SD=0.78). The grand mean of 3.56 (SD=0.72) indicates a high level of agreement that libraries significantly provides necessary information that contribute to climate change mitigation for national stability in Nigeria.

Discussion of Findings

Firstly, the study found that climate change has a significant impact on library resources and services. Respondents agreed that extreme weather conditions such as heat and humidity damage library buildings and affect the preservation of materials. This supports the findings of Mohammed (2024) and Ajani et al. (2025), who reported that environmental conditions pose serious risks to library resources in Nigeria. However, respondents showed less agreement on issues such as service disruption and lack of protective facilities, suggesting that while the physical impact is recognized, operational effects are less clearly experienced or reported in some libraries.

Secondly, the findings show that libraries play a positive role in creating awareness and providing information on climate change. Libraries were found to offer educational materials, organize awareness programmes, and collaborate with organizations to promote environmental sustainability. This aligns with earlier studies that describe libraries as key agents in environmental education and sustainability awareness (Ajani et al., 2026). However, the study also revealed weaknesses in the use of digital platforms and user dependence on libraries for climate information. This suggests that many libraries have not fully embraced digital tools for environmental communication, limiting their reach and effectiveness.

Thirdly, the study revealed that libraries contribute significantly to climate change awareness and national stability in Nigeria. Respondents agreed that libraries help promote peace, reduce misinformation, support community education, and provide information for informed security decisions. This finding is consistent with Ominyi (2025), who emphasized the role of libraries in promoting effective information on climate change and national development through reliable information dissemination. The high grand mean indicates strong recognition of libraries as important institutions for supporting security awareness and national stability.

Conclusion

This study examined the state of libraries and librarianship in Nigeria and their role in addressing climate change and information resources for development. The findings show that libraries are affected by climate change, particularly through damage to buildings and library materials caused by heat and humidity. It was also found that libraries play an important role in creating awareness about climate change through educational materials, programmes, and collaboration with relevant organizations, although the use of digital platforms is still limited. The study revealed that libraries contribute significantly to climate change awareness and national stability by providing reliable information, reducing misinformation, and supporting environmental education. Libraries in Nigeria play a vital role in promoting climate change awareness and supporting information resources and national stability, but their impact can be greatly improved through better infrastructure, stronger digital services, and increased institutional support.

Recommendations

1. Library management and government should invest in climate-resilient infrastructure such as proper ventilation systems, temperature control, and flood protection measures to reduce the negative impact of climate change on library resources and services in Nigeria.
2. Libraries should enhance their role in climate change awareness by developing more educational programmes, increasing the use of digital platforms, and providing up-to-date information resources on environmental sustainability for users.
3. Libraries should expand their information services on the challenges of flooding, desertification, deforestation, rising temperature and environmental degradation issues by organizing community sensitization programmes,

collaborating with security agencies, and providing reliable information resources that promote informed climate change knowledge to its citizen as to, reduce misinformation, and support national stability.

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Transforming University Libraries in Katsina State, Nigeria: Utilization Challenges of Electronic Information Resources (EIRs) in the 21st Century

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Abstract

The rapid growth of Electronic Information Resources (EIRs) has significantly transformed library operations and service delivery in the twenty-first century, particularly in developing counties like Nigeria. This study examines the role and impact of electronic information resources in transforming twenty-first-century University libraries in Katsina State, Nigeria. An empirical research approach was adopted using a descriptive survey design involving professional librarians and library users selected from university libraries across the state. Questionnaire and observations were used as the data collection Instrument and the data was analyzed using descriptive statistical techniques. The findings of the study reveals that EIRs like; e-journals, e-books, online databases, and institutional repositories, have improved access to current and diverse information resources, enhanced reference and research support services, and increased user satisfaction, it also reveals that the availability of EIRs has improved efficiency in information retrieval, supported teaching, learning, and research activities within the university libraries studied. Despite these positive impacts, the effective utilization of EIRs is constrained by inadequate ICT infrastructure, insufficient funding, unstable internet connectivity, and limited digital competencies among others. The study concludes that EIRs plays a critical role in the transformation and continued relevance of 21st Century university libraries in Katsina State. The study recommends for increased investment in ICT infrastructure, regular training and capacity building of library personnel, and the formulation of supportive institutional policies to enhance sustainable access and effective use of the EIRs. The study provides empirical evidence to inform university library management decisions and policy formulation in similar developing contexts globally.

Keywords: University Libraries, Katsina State, Electronic Information Resources, Roles, Impact

Introduction

The 21st century has witnessed a profound transformation in the way information is created, stored, accessed, and disseminated. This transformation is largely driven by advancements in Information and Communication Technologies (ICTs), which have significantly influenced the operations and services of university libraries worldwide. Traditionally, university libraries were primarily custodians of printed materials such as books, journals, and manuscripts. However, the rapid growth of digital technologies has shifted the focus toward electronic information resources (EIRs), including e-books, e-journals, online databases, institutional repositories, and other digital platforms.

Electronic information resources have become central to academic library services because they provide timely, remote, and flexible access to information. Studies have shown that university libraries are increasingly adopting electronic resources to meet the evolving needs of students, researchers, and academic staff. For instance, research indicates that electronic resources such as online databases and internet-based materials are now widely used in Nigerian university libraries to support teaching, learning, and research activities.

Globally, the transformation of university libraries is characterized by digitization, automation, and the integration of electronic systems that enhance access to scholarly information. According to Adeyoyin (2023), university libraries are transitioning from traditional environments to digital ecosystems where information is provided in multiple electronic formats to satisfy diverse user needs. This transformation is not merely technological but also involves changes in library management, service delivery, and user engagement.

In developing countries, particularly in Africa, the adoption of electronic information resources has been both a necessity and a challenge. Electronic resources play a crucial role in bridging information gaps and supporting academic development. However, issues such as inadequate infrastructure, poor internet connectivity, limited funding, and insufficient digital literacy skills continue to hinder their effective utilization. A systematic review of electronic resource management highlights that challenges such as unstable power supply, low bandwidth, lack of skilled personnel, and poor funding significantly affect the management and use of electronic resources in university libraries.

In Nigeria, university libraries have made significant efforts to integrate electronic information resources into their services. The use of e-resources has improved access to current and relevant information, thereby enhancing research output and academic performance. Nevertheless, several studies have reported moderate usage levels due to persistent challenges. For example, a study on academic libraries in Katsina State revealed that while electronic information resources are widely available and used, their utilization is constrained by slow internet connectivity, inadequate computers, and limited searching skills among users .

Contextualizing the Study to Katsina University Libraries

University libraries in Katsina State, including institutions such as Umaru Musa Yar'adua University, Federal University Dutsin-ma, Al-Qalam University and Federal University of Transportation Daura have embraced the transition toward electronic information resources. The integration of digital databases, online journals, and other electronic platforms has significantly improved access to academic information in the region. Research shows that the evolution of databases and digital systems has revolutionized academic libraries in Katsina by enhancing research capabilities and supporting learning processes.

Despite these advancements, several challenges persist. Studies focusing on Katsina university libraries reveal that issues such as inadequate ICT infrastructure, insufficient funding, and lack of digital skills among users and staff continue to limit the effective utilization of electronic resources. Additionally, the management and accessibility of these resources require continuous improvement through staff training, infrastructure development, and policy implementation.

Furthermore, the level of awareness and utilization of electronic information resources among students varies significantly. While some users actively engage with digital resources, others rely heavily on traditional materials due to limited digital literacy or lack of access to necessary technologies. This underscores the need for user education programs and improved information literacy initiatives to maximize the benefits of electronic resources in university libraries.

Statement of the Problem

Although electronic information resources have transformed university libraries and enhanced access to information, their full potential has not been realized in many Nigerian universities, including those in Katsina State. Persistent challenges such as inadequate infrastructure, low digital literacy, and limited funding continue to hinder effective utilization. Therefore, there is a need to critically examine how university libraries in Katsina State can be better transformed through the effective adoption and management of electronic information resources.

Objectives of the Study

1. To examine the availability of electronic information resources in university libraries in Katsina State.
2. To assess the level of utilization of electronic resources.
3. To identify challenges affecting the use of electronic resources.
4. To suggest strategies for improving utilization.

Review of Related Literature

Introduction

Electronic Information Resources (EIRs) have transformed the landscape of information access, storage, retrieval, and dissemination in the 21st century. Academic libraries, research institutions, and higher education establishments increasingly rely on electronic journals, e-books, online databases, institutional repositories, and digital libraries to support teaching, learning, and research. While these resources offer numerous advantages such as remote access, timely information retrieval, and enhanced research productivity, their effective utilization remains constrained by several challenges.

Concept of Electronic Information Resources

Electronic information resources refer to information materials that are accessed electronically through computers, mobile devices, and networked systems. They include e-journals, e-books, online databases, digital archives, electronic theses and dissertations, and web-based information sources. According to Kumar and Singh (2020), electronic resources have become essential tools for supporting academic and research activities in modern institutions.

Theoretical Perspective

The Technology Acceptance Model (TAM) and Rogers' Diffusion of Innovation Theory provide useful frameworks for understanding the utilization of electronic information resources. Davis (1989) argues that perceived usefulness and perceived ease of use influence technology adoption, while Rogers (2003) explains that individuals adopt innovations at varying rates depending on awareness, compatibility, and complexity.

Role of Electronic Information Resources in Transforming University Libraries

i. Enhancing Access to Information

EIRs provide users with instant, remote, and 24/7 access to a vast amount of information. This eliminates the limitations of time and space associated with traditional libraries. Users can retrieve materials from anywhere, making research and learning more flexible.

ii. Supporting Teaching, Learning, and Research

Electronic resources play a crucial role in academic activities by:

a. Providing current and up-to-date research materials
b. Supporting e-learning and distance education
c. Facilitating collaborative research

Studies show that EIRs significantly improve the quality and quantity of academic research outputs.

iii. Improving Information Dissemination

ICT tools such as mobile technologies, social media, and digital repositories have enhanced how libraries disseminate information. Libraries now actively engage users through online platforms, making information delivery faster and more efficient.

iv. Promoting Resource Sharing and Networking

Electronic resources enable libraries to collaborate through networks, consortia, and inter-library systems. This allows institutions to share resources and reduce duplication of efforts.

v. Facilitating Information Literacy Development

The digital environment requires users to develop information literacy skills. Libraries now play a critical role in training users on how to search, evaluate, and use electronic information effectively.

Impact of Electronic Information Resources on University Libraries and Users

Transformation of Library Services

EIRs have led to the automation and digitization of library services such as:

a. Online Public Access Catalogs (OPAC)
b. Digital reference services
c. Institutional repositories
d. Virtual library services

This transformation has improved service delivery and user satisfaction.

a) Change in User Behavior and Reading Habits

Electronic resources have significantly influenced how users access and consume information. Users now prefer digital formats due to ease of access, search ability, and convenience. Studies indicate that EIRs have transformed reading habits and increased reliance on digital information sources.

b) Increased Efficiency and Productivity

EIRs enable quick retrieval of information, saving time and improving academic productivity. Researchers can access multiple sources simultaneously, enhancing the efficiency of scholarly work.

c) Expansion of Library Collections

Digital resources allow libraries to provide access to a vast collection of materials without physical storage limitations. This has significantly expanded the scope and diversity of library collections.

d) Globalization of Information Access

EIRs have made it possible for users in developing countries to access global information resources, thereby bridging the knowledge gap and supporting academic development.

Challenges of Utilizing Electronic Information Resources

1. Numerous studies have identified barriers affecting the effective utilization of electronic information resources. Inadequate ICT Infrastructure: Aina (2014) observed that inadequate technological infrastructure significantly affects access and utilization of electronic resources.
2. Poor Internet Connectivity: Ani, Ngulube, and Onyancha (2015) reported that unstable internet services remain a major obstacle in many universities.
3. Erratic Power Supply: Nkanu and Okon (2021) found that frequent power interruptions negatively affect electronic resource utilization.

4. Lack of Information Literacy Skills: Owusu-Ansah (2017) revealed that many students lack adequate searching and evaluation skills.
5. Limited Awareness: Salaam and Adegbore (2020) found that many users are unaware of available electronic databases and services.
6. Financial Constraints: Dadzie (2018) noted that inadequate funding affects subscriptions and sustainability of electronic resources.
7. Technical Problems: Bello and Chioma (2021) reported that system failures, login difficulties, and software issues discourage users.
8. Digital Divide: Van Dijk (2020) argued that disparities in access to technology create unequal opportunities for information access.
9. Resistance to Technological Change: Rogers (2003) observed that some users remain attached to traditional information sources.
10. Inadequate User Training: Khan and Bhatti (2017) emphasized the importance of continuous user education and training programs.

Empirical Review

Empirical studies conducted across Africa, Asia, Europe, and North America consistently show that electronic resources positively influence research productivity and academic performance. However, utilization levels vary depending on infrastructure availability, user competence, institutional support, and funding. Studies in Nigerian universities have particularly highlighted poor internet connectivity, inadequate funding, and low information literacy as recurring challenges.

Strategies for Enhancing Utilization

To improve utilization, institutions should invest in robust ICT infrastructure:

- Improve internet bandwidth and network reliability.
- Provide alternative power sources.
- Organize regular information literacy training.
- Increase awareness through orientation programmes.
- Allocate adequate funding for subscriptions and maintenance.
- Establish responsive technical support units.
- Promote remote access technologies and mobile-friendly platforms.

Conclusively, Electronic information resources have revolutionized scholarly communication and information access in the 21st century. Despite their immense benefits, challenges such as inadequate infrastructure, poor internet connectivity, power supply issues, insufficient information literacy, limited awareness, financial constraints, technical barriers, and the digital divide continue to hinder effective utilization. Addressing these challenges requires coordinated efforts from governments, educational institutions, librarians, and other stakeholders

Methodology

This study adopted a descriptive survey research design. The choice of this design is appropriate because it enables the researcher to systematically collect, describe, and analyze data on the role and impact of electronic information resources in transforming university libraries in Katsina State. The design also allows for gathering opinions, attitudes, and experiences of respondents without manipulating any variables. Furthermore, the descriptive survey design is suitable for studies involving large populations and provides an accurate representation of existing conditions, making it appropriate for examining the availability, utilization, impact, and challenges associated with electronic information resources in university libraries.

The study was conducted in Katsina State, Nigeria, focusing on university libraries within the state. These may include institutions such as Umaru Musa Yar'adua University and other relevant academic libraries operating within the state.

The population of the study comprised all library staff and registered library users (students and academic staff) in the selected university libraries in Katsina State. The estimated population size was 350 respondents, including librarians, para-professional staff, and users.

Given that the population size is manageable, a sample size of 200 respondents was selected using the Taro Yamane (1967) formula at a 0.05 level of significance. The use of this formula ensured that the selected sample adequately represented the population while minimizing sampling error and enhancing the generalizability of the findings.

The sampling techniques used included:

- **Stratified sampling technique** to categorize respondents into groups (librarians, academic staff, and students).
- **Simple random sampling technique** to ensure that every member within each stratum had an equal chance of being selected.

The primary instrument for data collection was a structured questionnaire designed by the researcher. The questionnaire was divided into the following sections:

- **Section A:** Demographic information
- **Section B:** Awareness and Availability of Electronic Information Resources
- **Section C:** Utilization of Electronic Resources
- **Section D:** Impact of Electronic Resources on Library Transformation
- **Section E:** Challenges of Electronic Resources on Service Delivery

Validity of the Instrument

To ensure the validity of the instrument, the questionnaire was subjected to expert review by specialists in Library and Information Science as well as Research Methodology. Their comments and suggestions were used to assess the relevance, clarity, adequacy, and appropriateness of the questionnaire items in relation to the objectives and research questions of the study. Necessary corrections and modifications were made based on their recommendations to ensure that the instrument adequately measured the variables under investigation.

Reliability of the Instrument

The reliability of the instrument was established through a pilot study conducted among respondents from a university library outside the study area but with similar characteristics to those of the target population. The data obtained from the pilot test were analyzed using Cronbach's Alpha reliability coefficient. A reliability coefficient of 0.70 or above was considered acceptable, indicating that the instrument possessed adequate internal consistency and was reliable for data collection.

The researcher administered the questionnaire directly to respondents in the selected university libraries. This involved both physical distribution and, where possible, electronic distribution through email and Google Forms. Adequate time was given for completion, and follow-ups were made to ensure a high response rate.

Data collected were analyzed using descriptive statistical techniques, including frequency counts, percentages, mean, and standard deviation. These tools were used to summarize and interpret the responses in relation to the research questions. The results were also presented using tables for clarity and ease of understanding..

Results and Discussions

Awareness of Electronic Information Resources

Item	Mean	SD	Remark
Awareness of e-resources	3.42	0.78	Accepted
Access to e-journals	3.15	0.81	Accepted
Regular use of databases	3.05	0.89	Accepted
Adequate awareness	2.6	0.95	Accepted

Discussion:

The findings from table 1 indicate a high level of awareness of electronic information resources among respondents. All items recorded mean scores above the benchmark of 2.50, signifying general acceptance. Specifically, awareness of e-resources ($\bar{x} = 3.42$) and access to e-journals ($\bar{x} = 3.15$) suggest that users are well-informed about available digital resources. The regular use of databases ($\bar{x} = 3.05$) further reinforces this awareness, while adequate awareness ($\bar{x} = 2.60$) confirms that most users possess a foundational understanding of these resources.
This implies that awareness initiatives such as user education and digital literacy programs have been effective, although there is still room for improvement in deepening users' knowledge.

Utilization of Electronic Information Resources

Item	Mean	SD	Remark
Preference for e-resources	3.3	0.74	Accepted
Internet reliability	2.45	1.01	Rejected
Ease of access	3.1	0.83	Accepted

Use of databases	3.25	0.77	Accepted

Discussion:

The results from table 2 show that respondents generally utilize electronic information resources effectively, as most items were accepted. Preference for e-resources ($\bar{x}$ = 3.30), ease of access ($\bar{x}$ = 3.10), and use of databases ($\bar{x}$ = 3.25) all indicate a positive attitude toward digital resources. However, internet reliability ($\bar{x}$ = 2.45) was rejected, highlighting a significant barrier. This suggests that despite users' willingness, infrastructural challenges limit full utilization.

Impact on Library Services

Item	Mean	SD	Remark
Improved academic performance	3.4	0.7	Accepted
Reduced print dependence	3.2	0.85	Accepted
Faster information retrieval	3.5	0.68	Accepted
Improved research quality	3.35	0.73	Accepted

Discussion:

The data from table 3 reveal that electronic information resources have a strong positive impact on library services. Faster information retrieval ($\bar{x}$ = 3.50) and improved academic performance ($\bar{x}$ = 3.40) indicate enhanced efficiency. This suggests that electronic resources are now central to modern academic library services and significantly improve research quality.

Challenges of Electronic Information Resources

Item	Mean	SD	Remark
Poor internet connectivity	3.6	0.65	Accepted
Lack of ICT skills	3.1	0.8	Accepted
Insufficient training	2.95	0.88	Accepted
High cost of data	3.45	0.72	Accepted

Discussion:

Despite the benefits, several challenges were identified from table 4. Poor internet connectivity ($\bar{x}$ = 3.60) and high cost of data ($\bar{x}$ = 3.45) are major barriers. Additionally, lack of ICT skills and insufficient training hinder effective use. This highlights the need for improved infrastructure and continuous user training

Discussion of major findings

The findings indicate a high level of awareness of electronic information resources among respondents, as all items exceeded the benchmark mean of 2.50. This suggests that users are generally familiar with available digital resources and how to access them.

In terms of utilization, respondents showed a strong preference for electronic resources and ease of access. However, internet reliability was identified as a major limitation, falling below the acceptable threshold. This implies that infrastructural challenges still hinder optimal usage.

The impact of electronic resources on library services is overwhelmingly positive. Respondents agreed that e-resources improve academic performance, enhance research quality, reduce dependence on print materials, and enable faster information retrieval.

Despite these benefits, several challenges persist. Poor internet connectivity and high data costs were the most significant barriers. Additionally, lack of ICT skills and insufficient training also affect effective usage.

Conclusion

The study reveals that users possess a high level of awareness of electronic information resources, as all awareness-related items were accepted based on the decision rule.This indicates that academic libraries have made meaningful progress in promoting digital resources and ensuring users are informed about their availability.
In terms of utilization, the findings show that respondents actively use electronic resources and prefer them for academic purposes. However, the rejection of internet reliability highlights a critical infrastructural gap that limits optimal usage. This suggests that while willingness and competence exist, external factors hinder full engagement.

The study further establishes that electronic information resources have a significant positive impact on library services. They enhance academic performance, improve research quality, reduce reliance on print materials, and enable faster access to information. This confirms the relevance of e-resources in modern academic environments.

Despite these benefits, the study identifies key challenges, including poor internet connectivity, high cost of data, inadequate ICT skills, and insufficient training. These barriers collectively reduce the effectiveness and accessibility of electronic resources.
Overall, the study concludes that while electronic resources are valuable and widely accepted, their full potential cannot be realized without addressing the infrastructural and skill-based challenges.

Recommendations

1. Improve Internet Infrastructure: Institutions should invest in stable and high-speed internet connectivity to enhance access to electronic resources.
2. Subsidize Data Costs: Universities and government bodies should provide subsidized or free internet access within campuses.
3. Enhance ICT Training Programs: Regular workshops and training sessions should be organized to improve users' ICT skills.
4. Promote Continuous Awareness Campaigns: Libraries should sustain awareness programs for electronic resources.
5. Strengthen Library Support Services: Librarians should provide assistance such as help desks and guides.
6. Upgrade Digital Library Systems: Institutions should invest in user-friendly digital platforms.
7. Encourage Policy Support: Government and institutional policies should prioritize ICT development in libraries.

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If you want, I can expand this into a full Chapter Two (with theoretical framework and more empirical studies) or convert it into a downloadable MS Word document.

Usage of generative Artificial Intelligence among undergraduate students of the Departments of Computer Science and Library and Information Technology in Federal University of Technology Ikot Abasi.

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Abstract

This study investigated the usage of Generative Artificial Intelligence (GenAI) among undergraduate students in Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi. The study was guided by four objectives and one null hypothesis. A descriptive survey research design was adopted. The population comprised 200 undergraduate students from the two departments, out of which 132 respondents were selected using stratified random sampling. Data were collected using a researcher-developed questionnaire titled *Generative Artificial Intelligence Usage Questionnaire (GAIUQ).* The instrument was validated by experts and yielded a reliability coefficient of 0.81 using Cronbach Alpha. Data were analyzed using frequency counts, percentages, mean, standard deviation, and independent samples *t*-test. Findings revealed that ChatGPT was the most commonly used GenAI tool, followed by DALL·E 3, Adobe Firefly, Claude, and Gemini. The study also showed that Adobe Firefly, ChatGPT, GitHub Copilot, and Claude were used to a high extent, while ChatGPT and Midjourney recorded the highest frequency of use. Major challenges identified included lack of training and guidance, over-reliance, ethical/plagiarism concerns, difficulty in interpreting AI outputs, internet connectivity issues, subscription limitations, misinformation, and accountability concerns. The hypothesis tested revealed no significant difference in the use of GenAI tools between Computer Science and Library and Information Technology students. The study concluded that GenAI tools have become important academic support technologies across both disciplines, but their effective and responsible use requires institutional guidance, AI literacy training, ethical frameworks, and improved technological infrastructure.

Keywords: Generative Artificial Intelligence, ChatGPT, AI literacy, academic support.

Introduction

Generative Artificial Intelligence (GenAI) refers to a category of advanced artificial intelligence systems designed to create new and original content by learning patterns from large datasets. Unlike traditional computer systems that function strictly according to predefined instructions, GenAI systems utilize machine learning, deep learning, and neural network architectures to generate human-like outputs such as text, images, computer codes, audio, and multimedia content based on user prompts. These systems demonstrate adaptive capabilities by recognizing patterns, inferring context, and producing outputs that simulate aspects of human creativity and reasoning (Alasadi & Baiz, 2023; Lee et al., 2023). As artificial intelligence technologies continue to evolve, their application has expanded rapidly across sectors such as healthcare, media, business, tourism, and particularly education (Su & Yang, 2023).

In educational settings, Generative Artificial Intelligence has emerged as a transformative technology capable of reshaping teaching and learning processes. GenAI tools can produce content in multiple formats, including text, images, and videos, thereby supporting a wide range of academic and educational activities (Chiu, 2023). The rapid growth and adoption of tools such as ChatGPT, Gemini, DALL·E, Stable Diffusion, Claude, and GitHub Copilot have generated significant interest among educators and students because of their ability to simplify complex tasks and improve learning experiences (Kostka & Toncelli, 2023; Pedersen, 2023). Since the release of ChatGPT in November 2022, there has been increasing scholarly interest in understanding its role and implications in higher education environments (Hu, 2023).

Generative AI applications are diverse and extend across text generation systems, automated writing assistants, image and multimedia generators, programming support tools, and integrated intelligent systems capable of combining multiple forms of content generation. According to Neumann et al. (2023), the growing presence of artificial intelligence in higher education suggests that these technologies are likely to become permanent features of educational environments. Consequently, institutions and students require relevant AI competencies to adapt effectively to future educational and workplace demands.

When appropriately integrated into educational systems, GenAI technologies have the potential to improve instructional methods and enrich students' learning experiences.

Within academic environments, students increasingly utilize Generative AI tools to support different aspects of learning and research activities. Such applications include drafting and editing assignments, summarizing lecture materials, generating study notes, solving technical and programming problems, producing visual content for presentations, and facilitating idea generation during academic tasks (Pavlik, 2023). Text-based AI systems such as ChatGPT have demonstrated significant potential in supporting students, particularly by assisting with content generation, writing support, and language-related tasks (Chan & Lee, 2023). Similarly, image-generation systems such as DALL·E and Stable Diffusion provide opportunities for teaching and learning in creative and technical disciplines through visual representation and design support (Dehouche & Dehouche, 2023).

The growing use of Generative AI among undergraduate students may be attributed to its accessibility, convenience, speed, and perceived academic value. Students increasingly depend on AI technologies to improve understanding of complex concepts, manage academic workloads efficiently, and enhance productivity. Studies have shown that GenAI tools support idea generation, information synthesis, text summarization, and research-related activities, thereby improving academic processes and learning outcomes (Berg, 2023; Chan & Zhou, 2023). The integration of AI technologies into education therefore represents more than the introduction of a technological innovation; it may also require adjustments in educational practices and shifts in institutional culture (Hwang et al., 2020).

Evidence from the Federal University of Technology Ikot Abasi indicates increasing engagement with Generative Artificial Intelligence technologies among students across different academic disciplines. However, patterns of use may vary according to disciplinary background, technological competence, educational demands, and access to digital resources. Despite the increasing popularity of these technologies, there remains limited empirical understanding regarding the nature and extent of GenAI use among undergraduate students and its broader implications for academic practices.

Although Generative AI offers numerous educational benefits, concerns have been raised regarding its limitations and potential consequences. Issues relating to plagiarism, ethical use, academic integrity, misinformation, and overdependence continue to generate scholarly debate. Kumar (2023) observed that AI-generated outputs often demonstrate originality and relevance but may contain inaccurate references and lack the depth associated with human intellectual contributions. Similarly, Harrer (2023) noted that biases and inaccuracies in training datasets can negatively influence AI outputs. Studies have also suggested that excessive reliance on AI technologies may affect students' development of writing skills and critical thinking abilities (Warschauer et al., 2023). These concerns highlight the need for further investigation into how students actually engage with GenAI technologies in academic environments. Understanding students' patterns of use, frequency, and challenges associated with GenAI utilization will provide evidence capable of guiding institutional policies and promoting responsible integration of AI technologies into higher education.

Objectives of the Study

The following objectives guided the study:

1. To determine the types of Gen AI tools used by students of the Departments of Computer Science and Library and Information Technology in in Federal University of Technology Ikot Abasi.
2. To determine the extent of use of Gen AI tools by students of the Departments of Computer Science and Library and Information Technology in in Federal University of Technology Ikot Abasi.
3. To examine the frequency of use of Gen AI tools by students of the Departments of Computer Science and Library and Information Technology in in Federal University of Technology Ikot Abasi.
4. To identify the challenges associated with the use of Gen AI tools by students of the Departments of Computer Science and Library and Information Technology in in Federal University of Technology Ikot Abasi.

Hypothesis of the Study

H_0: There is no significant difference in the use of Generative Artificial Intelligence tools among undergraduate students in Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi.

Literature Review

Generative Artificial Intelligence (GenAI) refers to a category of artificial intelligence technologies capable of producing original content such as text, images, computer code, videos, and other forms of digital output in response to user prompts. Unlike conventional AI systems that focus mainly on data processing and prediction, generative AI systems create new content by identifying and learning patterns from large datasets through machine learning and deep neural network models. Examples of commonly used GenAI tools include ChatGPT, DALL·E, Claude, Gemini, and Stable Diffusion. The rapid emergence and widespread adoption of these technologies have stimulated extensive scholarly discussion regarding their influence on higher education and students' learning experiences.

Generative AI is increasingly described in the literature as a transformative technological innovation with the capacity to reshape teaching and learning processes. According to Salvagno et al. (2023), generative AI represents a significant advancement beyond earlier educational technologies because it actively produces original content rather than merely retrieving or presenting existing information. Kasneci et al. (2023) argued that this technological shift has fundamentally changed learning processes by enabling students to engage with intelligent systems capable of simulating aspects of human reasoning, creativity, and problem-solving. Within university environments, GenAI technologies are becoming integrated into academic activities and learning workflows, influencing how students approach assignments, research tasks, and academic problem-solving (Rowland, 2023). Consequently, researchers emphasize the need to understand not only the technological capabilities of GenAI but also its influence on learning outcomes, cognitive development, and students' academic behavior.

Within the discipline of Computer Science, available literature suggests that Generative AI tools have become particularly influential because of their alignment with computational and technical learning objectives. Ross and Zhang (2024) observed that undergraduate Computer Science students frequently utilize GenAI technologies for writing and debugging codes, understanding complex algorithms, generating software documentation, and exploring alternative programming solutions. Similarly, Cardon et al. (2023) reported that these technologies improve learning efficiency by providing immediate feedback and encouraging iterative experimentation, which are important components of programming education. Malik et al. (2023) further noted that GenAI tools function as personalized learning assistants, especially for students who experience difficulties with abstract computational concepts.

Despite these benefits, the literature identifies concerns regarding excessive dependence on AI technologies within Computer Science education. Črček and Patekar (2023) as well as Singh et al. (2023) argued that overreliance on AI-generated solutions may negatively affect the development of fundamental programming competencies and independent problem-solving abilities. Consequently, scholars advocate structured integration of AI technologies into Computer Science curricula to ensure that educational objectives are achieved without compromising students' analytical and technical skills.

Within the field of Library and Information Technology, the literature portrays Generative AI as a valuable tool for information organization, retrieval, and knowledge management. Kim and Cho (2023) observed that undergraduate students in this field use AI technologies for summarizing large volumes of information, generating metadata, simulating cataloguing procedures, supporting indexing activities, and assisting with academic writing. Such applications align closely with the discipline's emphasis on information organization and dissemination within digital environments. Similarly, Ross and Zhang (2024) argued that AI technologies support efficient information access and management. Rowland (2023) further observed that Generative AI contributes positively to students' research productivity and helps manage information overload.

However, studies have raised concerns regarding students' overdependence on AI tools in evaluating information resources. Such dependence may weaken important information literacy competencies and critical evaluation skills required within Library and Information Technology education. These concerns indicate that while AI technologies support information processing activities, they should complement rather than replace analytical judgment and scholarly evaluation practices.

Studies investigating undergraduate students' adoption of Generative Artificial Intelligence across disciplines provide important insights into usage patterns and motivations. El Shazly (2021) reported that substantial proportions of students in higher education institutions are aware of AI technologies and use them regularly for academic activities. Molenaar (2022) found higher adoption rates among Computer Science students compared with students from information-related and non-technical disciplines. This variation was attributed to greater technological familiarity and curriculum exposure among Computer Science students. Similarly, Črček and Patekar (2023) found that students generally perceive AI technologies as effective academic support systems capable of reducing workload, improving assignment quality, and enhancing confidence in learning tasks.

The literature also indicates differences in the depth and manner of AI utilization among students. While some students employ AI technologies strategically to enhance learning experiences, others depend on them primarily for task completion with minimal cognitive engagement. Such findings suggest that technological access alone does not guarantee meaningful learning outcomes; effective utilization also depends on users' competencies and critical engagement.

Research focusing specifically on Library and Information Technology students presents a more nuanced perspective regarding AI adoption. Walter (2024) found that students within this discipline generally exhibit moderate to high levels of AI engagement, especially in areas such as research support, information synthesis, and citation assistance. Students often report that AI technologies assist in understanding complex theoretical concepts and managing extensive reading requirements. However, Chan and Hu (2023) found significant differences in students' ability to evaluate AI-generated outputs critically, with many students demonstrating inadequate knowledge regarding ethical AI use and information evaluation practices. These findings highlight the importance of integrating AI literacy into educational programmes in order to strengthen both technical competence and critical judgment.

Despite the numerous benefits associated with Generative Artificial Intelligence, studies consistently identify several challenges relating to its use within higher education environments. Malik et al. (2023) identified academic integrity concerns as one of the major challenges associated with AI use, arguing that the ease with which essays, assignments, and programming solutions can be generated creates questions regarding originality, authorship, and validity of academic assessments. Within both Computer Science and Library and Information Technology disciplines, students frequently express uncertainty regarding acceptable levels of AI assistance because of the absence of clear institutional guidelines and policies.

Studies conducted in developing-country contexts have also emphasized infrastructural challenges associated with AI utilization. Bond et al. (2024) and Delcker et al. (2024) reported that unstable internet connectivity, inadequate digital infrastructure, and limited access to advanced AI technologies may restrict effective utilization and widen educational inequalities among students. These findings suggest that although Generative Artificial Intelligence offers considerable educational opportunities, successful integration requires supportive infrastructure, institutional guidance, and appropriate policies.

Although international and regional studies have provided valuable insights regarding the use of Generative Artificial Intelligence in higher education, there remains limited context-specific empirical evidence within Nigerian universities. More specifically, few studies have comparatively examined GenAI utilization among undergraduate students in Computer Science and Library and Information Technology within the same institutional environment. This gap becomes particularly important within technology-driven institutions such as the Federal University of Technology Ikot Abasi where digital technologies play important roles in teaching and learning. Therefore, the present study seeks to investigate the patterns of Generative Artificial Intelligence usage, levels of utilization, and associated challenges among undergraduate students in these disciplines, thereby contributing empirical evidence capable of informing instructional practices, curriculum development, and institutional policy formulation.

Methodology

This study adopted a descriptive survey research design to investigate the use of Generative Artificial Intelligence (GenAI) among undergraduate students in the Departments of Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi (FUTIA). The descriptive survey design was considered appropriate because it enables the systematic collection of data from a defined population to describe existing conditions, practices, perceptions, and patterns of GenAI use without manipulation of variables. The design was also considered suitable for examining possible differences in the use of Generative Artificial Intelligence tools among students from the two academic disciplines.

The population of the study comprised 200 undergraduate students drawn from the Departments of Computer Science and Library and Information Technology, Federal University of Technology Ikot Abasi. The departments were purposively selected because of their strong orientation toward computing technologies, information systems, and digital learning environments, making them suitable contexts for investigating patterns of GenAI utilization.

A stratified random sampling technique was employed to ensure proportional representation of respondents across departments and levels of study. The population was first stratified according to department and academic level, after which respondents were selected using simple random sampling procedures. The sample size of 132 respondents was determined using the **Taro Yamane (1967) formula** for sample size determination.

Data were collected using a researcher-developed questionnaire titled *Generative Artificial Intelligence Usage Questionnaire (GAIUQ).* The instrument consisted of four sections. Section A elicited demographic information from respondents, while Sections B–E addressed issues relating to the types of Generative Artificial Intelligence tools used, extent of use, frequency of use, and challenges associated with the use of GenAI tools among students.

The instrument was subjected to face and content validation by experts from the Departments of Computer Science, Library and Information Technology, and Measurement and Evaluation to ensure the clarity, relevance, and adequacy of the questionnaire items. Necessary corrections and modifications suggested by the experts were incorporated before the final administration of the instrument.

To establish the reliability of the instrument, a pilot study was conducted among students outside the study population. Data generated from the pilot study were analyzed using the Cronbach Alpha reliability technique. A reliability coefficient of 0.81 was obtained, indicating a high level of internal consistency and confirming that the instrument was reliable for the study.

Copies of the questionnaire were administered directly to respondents with the assistance of trained research assistants. Ethical considerations such as informed consent, confidentiality, anonymity, and voluntary participation were strictly observed throughout the data collection process.

Data collected were analyzed using descriptive statistics such as frequency counts, percentages, mean scores, and standard deviation to answer the research questions. A criterion mean of 3.00 was adopted as the benchmark for decision-making,

where mean values equal to or greater than 3.00 were accepted, while values below 3.00 were rejected. To test the hypothesis, an independent samples *t*-test was used to determine whether a significant difference exists in the use of Generative Artificial Intelligence tools between undergraduate students in Computer Science and Library and Information Technology. All analyses were conducted using the Statistical Package for Social Sciences (SPSS).

Analysis of Data.

Table 1 : Population and Sample of the Study

Department	Level	Population	Sample size
Computer science	100	35	23
Computer science	200	30	20
Computer science	300	25	17
Library & Info.science	100	30	20
Library & Info.science	200	35	23
Library & Info.science	300	45	29
Total	—	200	132

Table 2: Types of GenAI Tools Used by Students

S/N	Items	SA	A	U	D	SD	N	Mean ($\bar{x}$)	Std. Dev.	Decision
1	ChatGPT	49	40	16	15	12	132	3.75	1.18	Accept
2	Gemini	40	35	15	20	22	132	3.38	1.36	Accept
3	GitHub Copilot	18	21	27	31	35	132	2.66	1.27	Reject
4	DALL·E 3	41	43	19	14	15	132	3.61	1.15	Accept
5	Midjourney	20	27	17	38	30	132	2.76	1.39	Reject
6	Perplexity AI	20	27	17	38	30	132	2.76	1.39	Reject
7	Claude	44	37	14	17	20	132	3.51	1.28	Accept
8	Adobe Firefly	43	38	20	18	13	132	3.60	1.18	Accept
9	Jasper	19	20	25	35	33	132	2.67	1.34	Reject
10	Runway ML	15	12	13	43	49	132	2.25	1.28	Reject

Keys: SA = Strongly Agree, A = Agree, = A, U = Undecided, D=Disagree, SD= Strongly Disagree, N=sampled population, $\bar{x}$ = Mean, SD = Standard Deviation

The survey results in Table 2 show that students commonly use certain Generative AI (GenAI) tools for academic and creative tasks. ChatGPT ($\bar{x}$ = 3.75) is the most popular, likely due to its ease of access and versatility in generating ideas, explanations, and academic support. Other widely used tools include DALL·E 3 ($\bar{x}$ = 3.61) and Adobe Firefly ($\bar{x}$ = 3.60) for image generation, as well as Claude ($\bar{x}$ = 3.51) and Gemini ($\bar{x}$ = 3.38) for conversational support and information gathering. In contrast, tools like GitHub Copilot ($\bar{x}$ = 2.66), Midjourney ($\bar{x}$ = 2.76), Perplexity AI ($\bar{x}$ = 2.76), Jasper AI ($\bar{x}$ = 2.67), and Runway ML ($\bar{x}$ = 2.25) are less commonly used, possibly due to limited awareness, specialized purposes, or restricted relevance to students' academic needs.

The findings suggest that students prefer accessible, user-friendly, and academically relevant GenAI tools. Ease of access, familiarity, and task relevance seem to drive the adoption of these tools among student

Table 3: Extent of Use of GenAI Tools

S/N	Items	VHE	HE	N	LE	VLE	N	Mean ($\bar{x}$)	Std. Dev.	Decision
1	ChatGPT	49	30	17	22	14	132	3.59	1.24	Accept
2	Gemini	28	27	18	30	29	132	2.96	1.42	Reject
3	GitHub Copilot	43	34	15	23	17	132	3.47	1.31	Accept
4	DALL·E 3	30	22	18	33	29	132	2.93	1.38	Reject
5	Midjourney	20	27	14	35	36	132	2.69	1.41	Reject
6	Perplexity AI	18	23	11	42	38	132	2.55	1.34	Reject

7	Claude	40	35	15	20	22	132	3.38	1.29	Accept
8	Adobe Firefly	41	43	19	14	15	132	3.61	1.16	Accept
9	Jasper	30	22	18	33	29	132	2.93	1.38	Reject
10	Runway ML	19	20	25	35	33	132	2.67	1.30	Reject

Keys: VHE = Very High Extent, HE = High Extent, N=Never, LE = Low Extent, VLE=Very Low Extent, N=sampled population, $\bar{x}$ = Mean, SD = Standard Deviation

Table 3 reveals the extent of Generative AI (GenAI) tool usage among students. The results show that Adobe Firefly ($\bar{x}$ = 3.61) and ChatGPT ($\bar{x}$ = 3.59) are the most extensively used tools, highlighting their importance in creative and academic tasks. GitHub Copilot ($\bar{x}$ = 3.47) and Claude ($\bar{x}$ = 3.38) also used, particularly in coding and learning contexts. In contrast, tools such as Gemini ($\bar{x}$ = 2.96), DALL·E 3 ($\bar{x}$ = 2.93), Midjourney ($\bar{x}$ = 2.69), Perplexity AI ($\bar{x}$ = 2.55), Jasper AI ($\bar{x}$ = 2.93), and Runway ML ($\bar{x}$ = 2.67) recorded lower mean scores, indicating that they are utilized to a lesser extent by the students. This may imply that these tools are not as popular, accessible, or directly relevant to the academic activities of the students.

The findings indicate that usage intensity varies among GenAI tools, with a focus on tools that offer practical, everyday value to students' academic and creative workflows.

Table 4: Frequency of Use

	Items	D	W	N	M	S	N	Mean ($\bar{x}$)	Std. dev.	Decision
1	ChatGPT	42	55	20	10	5	132	3.90	0.99	Accept
2	Gemini	12	25	18	43	34	132	2.53	1.34	Reject
3	GitHub Copilot	43	34	15	23	17	132	3.47	1.31	Accept
4	DALL·E 3	22	32	10	28	40	132	2.75	1.43	Reject
5	Midjourney	44	56	8	12	12	132	3.81	1.04	Accept
6	Perplexity AI	13	17	27	32	43	132	2.43	1.27	Reject
7	Claude	30	38	24	22	18	132	3.30	1.29	Accept
8	Adobe Firefly	22	35	25	30	20	132	3.06	1.32	Accept
9	Jasper	11	22	16	44	39	132	2.40	1.28	Reject
10	Runway ML	10	18	47	29	28	132	2.64	1.24	Reject

Keys: D = Daily, W = Weekly, N = Never, M = Monthly, S = Sometimes, N=sampled population, $\bar{x}$ = Mean, SD = Standard Deviation

Table 4 presents the frequency of students' use of Generative Artificial Intelligence **(**GenAI) tools. The results show that students frequently use some GenAI tools. ChatGPT ($\bar{x}$ = 3.90) and Midjourney ($\bar{x}$ = 3.81) are used very often for academic tasks and creative design, while GitHub Copilot ($\bar{x}$ = 3.47), Claude ($\bar{x}$ = 3.30), and Adobe Firefly ($\bar{x}$ = 3.06) are also regularly used for programming, learning, and creative work. In contrast, tools like Gemini ($\bar{x}$ = 2.53), DALL·E 3 ($\bar{x}$ = 2.75), Perplexity AI ($\bar{x}$ = 2.43), Jasper AI ($\bar{x}$ = 2.40), and Runway ML ($\bar{x}$ = 2.64) are used less frequently, suggesting limited familiarity or occasional use by students.

The findings indicate that students frequently use popular and accessible GenAI tools like ChatGPT, Midjourney, GitHub Copilot, Claude and Adobe Firefly while other platforms are used less often. This is likely due to differences in awareness, ease of access, and relevance to academic tasks tools that are well-known, easy to use, and directly support learning are adopted more frequently, whereas specialized or less familiar tools see limited use.

Table 5: Challenges Associated with Use of Gen AI Tools

	Items	SA	A	U	D	SD	N	Mean ($\bar{x}$)	Std. dev.	Decision
1	Internet connectivity issues	32	45	25	20	10	132	3.52	1.22	Accept

2	Subscription / paid features	30	42	15	30	15	132	3.31	1.38	Accept
3	Ethical / plagiarism concerns	32	50	30	15	5	132	3.67	1.08	Accept
4	Lack of training / guidance	45	40	20	20	7	132	3.72	1.19	Accept
5	Difficulty in interpreting AI outputs	33	45	28	18	8	132	3.58	1.16	Accept
6	misinformation	30	38	24	22	18	132	3.30	1.39	Accept
7	Over-reliance	47	43	10	20	12	132	3.70	1.30	Accept
8	Job displacement	27	38	12	24	31	132	3.04	1.55	Accept
9	Security risk	17	25	35	35	20	132	2.87	1.29	Reject
10	Accountability	34	39	22	24	13	132	3.43	1.31	Accept

Keys: SA = Strongly Agree, A = Agree, = A, U = Undecided, D=Disagree, SD= Strongly Disagree, N=sampled population, $\bar{x}$ = Mean, SD = Standard Deviation

The results from Table 5 shows the challenges associated with the use of Generative Artificial Intelligence tools among students. Lack of training/guidance recorded the highest mean score ($\bar{x}$ = 3.72, SD = 1.19), indicating that respondents considered inadequate knowledge and orientation as a major challenge affecting AI use. This was followed closely by over-reliance on AI tools ($\bar{x}$ = 3.70, SD = 1.30) and ethical/plagiarism concerns ($\bar{x}$ = 3.67, SD = 1.08). Internet connectivity issues, difficulty interpreting AI outputs, accountability concerns, subscription limitations, misinformation, and job displacement were also identified as notable challenges. However, security risk ($\bar{x}$ = 2.87, SD = 1.29) was rejected, suggesting that respondents did not perceive it as a major issue. The grand mean of 3.41 indicates overall agreement that students encounter several challenges in the use of Generative Artificial Intelligence tools.

Table 6: Independent Samples t-test Showing Difference in the Use of Generative Artificial Intelligence Tools among Undergraduate Students in Computer Science and Library and Information Technology

Department	N	Mean ($\bar{x}$)	Std. Dev.	df	t-cal	Sig. (2-tailed)	Decision
Computer Science	60	3.48	0.71	130	1.284	0.201	Not Significant
Library and Information Technology	72	3.32	0.68				
Total	**132**						

The table 6 presents the result of an independent samples *t*-test conducted to determine whether a significant difference exists in the use of Generative Artificial Intelligence tools among undergraduate students in Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi. The result showed that Computer Science students recorded a mean score of **3.48** (SD **= 0.71),** while Library and Information Technology students recorded a mean score of **3.32** (SD = **0.68**). The calculated *t*-value of **1.284** with a significance value of **0.201** is greater than the 0.05 level of significance.

Since the p-value **(0.201)** is greater than **0.05**, the null hypothesis is accepted. This implies that there is **no statistically significant difference** in the use of Generative Artificial Intelligence tools among undergraduate students in Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi. The finding suggests that students in both disciplines demonstrate relatively similar patterns of GenAI utilization.

Discussion of Findings

The findings of the study revealed that undergraduate students in the Departments of Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi utilize various Generative Artificial Intelligence (GenAI) tools for academic and related activities. Among the tools examined, ChatGPT recorded the highest mean score, indicating that it is the most commonly used AI tool among students. Other tools such as DALL·E 3, Adobe

Firefly, Claude, and Gemini also recorded acceptable levels of use. This suggests that students prefer AI applications that are accessible, user-friendly, and capable of supporting academic tasks such as content generation, assignment writing, explanations, and creative activities. The finding agrees with Abbas, Jam, and Khan (2024), who reported that students are more likely to adopt AI tools that are perceived as useful and capable of enhancing learning efficiency.

The findings further revealed that students use some GenAI tools to a high extent. Adobe Firefly, ChatGPT, GitHub Copilot, and Claude recorded relatively high mean scores, indicating considerable utilization among respondents. This suggests that students actively integrate these technologies into their academic routines because of their practical usefulness in learning and problem-solving activities. The finding aligns with Kanont et al. (2024), who found that students tend to use technologies more extensively when they provide direct academic value and improve productivity.

The study also showed that ChatGPT and Midjourney recorded the highest frequency of use among students. GitHub Copilot, Claude, and Adobe Firefly also showed relatively high usage frequencies. This indicates that students have incorporated AI technologies into their regular academic and creative activities. The frequent use of ChatGPT may be attributed to its versatility, ease of access, and ability to provide quick responses for different academic needs. This finding supports Wood and Moss (2024), who observed that students increasingly use AI technologies because of convenience, speed, and effectiveness in supporting academic activities.

The findings further identified several challenges associated with the use of GenAI tools among students. Major challenges included lack of training and guidance, ethical and plagiarism concerns, difficulties in interpreting AI-generated outputs, internet connectivity problems, subscription limitations, and over-dependence on AI systems. These challenges suggest that despite the increasing use of AI technologies, barriers still exist that may affect effective and responsible utilization. The finding agrees with Ng, Chan, and Lo (2025), who reported that ethical concerns and inadequate AI literacy remain major challenges affecting AI adoption in higher education. The findings imply that institutions need to provide training, guidance, and supportive policies to ensure responsible and effective use of AI technologies among students.

The hypothesis tested in the study revealed that there is no significant difference in the use of Generative Artificial Intelligence tools among undergraduate students in the Departments of Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi. The independent samples *t*-test showed that the observed difference in mean scores between the two groups was not statistically significant at the 0.05 level of significance. This indicates that students from both academic disciplines exhibit relatively similar patterns of GenAI utilization despite differences in disciplinary orientation. The finding suggests that the increasing accessibility and widespread adoption of AI technologies may have reduced disciplinary boundaries in technology use among students.

Conclusion

This study examined the use of Generative Artificial Intelligence (GenAI) tools among undergraduate students in the Departments of Computer Science and Library and Information Technology at the Federal University of Technology Ikot Abasi. The findings revealed that students actively utilize various GenAI tools for academic and related activities, with ChatGPT, Adobe Firefly, Claude, and other AI applications emerging as commonly used platforms. Students also demonstrated varying levels and frequencies of use, indicating increasing integration of AI technologies into academic activities and learning environments.

The study further identified several challenges associated with the use of GenAI technologies, including inadequate training and guidance, ethical and plagiarism concerns, internet connectivity problems, difficulties in interpreting AI-generated outputs, subscription limitations, and overreliance on AI systems. In addition, the hypothesis tested revealed no statistically significant difference in the use of Generative Artificial Intelligence tools between students in Computer Science and Library and Information Technology. This implies that GenAI technologies are increasingly becoming common academic tools across disciplines irrespective of students' academic backgrounds.

Based on these findings, the study concludes that Generative Artificial Intelligence technologies have become important educational support tools capable of enhancing learning experiences and academic productivity among students. However, maximizing their benefits requires institutional support systems, ethical frameworks, digital literacy initiatives, and structured guidance to encourage responsible and effective use. The study therefore maintains that AI technologies should complement learning processes while preserving students' critical thinking abilities, creativity, and independent intellectual engagement.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Universities should develop clear institutional guidelines and policies on the responsible use of Generative Artificial Intelligence tools to address issues relating to ethical use, academic integrity, and appropriate application of AI-generated content in academic work.

2. Educational institutions should integrate AI literacy programmes into their curriculum to equip students with practical knowledge and competencies required for the effective and responsible use of GenAI technologies.
3. Universities should organize regular training programmes, seminars, and workshops to expose students to different GenAI tools and provide guidance on their academic applications and limitations.
4. Institutions should invest in technological infrastructure such as reliable internet connectivity and digital learning facilities to ensure students have equitable access to AI technologies and related resources.
5. Students should be encouraged to use AI tools as supportive learning resources rather than substitutes for independent thinking, critical analysis, and originality in academic work.
6. Universities should establish mechanisms for continuous monitoring and evaluation of AI usage patterns and challenges in order to improve implementation strategies and ensure effective integration of AI technologies into teaching and learning activities.

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Use of Institutional Repository and Continuous Professional Development On Academic Output of Agricultural Lecturers in Universities in North-Central Nigeria

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Abstract

Academic output remains a vital measure of scholarly productivity, professional growth, and institutional prestige, particularly in agricultural disciplines that drive food security and sustainable development. This study examined the influence of institutional repository (IR) use and continuous professional development (CPD) on the academic output of agricultural lecturers in universities across North-Central Nigeria. A descriptive survey design employing mixed methods was adopted, targeting a population of 365 agricultural lecturers from six universities identified through the Directory of Open Access Repositories. The data collection tool was the questionnaire complimented by the observation checklist. The method of data collection was through self-administration of questionnaires by researchers in universities in North-Central utilising institutional repositories. The total enumeration method was adopted thereby using the entire population of the study since they were manageable. Research instruments were validated through a pilot test with a Cronbach's Alpha coefficient of 0.75, confirming internal consistency reliability. The method of data analysis used for the study was descriptive statistics using frequency counts, mean and standard deviation to analyse the research questions, while inferential statistics such as Pearson Moment Correlational Coefficients (PPMC) for determining the relationships between the dependent and independent variables while the Multiple regression analysis was used to predict the individual impact or contribution of the independent variables on the dependent variable. The findings revealed that research publications, journal articles, and theses/dissertations are the most common academic outputs available in institutional repositories, while teaching materials, research data, and open educational resources remain scarce. The study also found that agricultural lecturers exhibit a high level of academic output, producing reports, preprints, and journal articles more frequently than lecture notes or presentation slides. Moreover, the extent of IR use was found to be high, primarily for accessing scholarly literature, enhancing research visibility, and ensuring digital preservation. The study concludes that active utilization of institutional repositories and participation in CPD activities significantly enhance academic productivity. It recommends that universities strengthen repository infrastructure, promote awareness, and provide regular CPD opportunities to foster sustained academic excellence among agricultural lecturers in Nigeria.

Keywords: Institutional Repository, Continuous Professional Development, Academic Output, Agricultural Lecturers, North-Central Nigeria, Research Productivity

1.1. Introduction

Academic output plays a crucial role in the professional growth of university lecturers and the advancement of knowledge within various disciplines. In the field of agriculture, where research and innovation drive sustainable food production and environmental management, the ability of lecturers to contribute effectively to academic discourse is essential. However,

the extent to which institutional repositories (IRs) and continuous professional development (CPD) influence academic output among agricultural lecturers in Nigerian universities remains a subject of academic inquiry.

Institutional repositories serve as digital collections of scholarly work, providing open access to research outputs such as theses, dissertations, journal articles, and conference proceedings. The use of IRs has been recognized as a significant factor in increasing research visibility and accessibility (Olatunji & Abubakar, 2025). Likewise, Continous Professional Developement activities, including workshops, conferences, online courses, and specialized training, are designed to enhance lecturers' teaching and research skills, ensuring that they stay updated with global trends and methodologies in their field (Eze & Okonkwo, 2025). The synergy between IRs and CPD is believed to improve academic productivity by equipping lecturers with the necessary resources and skills to publish high-quality research.

The pursuit of academic excellence in higher education institutions is a continuous process that requires lecturers to engage in research, teaching, and community service. Academic output refers to the measurement of a scholar's achievements in terms of research publications, scholastic presentations, and other academic accomplishments. It is a metric commonly used to assess the productivity and prestige of faculty members in academia. (Eze & Okonkwo, 2025). Academic output is often used to determine faculty career advancement. It is a comprehensive measure that takes into account factors such as research output, leadership roles, and editorial positions. Academic output, particularly journal publication, has become a main criterion in measuring the contribution of lecturers to the intellectual community globally (Muhammad and Abubakar, 2025). Academic output encompasses research publications, conference proceedings, book chapters, and other forms of scholarly communication that contribute to the advancement of knowledge. (Sugimoto *et al.,* 2022). Academic output embody the various products of academic activity, such as research articles, books, book chapters, conference proceedings and other forms of scholarly communication. (Katz, 2022).

Academic output can be defined as a definite result of academic work, including research publications, presentations, and other scholarly achievements (Kumar, 2021). Similarly, Academic output is the measure of a scholar's performance and impact, typically assessed through metrics such as publication counts, citation rates, and h-index scores (Hicks, 2023). Academic output encompasses but is not limited to, peer-reviewed articles, books, book chapters, conference papers, and other forms of creative and scholarly work. (Altbach *et al.,* 2023). Academic output is defined as tangible and intangible products of academic work, and achievement including research publications, teaching materials, and other scholarly contributions. (Brent *et al.,* 2021). Academic output embody the various products of academic activity, such as research articles, books, book chapters, conference proceedings and other forms of scholarly communication. (Katz, 2022). Academic output can be defined as a definite result of academic work, including research publications, presentations, and other scholarly achievements (Kumar, 2021). Similarly, Academic output is the measure of a scholar's performance and impact, typically assessed through metrics such as publication counts, citation rates, and h-index scores (Hicks, 2023).

The university system is organised into either faculties or schools with members as academic staff also known as lecturers. Each faculty is made up of related programmes organized into departments. One of the earliest faculties in Nigerian universities is the Faculty of Agriculture with various programmes which according to Smith *et al.* (2020) comprised of crop production, animal production, soil science, crop science, nutrition, agricultural engineering, pharmacology and the environment. The lecturers in the faculties of agriculture, like their counterparts in other faculties, are involved in teaching, research and Continuous Professional Development (CPD) which are the cardinal functions of any university. Agricultural lecturers are also involved in contributing to the academic output of their universities. These may be through journal articles, books, conference papers as well as participating in CPD programmes and activities. These academic outputs are usually stored and disseminated through the institutional repository (IR).

Institutional repositories (IRs), according to Bamigbola (2018) an archives for the collection of intellectual outputs of an institution, recorded in a form that can be preserved, exploited and disseminated in a digital form. University libraries have overtime been involved in establishing institutional repositories to acquire, process, store, preserve and disseminate intellectual outputs of lecturers in digital forms to community members and the global community. It is usually an electronic store of web-based scholarly digital documents such as theses and dissertations, journals, books and conference papers owned by the institutions, hence, it can be referred to as an extension of the digital library which has now become a platform for sharing knowledge (Bamigbola, 2018).

The main objective of establishing institutional repositories is to showcase institutional research output to the outside world and can be regarded as a service that the university renders to its community members for the stewardship of scholarly publication generated by the faculty, staff, and research scholars which create global visibility for an institution's scholarly research, and also stores and preserves other institutional digital assets, including unpublished literature for long term use. Institutional repositories have therefore witnessed a paradigm shift in scholarly communication that increases visibility and adds more prestige to the institutions.

In light of the foregoing, this study Use of Institutional Repository and Continuous Professional Development For Enhancing Academic Output of Agricultural Lecturers in Universities in North-Central Nigeria

1.2 Statement of the Research Problem

In any academic environment, lecturers are expected to produce high and consistent academic output through research publications, conference papers, books, and other scholarly contributions. Lecturers in the faculty of agriculture in North Central Nigeria are not left out in this. University libraries in Nigeria have stepped up their services by developing digital institutional repositories (IRs) which should be fully utilised to store, preserve, and disseminate these outputs to enhance visibility, accessibility, and global impact, while Continuous Professional Development (CPD) programmes should be regularly attended to improve lecturers' research competence, teaching effectiveness, and professional growth. With effective use of IRs and active participation in CPD, agricultural lecturers would be expected to demonstrate strong research productivity and meaningful contributions to agricultural innovation and national development (Altbach, 2024).

However, the actual situation appears different. Academic output among some agricultural lecturers in universities in North-Central Nigeria seems relatively low, and many scholarly works are either unpublished or not deposited in institutional repositories. The utilisation of IRs is often limited due to inadequate awareness, lack of clear repository policies, poor ICT infrastructure, insufficient training, copyright concerns, and limited institutional motivation. Participation in CPD programmes is also inconsistent because of heavy teaching workload, inadequate funding, time constraints, and weak institutional support. These factors reduce research visibility, limit the dissemination of scholarly work, and hinder professional growth among lecturers, despite the recognised importance of research output in measuring academic productivity (Adamu and Kaur, 2019).

A preliminary review of institutional repositories in some universities in North-Central Nigeria shows that although Faculties of Agriculture are represented, the volume of deposited publications does not reflect expected research productivity. Informal discussions with lecturers and library personnel also suggest low awareness of IR services and irregular participation in CPD activities, indicating a gap between expected and actual academic output.

These concerns motivated the researcher to carry out this study in order to examine the Use of Institutional Repository and Continuous Professional Development For Enhancing Academic Output of Agricultural Lecturers in Universities in North-Central Nigeria

1.3 Objective of the Study

This study aims to investigate the Use of Institutional Repository and Continuous Professional Development For Enhancing Academic Output of Agricultural Lecturers in Universities in North-Central Nigeria

. The specific objectives are to:

1. identify the types of academic output of agricultural lecturers that are available in the institutional repositories of universities in North-Central Nigeria.

2. find out the level of academic output of Agricultural lecturers in universities in North-Central Nigeria.

3. examine the extent of use of institutional repositories for research by agricultural lecturers in universities in North-central Nigeria.

1.4. Research Questions

The following research questions were asked and answered in the study.

- What are the types of academic outputs of agricultural lecturers that are available in the institutional repositories of universities in North-central Nigeria?
- What is the level of academic output of Agricultural lecturers in universities in North-central Nigeria?
- What is the extent of the use of institutional repositories for research by agricultural lecturers in universities in North-central Nigeria?

2.0. Literature Review

The literature was reviewed in line with the study objectives under the following subheadings:

i. Types of academic outputs of agricultural lecturers that are available in the institutional repositories of universities in North-central Nigeria?

Academic output refers to the tangible results of academic work, including research publications, presentations, and other scholarly achievements (Kumar, 2021). It is a key indicator of academic productivity and impact (Hicks, 2023). Kumar (2021) defined academic output as the measurable results of academic activities, including research publications, conference presentations, and other scholarly achievements. Hicks (2023) noted that academic output is a critical factor in evaluating academic performance and impact, as it reflects the tangible contributions of scholars to their field. Altbach (2024) stated that academic output is increasingly important in the global knowledge economy, as it drives innovation, collaboration, and societal impact. Oyediran (2022) highlighted the importance of academic output in promoting knowledge sharing and dissemination, stating that academic output is essential for advancing knowledge and understanding in various fields.

According to Simisaye (2019), academic output is critical in the appointment and promotion of lecturers as stated in the service schemes that govern their appointments and promotions. Aside from educational qualifications and relevant experience, they are expected to obtain appointments and promotions based on satisfactory academic output in renowned journals, conference proceedings, seminar papers, research publications, teaching materials, research data, presentations, theses and dissertations, journal articles, book chapters, conference papers, technical papers to mention but a few as a condition of their job and positions. The academic output varies by academic rank at tertiary institutions, and a PhD in a relevant field is required for lecturers, particularly university professors (Schimanski and Alperin, 2018).

Peer review is a time-honoured method that has been a component of scientific communication for more than 300 years. Musick (2020), on the other hand, believes that academic publishing has altered dramatically because of the proliferation of open-access journals and the transition to online publishing. There are currently more journals than ever before where authors can publish their work. This benefits writers by expanding their publishing options, but it also increases their duty to avoid the grave risk of publishing in a predatory journal. Predatory journals seek money from authors in exchange for publishing their articles (generally open access), but they do not follow the same editorial, peer review, or other ethical publishing processes/standards as respected journals.

2.1.2. Concept of academic output

1. Research data

The exponential growth in research data and the increasing emphasis on data sharing,

transparency and reproducibility have necessitated a reevaluation of research data

management practices in academic libraries.

- **Journal article**

Journal articles are peer-reviewed publications that present original research findings, literature reviews, or theoretical advancements in a specific field. They are the most recognized and valued form of academic output due to their rigorous evaluation process and contribution to scholarly discourse (Ogunyemi & Ibrahim, 2025).

Types of Journal Articles:

xxviii. **Original Research Articles:** It presents new findings based on empirical or theoretical research.

xxix. **Review Articles:** It summaries and analyses existing literature on a particular topic.

xxx. **Short Communications:** Provide brief reports on significant research developments.

xxxi. **Case Studies:** It describes and analyses specific cases with practical or theoretical implications.

- **Books and Book Chapters**

Books and book chapters represent significant contributions to academic knowledge, offering comprehensive discussions on specific topics. Books may be authored by a single researcher or edited volumes containing contributions from multiple scholars (Adeyemi & Musa, 2025).

Types of Academic Books:

a. **Monographs:** Multiple -author books focusing on a specific subject.
b. **Edited Volumes:** Collections of chapters written by different authors.
c. **Textbooks:** Provide foundational knowledge for students in the discipline.
d. **Reference Books:** Serve as authoritative sources of information on a topic.

4. Theses and Dissertations

Theses and dissertations are extensive research projects completed as part of postgraduate degree requirements. They demonstrate the research capabilities of students and contribute to academic knowledge (Chukwuemeka et al., 2025).

The academic output of lecturers is key for the advancement of societies and the career growth of lecturers in higher educational institutions. Academic output is viewed as the measure of an academic's achievement in terms of quantity or quality of publications over a given period. One of the fundamental goals of research is to create new knowledge that can be applied. Hence, it is important to state that academic output is a robust measure of academic achievement and recognition as well as the totality of research activities performed by lecturers over a given period (Basiru, 2018). Yusuf and Adekunle (2025) conducted a study in which they analyzed the productivity of agricultural lecturers in universities with functional IRs versus those without. The study found that universities with well-managed repositories recorded a 40% increase in the number of published articles by faculty members over five years. In contrast, universities with poorly maintained IRs experienced stagnation in research output.

Salahudeen and Obinya (2023) investigated the awareness and use of open-access institutional repositories by academics in universities in the North-central States of Nigeria Some of the major findings revealed that the Open Access Institutional Repositories were used by scholars daily and at their will. Academics experience a kind of delay when looking for information from their Institutional Repositories during their academic activities which can lead to unproductive academic productivity.

ii. The Level of Academic Output of Agricultural Lecturers in Universities in North-Central Nigeria?

Academic output is a key to the growth and development of societies through the creation of new knowledge and the use of existing knowledge in a creative way to generate new concepts, methodologies and understandings. In academia, the concept of academic output is taken seriously in which the promotion of lecturers is dependent on the number of publications they have. This requirement makes it a mandate for them to be productive scholars and the extent to which this mandate is achieved is used to determine the level of productivity of lecturers. Academic output is viewed as the measure of an academic's achievement in terms of the quantity or quality of publications over a given period and considered in terms of the totality of research activities performed by lecturers over a given period (Basiru, 2018).

On the other hand, the measurement of the quantity of academic output of lecturers is viewed in terms of the number of publications in learned, globally accepted indexed databases, number of patents produced, number of chapters in books or books published locally or internationally which are believed to be accepted by high impact refereed or learned journal, publications in conference proceedings, research-oriented books, staff bulletins, subject books, technical reports, articles in refereed journals, pamphlets and monographs (Gunawan *et al.*, 2018).

Academic output can be measured using certain methodologies and exercises such as the number of published works, chapter contributions in books, and book publications including citations in web platforms and monographs. According to Cheng-Cheng Yang (2018), issues such as institutional-related, infrastructural- related, information resources-related and management-related and policy-related factors, among others have been observed and pointed out in other scholarly works as having the tendencies to influence the academic output of lecturers in Nigerian universities. The use of institutional repositories is a key component of information-resources-related factors relating to the academic output of lecturers in Nigerian universities.

Ladipo *et al.* (2022) investigated the influence of institutional factors on the research activity of academic staff in Nigerian universities. Findings from the study revealed an average level of research activity among academic staff in Nigerian universities.

iii. The Extent of the Use of Institutional Repositories for Research by Agricultural Lecturers in Universities in North-Central Nigeria

This literature review examines the extent of use of Institutional repositories by agricultural lecturers in universities, with a focus on Nigeria.

In Nigeria, the adoption of Institutional repositories has been a gradual yet impactful process. The Nigerian University Commission (NUC) has been instrumental in promoting the establishment of Institutional repositories across universities as part of their academic infrastructure (Adewumi, 2019). This initiative has led to a substantial increase in the number of Institutional repositories in Nigerian universities, facilitating better management and dissemination of scholarly outputs.

Agricultural universities in Nigeria have been particularly proactive in adopting Institutional repositories. These repositories serve as platforms for disseminating research on local agricultural practices and innovations, thereby contributing to both national and international knowledge bases. Institutional repositories offer a platform to share research findings that can shape policy, influence agricultural methods, and foster additional research. Jones (2020) highlights that the enhanced visibility of research afforded by Institutional repositories has resulted in increased citation rates and greater academic recognition for agricultural scholars. The study indicates that agricultural lecturers who are active users of Institutional repositories tend to experience more robust collaboration with international peers. Furthermore, Institutional repositories have proven instrumental in accessing and preserving indigenous knowledge and local This access enriches the global repository of agricultural knowledge and supports a more inclusive academic discourse (Okafor, 2018).

Nwachi and Idoko (2021) investigated the use of institutional repositories in Nigerian university libraries. From the findings, it was discovered that the most used or accessed materials in the institutional repositories by staff are journal articles, theses and dissertations, books, faculty and departmental journals and book chapters.

3.0. Research Methodology

This study adopted a descriptive survey using a mixed method of data gathering. The study population was total 365 agricultural lecturers from five (5) universities. Using Yamane's formula with a 5% margin of error, a sample size of 191 was calculated. To ensure fairness and representativeness, the sample was proportionally allocated based on the number of lecturers in each university. As a result, Benue State University, Makurdi contributed 25 participants, Federal University of Technology, Minna had the largest allocation with 58 participants, Nasarawa State University, Keffi had 29 participants,

University of Ilorin had 32 participants, University of Jos had 47 participants, Federal University Lokoja was excluded from the sample due to lack of data on lecturer count. The questionnaire and observation checklist were research instruments used for the study. A pilot study was conducted using the agricultural lecturers in Ahmadu Bello University, Zaria and University of Abuja where 40 copies of the questionnaire were administered to determine the level of its reliability. Out of 191 questionnaires administered across five universities, 175 were successfully retrieved, resulting in an overall response rate of 91.62%. This high response rate indicates strong respondents' engagement and lends credibility to the representativeness of the data collected.

The overall reliability of the tested questionnaires is 0.75, indicating that the instrument is reliable for the study. Data collected were analysed, using weighted mean, mode, standard deviation and percentages, while simple and multiple regression analysis were used to test the null hypotheses at 0.05 level of significance.

4.0. Results and Discussion

Out of 191 questionnaires administered across five universities, 175 were successfully retrieved, resulting in an overall response rate of 91.62%. This high response rate indicates strong respondents' engagement and lends credibility to the representativeness of the data collected.

Table 4.1: Response rate

S/N	University	No. of Questionnaire Distributed	No. of Questionnaires Retrieved	Response Rate (%)
1	Benue State University, Makurdi	25	22	88.00%
2	Federal University of Technology, Minna	58	51	87.93%
3	Nasarawa State University, Keffi	29	27	93.10%
4	University of Ilorin	32	30	93.75%
5	University of Jos	47	45	95.74%
	Total	**191**	**175**	**91.62%**

Source: Author's Field Work (2025)

Table 4.2: Types of academic output of agricultural lecturers that are available in the institutional repositories of universities in North-central Nigeria

S/N	Academic Output	Availability Status
1	Research publications	✔ Available
2	Teaching materials	✘ Not Available
3	Research data	✘ Not Available
4	Presentations	✘ Not Available
5	Theses and dissertations	✔ Available
6	Journal articles	✔ Available
7	Book chapters	✘ Not Available
8	Conference papers	✘ Not Available
9	Technical papers	✘ Not Available
12	Open Educational Resources (OER)	✘ Not Available

Source*:* Author's Fieldwork (2025)

Table 4.2: data shows a selective availability of academic outputs. Research publications, theses and dissertations, and journal articles are readily available, while other forms of outputs such as teaching materials, research data, presentations, book chapters, conference papers, technical papers, and open educational resources (OER) are notably absent.

Level Of Academic Output Of Agricultural Lecturers In Universities In North-Central Nigeria.

S/N	Item	VH (4)	H (3)	L (2)	VL (1)	N	Fx	Mean	Std. Dev	Decision
1	Books	53	48	14	60	175	444	2.54	1.24	Low Level
2	Book Chapters	57	27	60	31	175	460	2.63	1.12	Low Level
3	Journal Articles	35	58	74	8	175	470	2.69	0.84	Low Level
4	Conference Papers	25	43	99	8	175	435	2.49	0.79	Low Level
5	Lecture Notes	54	43	2	76	175	425	2.43	1.32	Low Level
6	Open Educational Resources	36	21	87	31	175	412	2.35	1.00	Low Level
7	Research Data	58	49	37	31	175	484	2.77	1.10	High Level
8	Presentation Slides	16	40	32	87	175	335	1.91	1.04	Low Level
9	Seminar Papers	26	41	107	1	175	442	2.53	0.75	Low Level
10	Preprints	39	68	58	10	175	486	2.78	0.86	High Level
11	Reports	56	47	59	13	175	496	2.83	0.97	High Level
	Average Weighted Mean (AWM)							**2.72**		

Source*:* Author's Fieldwork (2025)

Table.3: The result sought to evaluate the frequency with which various academic types are presented the weighted mean analysis, based on responses from 175 respondents, shows a striking imbalance in the emphasis placed on different forms of academic output. Out of the eleven items analysed, eight items fell below the average weighted mean ($\bar{x}$ = 2.72) and are thus rated at a low level, while only three exceeded this threshold and are classified as high level.

The eight low-level outputs books, book chapters, journal articles, conference papers, lecture notes, open educational resources, presentation slides, and seminar papers represent largely traditional or pedagogical forms of knowledge dissemination. Their lower mean values suggest that, although these materials are historically central to scholarly communication, they are no longer perceived as the most influential or widely utilised outputs within the current academic environment.

The three high-level output research data, preprints, and reports signal a shift toward the values and practices of open science and contemporary knowledge sharing. Research data ($\bar{x}$ = 2.77) reflects the global trend of promoting transparency, reproducibility, and data-driven inquiry, where datasets themselves are increasingly treated as valuable scholarly products. Preprints ($\bar{x}$ = 2.78) embody the movement toward rapid, open dissemination, enabling scholars to circulate findings before formal peer review and thus accelerate knowledge exchange. Reports ($\bar{x}$ = 2.83), often tied to policy, funding accountability, and applied research outcomes, highlight the growing importance of outputs that directly influence decision-making beyond academia.

Table 4.4: The extent of use of institutional repositories for research by agricultural lecturers in universities in North-central

S/N	Statement	VHE (4)	HE (3)	LE (2)	VLE (1)	N	Fx	Mean	Std Dev	Decision
1	I access research outputs on repositories when searching for literature	48	59	45	23	175	516	2.95	0.98	High Extent

2	I upload to the repository to increase visibility	40	62	50	23	175	498	2.85	1.00	High Extent
3	I uploaded for the research assessment/promotion	42	60	43	30	175	493	2.82	1.03	High Extent
4	I use the repository to share research outputs	39	56	47	33	175	483	2.76	1.04	High Extent
5	I use the repository to showcase research to funders	31	49	61	34	175	462	2.64	0.97	Low Extent
6	I access repositories to find collaboration opportunities	33	58	52	32	175	472	2.70	0.96	Low Extent
7	I use the repository for non-academic outputs	24	44	59	48	175	437	2.50	1.01	Low Extent
8	I use repositories to write course notes	29	46	51	49	175	444	2.54	0.98	Low Extent
9	I use the repository to digitally preserve outputs	38	55	46	36	175	477	2.73	0.95	High Extent
	Average Weighted Mean (AWM)							**2.72**		

Source*:* Author's Fieldwork (2025)

Table 4.4 shows the findings on agricultural lecturers in universities across North-central Nigeria. On the use of Institutional Repositories. The analysis of repository usage by agricultural lecturers in universities in North-Central, Nigeria, as measured through the weighted mean, shows a differentiated pattern of engagement among respondents. Out of the nine identified practices, five were rated above the average weighted mean ($\bar{x}$ = 2.72), and thus classified as high extent, while four fell below this threshold and were rated at a low extent.

The practices rated at a high extent highlight the repository's perceived centrality in supporting core academic activities. The highest mean score was observed for accessing research outputs in repositories when searching for literature ($\bar{x}$ = 2.95, SD = 0.98), indicating that repositories are primarily valued as tools for knowledge discovery and literature retrieval. Similarly, uploading outputs to increase visibility ($\bar{x}$ = 2.85, SD = 1.00) and uploading for research assessment or promotion ($\bar{x}$ = 2.82, SD = 1.03) underscore the instrumental role repositories play in enhancing academic reputation and meeting institutional requirements for career advancement. The high rating of sharing outputs ($\bar{x}$ = 2.76, SD = 1.04) and digital preservation ($\bar{x}$ = 2.73, SD = 0.95) further reflects recognition of repositories as both dissemination platforms and long-term archival systems.

The four practices rated at a low extent reflect more peripheral or emerging uses of repositories. Showcasing research to funders ($\bar{x}$ = 2.64, SD = 0.97) and finding collaboration opportunities ($\bar{x}$ = 2.70, SD = 0.96) received relatively modest ratings, suggesting that repositories are not yet widely perceived as vehicles for research funding or collaborative networking. Even lower means were recorded for non-academic outputs ($\bar{x}$ = 2.50, SD = 1.01) and course notes ($\bar{x}$ = 2.54, SD = 0.98), indicating limited integration of repositories into teaching and non-scholarly domains.

4.2. Discussion of the findings

Types of Academic Outputs in IRs

The findings revealed that the availability of research publications, journal articles, and theses or dissertations reflects a strong emphasis on formal scholarly dissemination. These forms of output are traditionally considered central to academic productivity and recognition. Theses and dissertations are systematically archived in institutional repositories as part of academic requirements, ensuring long-term accessibility. Similarly, journal articles and research publications are widely prioritised because they contribute directly to institutional visibility, faculty career progression, and the broader dissemination of knowledge through peer-reviewed channels. In contrast, the absence of other academic outputs points to structural and cultural gaps in academic practice. Teaching materials are often treated as informal or proprietary resources, which limits their circulation and prevents them from being preserved systematically. Research data, despite its growing importance in open science, may be unavailable due to confidentiality concerns, lack of infrastructure for storage, or the absence of institutional policies mandating data sharing. Presentations and conference papers are often perceived as supplementary forms of dissemination and, without deliberate archiving systems, remain inaccessible after the event. Book chapters and technical papers are also unavailable, likely due to restrictive publishing agreements or their limited prioritisation in academic evaluation systems compared to journal articles. Finally, the absence of OER highlights a broader

issue: the slow institutional adoption of open educational practices. Developing and sharing OER requires both institutional support and incentives, which may not yet be embedded within the academic culture under review.

The findings of this study is in consonance with that of Yusuf and Adekunle (2025) who conducted a study in which they analyzed the productivity of agricultural lecturers in universities with functional IRs versus those without. The study found that universities with well-managed repositories recorded a 40% increase in the number of published articles by faculty members over five years. In contrast, universities with poorly maintained IRs experienced stagnation in research output.

What is the level of academic output of Agricultural lecturers in universities in North-central Nigeria?

Using a four-point Likert scale to measure frequency, the study found that agricultural lecturers frequently produce academic outputs, with an average weighted mean (AWM) of 2.72. According to the interpretation scale, this score falls within the "High" category. Outputs such as reports, preprints, research data, and journal articles recorded the highest individual mean scores, reflecting a robust research culture among lecturers. However, the findings also revealed that instructional and open-access resources such as OERs, lecture notes, and presentation slides were produced less frequently, despite their growing importance in modern academic environments. While these items still fell under the "High" category when evaluated using the AWM, their individual mean scores were notably lower. This implies that lecturers are more focused on research outputs that directly contribute to academic promotion and peer recognition, while less attention is given to open teaching resources and knowledge-sharing formats that are crucial in supporting student learning and collaborative scholarship. Several factors may explain this decline: restrictions imposed by publishers on books and book chapters, the perception of presentations and lecture notes as supplementary rather than core contributions, and the underdevelopment of open educational resources due to limited institutional incentives or infrastructure. Even journal articles, long considered the gold standard for scholarly recognition, appear to be relatively undervalued in this analysis, reflecting both the saturation of publication venues and the growing push toward alternative, faster modes of dissemination. This finding also aligns with that of Ladipo *et al.* (2022) who investigated the influence of institutional factors on the research activity of academic staff in Nigerian universities. Findings from the study revealed an average level of research activity among academic staff in Nigerian universities.

What is the extent of the use of IR for research by agricultural lecturers in universities in North-central Nigeria?

The extent of IR usage was also rated using a four-point Likert scale. Agricultural lecturers demonstrated a relatively high level of engagement with institutional repositories, with an overall AWM of 2.72, which again falls within the "High Extent" category. Respondents reported frequent use of IRs for accessing literature, uploading research for visibility and assessment, and for digital preservation of their scholarly work. Despite this, several important research-related uses of IRs were less frequently practiced. These included using IRs to engage potential collaborators, to access non-academic outputs, and to support the preparation of course materials. These findings suggest that while lecturers are aware of and utilize the core functions of institutional repositories, they may not be fully capitalizing on their wider potential for academic collaboration, teaching support, and open knowledge dissemination. The limited use of IRs for open education and interdisciplinary exchange may reflect a narrow perception of IRs as static archives rather than dynamic platforms for interactive scholarly engagement. Institutional culture, lack of training, and limited incentives might be contributing to this narrow scope of use. This finding is in line with that of Nwachi and Idoko (2021), investigated the use of institutional repositories in Nigerian university libraries. From the findings, it was discovered that the most used or accessed materials in the institutional repositories by staff are journal articles, theses and dissertations, books, faculty and departmental journals and book chapters.

Summary of Findings

The following findings were reached based on the results from the study.

- Research publications, journal articles, and theses/dissertations are the most commonly available academic outputs in institutional repositories (IRs) while Teaching materials, research data, presentations, conference papers, technical papers, and OERs are largely unavailable in the repositories.
- The level of academic output of agriculture lecturer is high, reports, preprints, research data, and journal articles are produced more frequently, while lecture notes, OERs, and presentation slides are produced less frequently.
- The extent of IR use for research purposes is also at a high extent of use by lecturers. IRs are most used for accessing literature, uploading research for visibility and promotion, and digital preservation.

5.0. Conclusions

This study examined the influence of institutional repository (IR) use and continuous professional development (CPD) on the academic output of agricultural lecturers in universities across North-Central Nigeria. Findings revealed that agricultural lecturers exhibit a high level of research productivity, with journal articles, reports, and preprints being the most frequently produced outputs. However, teaching-related and open-access materials such as lecture notes, presentations, and Open Educational Resources (OERs) remain underrepresented in institutional repositories. The study further established that institutional repositories are predominantly utilized for traditional scholarly purposes, such as accessing research literature,

uploading publications for visibility, and ensuring digital preservation, rather than for collaborative, pedagogical, or interdisciplinary engagement. This limited scope of use suggests a need to broaden institutional understanding and utilization of IRs as comprehensive academic platforms.

The findings underscore that both IR use and CPD participation positively influence academic productivity among agricultural lecturers. Universities with well-managed repositories and active CPD programs tend to record higher levels of scholarly output and visibility. Therefore, strengthening the synergy between digital repository infrastructure and professional development initiatives is essential for sustaining research excellence and promoting innovation within agricultural faculties.

5.1. Recommendations

Based on the findings, the following recommendations are made:

- Universities should establish and enforce comprehensive IR policies mandating the inclusion of diverse academic output such as teaching materials, research data, OERs, and conference presentations in addition to traditional publications.
- The universities are encouraged to provide adequate support to agricultural lecturers in the areas of preprints, research data, and journal articles that are produced more frequently, while lecture notes, OERs, and presentation slides are produced less frequently, since the level of research output of agricultural lecturer is high.
- Universities should recognize and reward lecturers who actively deposit and disseminate their works through institutional repositories, integrating such contributions into promotion and appraisal systems.

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UTILISATION OF INNOVATIVE TEACHING AND LEARNING APPROACHES BY LIS EDUCATORS IN RIVERS STATE, NIGERIA

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Abstract

The conventional lecturer-centred that emphasise theoretical instruction and passive knowledge transmission appear to remain dominant in Library and Information Science (LIS) education in Nigeria, including Rivers State. Although these approaches have contributed to the foundational training of librarians and information professionals, they are increasingly considered inadequate for preparing graduates for the rapidly changing information environment driven by digital technologies. The study therefore, investigated utilisation of innovative teaching and learning approaches by LIS educators in Rivers State, Nigeria**.** Descriptive survey design was adopted for the study and a population of fifty-five (55) LIS educators in library schools in Rivers State, Nigeria, thus, a census sampling technique was used. The primary instrument for data collection is a structured questionnaire. 47 copies of the questionnaires were found valid for analysis. The data collected from the questionnaire was analyzed using descriptive statistics, primarily the mean score and standard deviation. The findings of the study indicate a progressive shift in LIS education in Rivers State, where innovative and andragogical approaches are being actively integrated alongside traditional pedagogical methods, while heutagogical practices are gradually emerging. This pattern reflects a transitional phase in instructional practice, consistent with the broader evolution of educational paradigms in the digital age. Further, the study implies that each approach pedagogy, andragogy, and heutagogy plays a valuable and complementary role in enhancing Library and Information Science (LIS) education. It was therefore recommended that LIS institutions in Rivers State should strengthen and sustain the use of these innovative approaches by providing continuous professional development, training workshops, and access to modern instructional technologies

Keywords: Innovative teaching and learning approaches, andragogical approaches, pedagogical approach, heutagogical, library schools.

Introduction

Higher education globally is undergoing rapid transformation due to technological advancement, digitalization, globalization, and the growing demand for 21st-century competencies such as critical thinking, digital literacy, collaboration, adaptability, and lifelong learning. These developments have increasingly challenged traditional lecturer-centred teaching approaches that rely heavily on rote learning and passive knowledge transmission. Contemporary higher education now emphasizes learner engagement, problem-solving, independent learning, and technology-supported instruction as essential components for preparing graduates for modern professional environments (Lai, 2023).

In Nigeria, universities are expected to reform instructional practices in order to produce graduates who can function effectively in an increasingly digital and information-driven society. This challenge is particularly significant in Library and Information Science (LIS) education because the LIS profession has evolved beyond the traditional management of printed resources to include digital librarianship, information literacy instruction, research data management, artificial intelligence applications, and emerging information technologies. Consequently, LIS educators are expected to adopt innovative teaching approaches that promote practical competencies, digital skills, critical thinking, creativity, collaboration, and self-directed learning among students.

Innovative teaching approaches in this study refer to learner-centred and technology-supported instructional methods that enhance active participation, collaboration, independent learning, and practical skill acquisition. However, conventional pedagogical practices continue to dominate instructional delivery (Ahiauzu et al., 2020). While these approaches have historically provided foundational knowledge and professional grounding, they are less suited to the current information ecosystem characterized by digital transformation, information explosion, and the need for innovative problem-solving

skills. Modern LIS professionals are expected not only to manage information resources but also to navigate emerging technologies, support digital scholarship, and foster information literacy among diverse user populations. Consequently, there is a growing call for a shift towards more learner-centred, flexible, and innovative teaching approaches that align with contemporary professional realities (Nyagope, 2024). One such shift is reflected in the transition from pedagogy to andragogy and ultimately to heutagogy. Andragogy, emphasizes self-directed learning and recognizes the unique characteristics of adult learners, including their prior experiences and intrinsic motivation. It encourages participatory, problem-based, and experiential learning approaches that enhance engagement and relevance (Singh et al., 2025). However, heutagogy extends this paradigm further by promoting self-determined learning, where learners take full responsibility for defining their learning paths, processes, and outcomes. This approach fosters autonomy, capability development, and reflective learning, making it particularly suitable for complex and rapidly changing environments (Menon et al., 2026).

In Rivers State, anecdotal observations and institutional realities suggest that many LIS programmes still rely substantially on conventional teaching methods despite increasing demands for digital and professional competencies among graduates. There is limited empirical evidence regarding the extent to which LIS educators in the state adopt innovative teaching approaches and how such practices align with the competencies required in contemporary library and information services. This gap creates uncertainty about the preparedness of LIS students for emerging professional roles in the digital information environment. It is therefore, imperative to investigates the adoption of innovative teaching and learning approaches in Library and Information Science education with particular attention to andragogical and heutagogical practices. The study seeks to provide empirical evidence on current instructional practices and contribute to ongoing efforts aimed at improving the relevance and quality of LIS education.

Statement of the Problem

The conventional lecturer-centred pedagogical approaches that emphasise theoretical instruction and passive knowledge transmission appear to remain dominant in Library and Information Science (LIS) education in Nigeria, including Rivers State. Although these approaches have contributed to the foundational training of librarians and information professionals, they are increasingly considered inadequate for preparing graduates for the rapidly changing information environment driven by digital technologies, information explosion, and evolving user needs. Traditional teaching methods often limit students' opportunities for critical thinking, practical engagement, creativity, collaboration, and independent learning, thereby affecting their ability to develop the professional and technological competencies required in contemporary library and information practice. Consequently, many LIS graduates may experience challenges adapting to emerging responsibilities such as digital resource management, information literacy instruction, virtual information services, and the application of modern technologies in library operations. The changing nature of the LIS profession has therefore created the need for innovative teaching and learning approaches that promote learner participation, problem-solving, adaptability, and lifelong learning. Approaches rooted in andragogy and heutagogy encourage active learning, learner autonomy, experiential learning, and self-directed knowledge acquisition, which are essential for preparing students for contemporary professional realities. Despite the increasing relevance of these approaches, there is limited empirical evidence regarding their utilisation in LIS education in Nigeria, particularly in Rivers State. This study therefore examines the utilisation of innovative teaching and learning approaches by LIS educators in library schools in Rivers State, Nigeria

Objectives of the Study

The main objective is to examine the utilisation of innovative teaching and learning approaches by LIS educators in library schools Rivers State. The specific objectives are to:

1. identify the innovative teaching and learning approaches utilised by LIS educators in Rivers State.
2. examine the extent to which pedagogical practices are still employed for effective LIS Education in Rivers State.
3. examine the extent to which andragogical practices are still employed for effective LIS education in Rivers State.
4. Investigate the adoption of heutagogical practices for the effectiveness of LIS education in Rivers State.
5. determine the implications of different teaching approaches on the effectiveness of LIS education in Rivers State
6.

Research Questions

1. What innovative teaching and learning approaches are utilised by LIS educators in Rivers State?
2. To what extent are pedagogical practices employed for effective LIS education in Rivers State?
3. To what extent are andragogical approaches adopted for effective LIS education in Rivers State?
4. What is the level of adoption of heutagogical practices for effective LIS education in Rivers State?
5. What are the implications of different teaching approaches on the effectiveness of LIS education in Rivers State?

Literature Review

Conceptual Review of Innovative Teaching and Learning Approaches

The evolution of teaching and learning approaches in higher education reflects a gradual shift from rigid, teacher-centred models to more flexible and learner-driven paradigms. Traditional pedagogical approaches, which emphasize structured content delivery and instructor authority, have historically shaped formal education systems. However, these approaches are increasingly criticized for limiting learner engagement, creativity, and critical thinking, as they position students as passive recipients of knowledge rather than active participants in the learning process (Ahiauzu et al., 2020).

In response to the shortcomings of pedagogy, andragogy emerged as a more appropriate framework for adult education, particularly in higher education contexts (Tezcan, 2022). Andragogy emphasizes self-directed learning, experiential engagement, and the relevance of instruction to real-life situations. According to Livingston and Cummings-Clay (2023), it acknowledges that adult learners bring prior knowledge and experiences into the classroom, which should be integrated into the learning process. This approach has been shown to improve learner motivation, participation, and problem-solving skills, thereby enhancing the overall effectiveness of instruction in professional fields such as Library and Information Science (LIS).

Building on the principles of andragogy, heutagogy represents a more advanced and flexible approach to learning, often described as self-determined learning. Chakraborty and Halder (2024) opined that heutagogy is one of the most effective approaches within contemporary pedagogical practices that represents an advancement of andragogy, focusing on the fulfillment of learners' autonomy. As a self-directed and self-determined learning approach, heutagogy empowers learners to define their own learning objectives and develop the necessary plans to achieve them. In this model, learners are fully aware of their strengths and weaknesses, enabling them to take greater responsibility for their learning process. Panta (2025) noted that it places greater emphasis on learner autonomy, capability development, and reflective practice, allowing learners to take full control of their learning processes and outcomes.

Heutagogy aligns with the demands of the digital age, where learners must continuously adapt to new information and technologies. According to Newfield (2025), it also redefines the role of educators as facilitators who guide and support learners rather than dictate learning pathways. The growing importance of heutagogy is closely linked to the increasing integration of digital technologies in education. The availability of online learning platforms, open educational resources, and digital collaboration tools has enabled more flexible and personalized learning experiences. These technological advancements support the principles of self-determined learning by providing learners with greater access to information and opportunities for independent exploration. Consequently, heutagogy has gained prominence as a framework for preparing learners to thrive in complex and rapidly changing environments (Mangtani, 2024).

Furthermore, the adoption of innovative teaching and learning approaches has become a central focus in contemporary educational practice. Strategies such as blended learning, flipped classrooms, collaborative learning, problem-based learning, inquiry-based learning, and technology-enhanced learning environments have been widely implemented to enhance student engagement and learning outcomes. These approaches leverage both traditional and digital methods to create interactive and learner-centred experiences that promote deeper understanding and skill development (Ahiauzu et al., 2020).

Despite the recognized benefits of innovative teaching approaches, their adoption remains inconsistent across different regions and disciplines. In many developing contexts, including Nigeria, traditional pedagogical practices continue to dominate due to infrastructural limitations, institutional constraints, and resistance to change (Turashkati, 2025). This situation presents a challenge for disciplines like Library and Information Science, which require continuous adaptation to technological advancements and evolving professional demands.

Furthermore, the implementation of heutagogical and other innovative approaches is often constrained by a lack of adequate training and professional development opportunities for educators. Effective adoption requires not only access to technological resources but also a shift in mindset and teaching practices. In this regard, Wittmann and Olivier (2021) noted that educators must be equipped with the skills and knowledge needed to facilitate learner-centred environments and support self-directed learning. This may which may require significant institutional support and policy reforms.

Theoretical Framework

Constructivist Learning Theory

Constructivist Learning Theory was principally developed by Jean Piaget in 1952 and later enriched by Lev Vygotsky in 1978. The theory emerged from the view that learning is not a passive process of receiving information but an active process in which learners construct knowledge based on their experiences and interactions with their environment. Constructivism challenges traditional teacher-centred approaches to education by emphasizing that learners are not empty vessels waiting to be filled with information; rather, they actively create meaning and understanding from new experiences by relating them to their existing knowledge and cognitive structures.

According to Piaget (1952), learning occurs through the processes of assimilation and accommodation. Assimilation involves incorporating new information into existing cognitive frameworks, while accommodation refers to modifying those frameworks when new experiences cannot fit into previous understandings. Piaget argued that learners continuously construct and reconstruct knowledge as they interact with their environment. This perspective places learners at the centre of the educational process and encourages active engagement with learning materials rather than passive memorization of facts. Vygotsky (1978) further expanded the theory by emphasizing the social nature of learning. He maintained that knowledge is constructed through social interaction, collaboration, and communication with others. His concept of the Zone of Proximal Development (ZPD) suggests that learners can achieve higher levels of understanding when guided by teachers, mentors, or more knowledgeable peers. Consequently, learning environments should encourage discussion, teamwork, problem-solving, and collaborative knowledge creation. Vygotsky's contribution shifted constructivism beyond individual cognitive development to include the importance of social and cultural influences on learning.

The theory advocates that learners should be actively involved in discovering, interpreting, and applying knowledge rather than merely receiving information from instructors.

Constructivist Learning Theory provides an appropriate theoretical foundation for this study because it explains the educational principles underlying innovative teaching and learning approaches. The theory supports the transition from traditional teacher-centred methods to learner-centred instructional practices and offers a useful lens for examining the extent to which LIS educators in Rivers State utilize innovative teaching approaches to improve teaching effectiveness and learning outcomes.

Heutagogical Learning Theory

This study is anchored on Heutagogical Learning Theory developed by Hase and Kenyon (2000). Heutagogy, also known as self-determined learning, extends the principles of andragogy by emphasizing learner autonomy, capability development, and reflective practice. The theory proposes that learners should not only determine how learning occurs but also participate in deciding what should be learned. In heutagogical environments, educators act as facilitators who create opportunities for exploration, collaboration, critical reflection, and independent knowledge construction. The theory is particularly relevant to Library and Information Science education because the profession operates in rapidly changing information environments characterized by continuous technological advancement. LIS students are expected to develop lifelong learning skills, digital competencies, adaptability, and critical thinking abilities that enable them to function effectively in dynamic information ecosystems. Innovative teaching approaches such as blended learning, collaborative learning, project-based learning, flipped classrooms, and digital learning platforms are consistent with the principles of heutagogy because they promote learner autonomy and active engagement. The application of Heutagogical Learning Theory in this study provides a suitable lens for examining the extent to which LIS educators in Rivers State utilize innovative teaching and learning approaches that encourage self-directed learning, capability development, and learner-centred educational experiences.

Empirical Review

Several empirical studies have examined the adoption and effectiveness of innovative teaching and learning approaches in higher education. Ahiauzu et al. (2020) reported that learner-centred and technology-supported instructional strategies significantly enhanced student participation and knowledge retention in tertiary institutions. Their findings suggest that innovative teaching approaches improve learning outcomes by promoting active student engagement.

Similarly, Tezcan (2022) found that andragogical teaching methods positively influenced adult learners' motivation and academic performance. The study emphasized the importance of incorporating learners' prior experiences into instructional processes. Livingston and Cummings-Clay (2023) further observed that self-directed learning strategies foster greater learner responsibilSity and problem-solving abilities among higher education students. Studies focusing on heutagogy have produced comparable findings. Chakraborty and Halder (2024) reported that self-determined learning approaches significantly enhanced learner autonomy, creativity, and critical thinking. Likewise, Mangtani (2024) found that digital learning environments strengthened the implementation of heutagogical practices by providing learners with opportunities for independent exploration and collaborative knowledge creation. Panta (2025) also concluded that reflective learning and learner autonomy contributed positively to capability development among university students. The findings from previous studies reveal both convergence and divergence. Most studies agree that innovative teaching approaches enhance learner engagement, critical thinking, motivation, and academic performance (Ahiauzu et al., 2020; Tezcan, 2022; Livingston & Cummings-Clay, 2023; Chakraborty & Halder, 2024).

Gap in Literature

The reviewed literature demonstrates substantial scholarly attention to pedagogy, andragogy, heutagogy, and innovative teaching approaches in higher education. Existing studies generally confirm that learner-centred approaches enhance engagement, critical thinking, creativity, and lifelong learning competencies. However, most of these studies have been conducted in developed countries and general higher education settings, with relatively limited attention given to Library

and Information Science education in Nigeria. Furthermore, although some Nigerian studies have examined the integration of educational technologies and learner-centred pedagogies, there is limited empirical evidence specifically focusing on the utilisation of innovative teaching and learning approaches by LIS educators in Rivers State. Existing studies have largely concentrated on student outcomes, technological adoption, or general higher education practices, leaving a contextual and disciplinary gap regarding how LIS educators apply innovative teaching approaches in their instructional activities. Therefore, this study seeks to fill this gap by investigating the utilisation of innovative teaching and learning approaches by LIS educators in Rivers State, Nigeria.

Methodology

This study adopted a descriptive survey design. The descriptive survey design is appropriate for this study as it allows for the collection of data from a large group of respondents to provide an accurate and comprehensive description of the current state of innovative teaching approaches in library schools in Rivers State. The population for this study consisted of Fifty-Five (55) Library and Information Science Educators in Rivers State which: Captain Elechi Amadi Polytechnic, Ignatius Ajuru University of Education, Rivers State University and University of Port Harcourt. A census sampling technique was used, meaning that the entire population were included as the sample size. This approach was chosen to ensure that every relevant individual involved in teaching in library schools in the state is represented in the research, providing a more comprehensive and accurate understanding of the situation. The primary instrument for data collection is a structured online questionnaire. The questionnaire was designed using a Likert scale with four response categories: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). This scale is used to measure the extent of agreement or disagreement with each item in the questionnaire. The items are carefully constructed to align with the research objectives. Furthermore, the instrument was validated by two experts, a librarian at Ignatius Ajuru University of Education, Port Harcourt and measurement and evaluation expert at the University of Port Harcourt. There inputs were incorporated into the final instrument. A pilot study was conducted on the instrument where a trial testing was done on ten (10) LIS educators at Delta State University Abraka and analysed using Cronbach Alpha and yielded a reliable coefficient 0.87 which implied that the instrument was reliable. However, the online questionnaire was administered to the respondents via WhatsApp platforms of LIS educators in Rivers State of which Forty-Seven (47) responses were found valid for analysis. The data collected was analyzed using descriptive statistics, primarily the mean score for each item. The mean score help determine the level of agreement or disagreement with each statement, and the results interpreted to draw conclusions. A criterion mean of 2.5 was used to assess the acceptance or rejection of each item. Items with a mean score of 2.5 and above was considered accepted, while items with a mean score below 2.5 was rejected. The findings were presented in tables to make the results clear and easily understandable.

Data Analysis and Discussion

Table 1: Innovative Teaching and Learning Approaches

Item	Mean ($\bar{X}$)	Std. Dev.	Decision
Blended learning	3.12	0.76	Agree
Flipped classroom	2.85	0.88	Agree
Collaborative learning	3.25	0.69	Agree
Use of digital tools	3.30	0.64	Agree
Problem-based learning	2.95	0.82	Agree
Case study method	3.05	0.71	Agree
Experiential learning	2.88	0.79	Agree
Interactive engagement	3.18	0.68	Agree
Grand Mean =	**3.07**	**0.75**	Agree

The results show that respondents **agreed** with all the items in this section, as their mean scores are above the benchmark of 2.50. Specifically, respondents agreed that they utilise blended learning ($\bar{X}$ = 3.12), flipped classroom strategies ($\bar{X}$ = 2.85), collaborative learning ($\bar{X}$ = 3.25), and digital tools ($\bar{X}$ = 3.30). They also agreed on the use of problem-based learning ($\bar{X}$ = 2.95), case study methods ($\bar{X}$ = 3.05), experiential learning ($\bar{X}$ = 2.88), and interactive engagement ($\bar{X}$ = 3.18). The **grand mean of 3.07** indicates that innovative teaching and learning approaches are **utilised** by LIS educators in Rivers State.

Table 2: Traditional Pedagogical Practices

Item	Mean ($\bar{X}$)	Std. Dev.	Decision
Lecture-based teaching	3.40	0.62	Agree
Teacher-centred approach	3.22	0.70	Agree
Focus on content delivery	3.18	0.73	Agree
Passive student role	2.95	0.81	Agree
Reliance on textbooks	3.10	0.77	Agree
Exam-based assessment	3.05	0.74	Agree
Limited innovation	2.78	0.86	Agree
Grand	**3.10**	**0.75**	**Agree**

The findings reveal that respondents **agreed** with all the items in this section. They agreed that they rely on lecture-based teaching ($\bar{X}$ = 3.40), adopt teacher-centred approaches ($\bar{X}$ = 3.22), and focus on content delivery ($\bar{X}$ = 3.18). Respondents also agreed that students play passive roles ($\bar{X}$ = 2.95), that teaching depends heavily on textbooks ($\bar{X}$ = 3.10), and that assessment is mainly quiz and examination-based ($\bar{X}$ = 3.05). Furthermore, they agreed that innovative methods are not frequently used ($\bar{X}$ = 2.78). The **grand mean of 3.10** shows that traditional pedagogical practices are still **highly prevalent** in LIS programmes in Rivers State.

Table 3 Andragogical Approaches

Item	Mean ($\bar{X}$)	Std. Dev.	Decision
Self-directed learning	3.15	0.66	Agree
Use of prior experience	3.28	0.61	Agree
Problem-solving approach	3.20	0.68	Agree
Student involvement	2.90	0.80	Agree
Participatory methods	3.05	0.72	Agree
Professional relevance	3.18	0.65	Agree
Independent research	3.10	0.70	Agree
Grand Mean	**3.12**	**0.69**	**Agree**

The results indicate that respondents **agreed** with all the items relating to andragogical practices. They agreed that they encourage self-directed learning ($\bar{X}$ = 3.15), relate teaching to students' prior experiences ($\bar{X}$ = 3.28), and promote problem-solving approaches ($\bar{X}$ = 3.20). They also agreed that students are involved in learning decisions ($\bar{X}$ = 2.90), participatory methods are used ($\bar{X}$ = 3.05), teaching is professionally relevant ($\bar{X}$ = 3.18), and independent research is encouraged ($\bar{X}$ = 3.10). The **grand mean of 3.12** implies that andragogical approaches are **widely adopted** in LIS education in Rivers State.

Table 4: Heutagogical Practices

Item	**Mean ($\bar{X}$)**	**Std. Dev.**	**Decision**
Learners determine their own learning goals	2.30	0.84	Disagree
Learners take full responsibility for their learning	2.25	0.88	Disagree
Learners engage in reflective learning	2.40	0.79	Disagree
Flexible learning paths are allowed	2.35	0.82	Disagree
Learners identify their own learning resources	2.28	0.86	Disagree
Learners evaluate their own learning outcomes	2.22	0.89	Disagree
Learning is largely self-determined by students	2.38	0.81	Disagree
Grand Mean	**2.31**	**0.84**	**Disagree**

The results show that respondents disagreed with all the items on heutagogical practices, as reflected in their mean scores, which were all below the criterion mean of 2.50. Specifically, respondents disagreed that learners determine their own goals ($\bar{X}$ = 2.30), take responsibility for learning ($\bar{X}$ = 2.25), and engage in reflective learning ($\bar{X}$ = 2.40). They also disagreed that flexible learning paths are allowed ($\bar{X}$ = 2.35), learners identify their own learning resources ($\bar{X}$ = 2.28), and evaluate their own learning outcomes ($\bar{X}$ = 2.22). Furthermore, respondents disagreed that learning is largely self-determined ($\bar{X}$ = 2.38). The grand mean of 2.31, which is below the criterion mean of 2.50, indicates that heutagogical practices are poorly

adopted among LIS educators in library schools in Rivers State. This finding suggests that self-determined and learner-autonomous instructional approaches are not widely integrated into LIS teaching practices in the study area.

Table 5: Implications of different teaching approaches for library and information science education

Items	Mean	SD	Decision
Pedagogical approaches			
Structured teacher-centered methods enhance understanding	3.12	0.68	Agree
Pedagogical approaches promote effective content delivery	3.08	0.72	Agree
Traditional methods improve academic performance	2.95	0.75	Agree
Teacher-directed instruction ensures curriculum coverage	3.20	0.66	Agree
Pedagogical approaches limit participation	2.30	0.81	Disagree
Andragogical			
Encourages active participation	3.25	0.64	Agree
Use of prior experience improves effectiveness	3.30	0.60	Agree
Enhances critical thinking and problem-solving	3.18	0.70	Agree
Increases motivation to learn	3.22	0.69	Agree
Promotes collaboration and knowledge sharing	3.15	0.71	Agree
Heutagogical			
Enhances independent learning ability	3.28	0.63	Agree
Improves adaptability to LIS trends	3.24	0.67	Agree
Encourages use of digital technologies	3.35	0.58	Agree
Fosters lifelong learning skills	3.31	0.61	Agree
Improves overall LIS education effectiveness	3.27	0.65	Agree

On pedagogy, respondents agreed that structured, teacher-centered methods enhance students' understanding of LIS concepts, indicating the continued relevance of pedagogy, traditional teaching methods contribute positively to students' academic performance, teacher-directed instruction is important for ensuring adequate curriculum coverage, pedagogical approaches limit participation, implying that when properly applied, they may not necessarily hinder student engagement. **On andragogical approach** respondents agreed that andragogical methods promote active student participation, reinforcing learner-centered education, shows that integrating learners' prior experiences significantly improves LIS education effectiveness. It also indicates that andragogy enhances critical thinking and problem-solving skills among students and learner-centered strategies boost students' motivation to learn, andragogical practices encourage collaboration and knowledge sharing. **Further, on Heutagogical Approach** respondents agreed that heutagogical approaches strengthen independent learning abilities among LIS students, self-determined learning improves adaptability to emerging trends in the LIS field, heutagogy strongly promotes the use of digital technologies in learning, approaches foster lifelong learning skills, which are essential in LIS education, thus integrating heutagogy enhances the overall effectiveness of LIS education in Rivers State.

This implies that each approach pedagogy, andragogy, and heutagogy plays a valuable and complementary role in enhancing Library and Information Science (LIS) education. While pedagogical methods remain important for structured learning, curriculum coverage, and foundational understanding, andragogical approaches foster active participation, critical thinking, and the effective use of learners' prior experiences. Meanwhile, heutagogical practices further extend learning by promoting independence, adaptability, digital competence, and lifelong learning skills. Therefore, a balanced integration of these approaches offers the most effective strategy for improving the quality and relevance of LIS education in Rivers State.

Discussion of Findings

The findings from research question one revealed that innovative teaching and learning approaches are highly utilised by LIS educators in Rivers State. This suggests that educators are increasingly integrating modern instructional strategies such as blended learning, collaborative learning, problem-based learning, and the use of digital tools into their teaching practices. This finding aligns with the position of Sharma et al., (2024) who reported that the adoption of innovative teaching strategies enhances learner engagement, interaction. Similarly, Kamrozzaman and Elias (2026) noted that the integration of

technology-driven and learner-centred approaches supports the development of critical competencies required in contemporary educational environments. The implication is that LIS educators in Rivers State are gradually responding to global educational trends by incorporating innovative methods that foster active learning and digital competence.

The findings from research question two showed that traditional pedagogical practices are still highly prevalent in LIS programmes in Rivers State. Despite the adoption of innovative approaches, lecture-based teaching, teacher-centred instruction, and content-focused delivery remain dominant. This indicates that while innovation is being introduced, it has not fully replaced conventional methods. This finding corroborates the study by Kurbanova et al., (20205) which emphasized that pedagogy continues to play a central role in formal education due to its structured and familiar nature. In addition, Ahiauzu et al., (2020) observed that many educational institutions in developing contexts still rely heavily on traditional teaching methods due to infrastructural challenges and resistance to change. The persistence of these practices suggests a hybrid instructional environment where traditional and modern approaches coexist, potentially limiting the full realisation of learner-centred education.

The results from research question three indicated that andragogical approaches are widely adopted by LIS educators. The high mean scores reflect that educators encourage self-directed learning, integrate learners' prior experiences, and promote participatory and problem-solving learning strategies. This finding is consistent with Green (2024) who found that andragogical practices significantly enhance learner motivation, engagement, and practical understanding, particularly among adult learners in higher education. Furthermore, andragogy fosters collaboration and relevance in learning, making it highly suitable for professional disciplines such as LIS. The widespread adoption of andragogical approaches in this study suggests that LIS educators recognize the importance of aligning teaching strategies with the characteristics and needs of adult learners.

The findings from research four revealed that heutagogical practices are poorly adopted. This indicates that while elements of self-determined learning such as learner autonomy, reflective practice, and flexible learning pathways are present, they are not yet fully embedded in instructional practices. This finding supports the work of Chakraborty and Halder (2024) who argued that the adoption of heutagogy is still progressive and often limited by institutional constraints and educators' readiness and balancing learners autonomy with necessary guidance. However, the relatively lower level of adoption found in this study suggests that LIS education in Rivers State is transitioning towards heutagogical practices but has not yet fully embraced them.

The findings from research question five indicates that each approach pedagogy, andragogy, and heutagogy plays a valuable and complementary role in enhancing Library and Information Science (LIS) education. While pedagogical methods remain important for structured learning, curriculum coverage, and foundational understanding, andragogical approaches foster active participation, critical thinking, and the effective use of learners' prior experiences. Meanwhile, heutagogical practices further extend learning by promoting independence, adaptability, digital competence, and lifelong learning skills. This study aligns with the study of Mangtani (2024) who noted the importance of pedagogy, andragogy, and heutagogy in instructional delivery. Thus, a balanced integration of these approaches offers the most effective strategy for improving the quality and relevance of LIS education in Rivers State.

Conclusion

This study examined the utilisation of innovative teaching and learning approaches among Library and Information Science (LIS) educators in Rivers State, with particular emphasis on pedagogical, andragogical, and heutagogical practices. The findings revealed that while innovative and andragogical approaches are widely utilised, traditional pedagogical methods still dominate instructional practices. This indicates that LIS education in Rivers State is currently in a transitional phase, where both traditional and modern teaching approaches coexist. Furthermore, the study established that heutagogical practices, though present, are not yet fully integrated into teaching and learning processes. Notwithstanding, the study indicates that each approach pedagogy, andragogy, and heutagogy plays a valuable and complementary role in enhancing Library and Information Science (LIS) education. The study therefore, underscores the importance of adopting a more balanced and progressive instructional approach that integrates innovation, learner-centred strategies, and autonomy in learning.

Recommendations

The recommendations of this study are made in line with the specific findings derived from each objective:

1. Based on the finding that innovative teaching and learning approaches are highly utilised, it is recommended that LIS institutions in Rivers State should strengthen and sustain the use of these innovative approaches by providing continuous professional development, training workshops, and access to modern instructional technologies. This will ensure that educators remain updated and can further enhance the quality of teaching and learning.
2. In response to the finding that traditional pedagogical practices are still highly prevalent, it is recommended that LIS schools should gradually reduce over-reliance on lecture-based and teacher-centred methods by revising

curricula and encouraging the integration of more student-centred and interactive teaching strategies. Institutional policies should support a balanced transition from traditional to modern pedagogies.

3. Following the finding that andragogical approaches are widely adopted, it is recommended that LIS educators should further deepen the application of andragogical principles by designing more learner-driven, experience-based, and problem-oriented instructional activities. Additionally, institutions should formally incorporate andragogical frameworks into curriculum design and instructional guidelines.
4. Based on the finding that heutagogical practices are poorly adopted, it is recommended that LIS institutions should promote the full integration of heutagogical practices by encouraging learner autonomy, flexible learning pathways, and self-determined learning. This can be achieved through curriculum redesign, integration of digital learning platforms, and training educators on facilitating self-determined learning environments.

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Utilization of Artificial Intelligence Chatbots for Virtual Reference Services in Academic Libraries

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Abstract

This study examined the utilization of artificial intelligence chatbots for virtual reference services in academic libraries, drawing from a sample of 60 academic librarians across Niger and Rivers States in Nigeria. The research addressed four research questions amongst which are: What types of chatbots are available for virtual reference services in academic libraries; how effective do librarians perceive AI chatbots in resolving queries for virtual reference services in academic libraries; and what challenges hinder the utilization of AI chatbots for virtual reference services in academic libraries. A survey research design was employed using observation checklists and structured questionnaires distributed to the respondents, with data analyzed via mean scores, and standard deviations on a four-point Likert scale to gauge responses. Findings indicate a complete absence of chatbots types for virtual reference services and utilization remains at a very low extent, covering routine queries, 24/7 support, website integration, peak-time management, multi-platform deployment, and analytics tracking. Despite this, librarians perceive chatbots as highly effective for accurate basic responses, faster times, user satisfaction, staff freeing, and positive feedback. Strong challenges persist, including customization issues, low trust, query limitations, privacy risks, costs, maintenance, and training gaps. In conclusion, a stark gap exists between high perceived potential and zero adoption due to entrenched barriers, leaving libraries dependent on manual services amid rising user demands for instant tech support. Recommendations include urged partnerships for chatbots deployment, pilot integrations with training to boost use, funding, and policies to tackle challenges, thereby fostering improved virtual reference in resource-limited settings.

Keywords: AI Chatbots, Virtual Reference Services, Academic Librarians, Information Technology Integration

Introduction

Academic libraries stand at the heart of learning institutions, serving as vital hubs for information access and user support through virtual reference services that bridge physical and digital divides. Virtual reference, which includes online chat, email, and instant messaging for query resolution, has grown essential as students and faculty increasingly seek real-time help amid hybrid learning shifts (Vincze, 2017). The rise of artificial intelligence chatbots offers a transformative tool in this space, enabling automated, round-the-clock responses to common inquiries like resource locations or database access, thus easing the load on librarians while enhancing service reach (Agim, Abah & Ezejiofor, 2025). These chatbots, powered by natural language processing and machine learning, simulate human-like interactions to deliver accurate, context-aware answers, aligning with modern user expectations for speed and convenience in academic environments. As libraries evolve to meet digital demands, integrating AI chatbots into virtual reference promises not only efficiency gains but also opportunities to personalize support and analyze usage patterns for better resource allocation.

Theoretical frameworks such as the Technology Acceptance Model by Venkatesh and Davis (2000) provide a lens to understand chatbots adoption, emphasizing perceived usefulness and ease of use as key drivers for librarians and users alike in academic settings. This model highlights how positive views on AI tools can spur utilization, yet barriers like technical complexity often stall progress, particularly in under-resourced libraries. Complementary theories, including the Diffusion of Innovations, explain varying adoption rates across institutions, where early adopters champion chatbots for their relative advantage in handling routine queries, while laggards cite risks such as data privacy concerns. Recent scholarship underscores these dynamics, noting that AI integration in libraries requires aligning technological capabilities with human-centered service goals to foster trust and sustained engagement (Nawaz & Saldeen, 2020). Such frameworks guide opinion pieces like this by framing utilization not merely as a technical upgrade but as a strategic shift demanding cultural and policy readiness.

Empirical evidence points to uneven global adoption of AI chatbots in academic virtual reference, with pioneering cases in North American and European libraries showcasing successes like hybrid systems that hand off complex queries to staff,

achieving high resolution rates for basic needs (Rodriguez & Mune, 2022). In contrast, developing regions face slower uptake due to infrastructural hurdles, yet pilots demonstrate potential for scalable improvements in service equity. Opinion leaders argue for proactive strategies, including open-source platforms that allow customization to local contexts, thereby democratizing access to advanced reference tools. Studies affirm that while chatbots excel in frequent question handling, their full value emerges when paired with librarian oversight, creating a symbiotic model that elevates overall service quality (Guy, Rival, Lewis & Groome, 2023). The promise of AI chatbots extends beyond immediate query resolution to long-term library transformation, enabling predictive analytics on user behaviors and freeing professionals for high-value consultations like research guidance. This paper was built on such insights to advocate for balanced implementation that maximizes benefits while mitigating pitfalls.

Statement of the Problem

Ideally, academic libraries would fully utilize AI chatbots in virtual reference services to provide instant, accurate support around the clock, reduce staff workload on repetitive tasks, and meet rising user demands for digital-first interactions, fostering an environment where every query receives swift, reliable handling regardless of time or volume. In reality, many libraries, especially in regions like Nigeria, report zero availability of chatbot types such as rule-based or generative models, very low utilization levels, with strong hindering challenges like customization difficulties, trust gaps, privacy risks, costs, infrastructure limits, maintenance needs, and skill shortages. These shortcomings lead to prolonged user wait times, overburdened staff handling basic inquiries manually, diminished service quality amid growing online expectations, and missed opportunities for data-driven improvements, ultimately widening the gap between library capabilities and user needs in fast-evolving academic landscapes. While prior studies document global trends and theoretical models, they often overlook context-specific barriers in developing African settings such as Nigeria, which has led to infrastructural deficits and localized training gaps, thereby creating a need for study

Research Questions

The following research questions guided the study:

1. What types of chatbots are available for virtual reference services in academic libraries?
2. To what extent are AI chatbots utilized for virtual reference services in academic libraries?
3. How effective do librarians perceive AI chatbots in resolving queries for virtual reference services in academic libraries?
4. What challenges hinder the utilization of AI chatbots for virtual reference services in academic libraries?

Review of Related Literature

Utilization

Utilization of emerging technologies in library services refers to the practical integration and consistent application of tools like AI systems to enhance operational efficiency and user satisfaction, particularly in handling daily tasks such as query resolution and resource navigation. In academic libraries, effective utilization means deploying these technologies not just as add-ons but as core components that support librarians in managing high volumes of repetitive inquiries, allowing human staff to focus on complex research assistance. Studies by Anyaoku, Emezie, Nwosu and Ezema (2020) show that low utilization often stems from infrastructural deficits, skill shortages among personnel, and policy gaps, leading to underleveraged potential despite clear benefits like 24/7 availability. For instance, Adeyemi, Osagie and Adegbite (2021) found through surveys of Nigerian librarians that AI tools see very low daily use due to connectivity issues and training lacks, mirroring patterns in developing contexts where grand means below 2.50 indicate minimal adoption. Globally, utilization trends reveal gradual uptake in Western libraries via pilot programs, but sustained use requires ongoing maintenance and user feedback loops to refine performance. Olapegba, Adeyemo and Akinola (2020) emphasized in their African library analysis that utilization improves when tied to measurable outcomes like reduced wait times, yet persistent barriers like cost keep rates low. Theoretical models such as the Technology Acceptance Model further explain utilization dynamics by linking it to perceived ease and value, urging libraries to invest in demonstrations that build staff confidence. Recent scholarship, including Yan, Zhao and Mazumdar (2023), highlights that while 94% of scanned chatbots represent advanced systems, actual utilization lags due to integration challenges with existing platforms. Overall, successful utilization demands strategic planning, from initial procurement to continuous evaluation, to transform theoretical promise into tangible service enhancements in academic settings.

Artificial Intelligence Chatbots

Artificial intelligence chatbots represent sophisticated software agents that employ machine learning, natural language processing, and generative algorithms to engage users in human-like conversations, processing inputs to deliver contextually relevant responses in real time. According to Mckie and Narayan (2019), evolving from simple rule-based scripts that follow fixed decision trees, modern AI chatbots like those powered by ChatGPT or Dialogflow leverage large language models to handle nuanced queries, learn from interactions, and escalate complex issues to humans. In library contexts, these tools

excel at multilingual support, personalization based on user history, and integration with knowledge bases for accurate information retrieval. Elejene, Agim and Umunnakwe (2025) detailed how AI chatbots streamline reference functions by automating FAQs, reducing library anxiety for new students, and fostering conversational discovery of resources. Challenges persist, including algorithmic biases that may skew responses and dependency on quality training data to avoid inaccuracies. McNeal and Newyear (2013) noted that hybrid models that combine AI speed with librarian oversight yield optimal results, with features like voice interaction expanding accessibility. Ethical considerations, such as transparency in AI limitations and data privacy compliance, remain critical, as highlighted by Kane (2019) in discussions of scholarly communication aids. Recent advancements enable predictive capabilities, where chatbots anticipate needs from patterns, but require regular updates to stay relevant amid evolving tech. Chase (2024) showcased a University of Calgary case where minimal resources sufficed for effective deployment, underscoring AI chatbots' versatility for diverse library scales.

Virtual Reference Services

Virtual reference services encompass digital platforms enabling remote user-librarian interactions via chat, email, video, or instant messaging to provide information, research guidance, and resource direction without physical presence. Originating from early 2000s chat widgets, these services have matured to support asynchronous and synchronous modes, catering to global, anytime access in academic environments where users span time zones and formats (Vincze, 2017). Core benefits include scalability for peak demands, recorded sessions for training, and analytics to refine offerings, though issues like query abandonment arise from delays. Rodriguez and Mune (2022) reviewed San Jose State University's chatbot-enhanced virtual reference, logging over 1,600 interactions that handled hours, resources, and borrowing effectively post-hours. Effectiveness hinges on response quality, with studies stressing proactive features like canned responses and co-browsing for complex aids. In developing regions, virtual services face bandwidth constraints but gain traction via mobile optimization. Gulita, Hathwar and Vijayakumar (2020) advocated AI augmentation to elevate virtual reference, adding reliability to traditional models. User satisfaction surveys consistently favor quick, accurate replies, prompting libraries to blend virtual with in-person for hybrid excellence. Chase (2024) in Evidence Based Library and Information Practice affirmed low-technical barriers for AI virtual tools, boosting after-hours equity.

Artificial Intelligence Chatbots and Virtual Reference Services

The intersection of AI chatbots and virtual reference services in academic libraries marks a pivotal shift toward automated, efficient query handling, where utilization levels determine service evolution amid digital user surges. Empirical scans reveal low global adoption, with Cox, et al (2019) analyzing 31 systems finding most AI-powered yet regionally uneven, often limited to basic intents like hours and resources. Benefits encompass workload relief, 24/7 coverage, and analytics for trends, but challenges like customization, trust, privacy, and infrastructure impede progress, especially in Africa. Ifijeh, Iwu-James and Ilogho (2020) reported low means in Nigerian contexts due to skills gaps, echoing Edelwor and Imhonopi (2017) on cost barriers. Success stories, such as Dialogflow implementations, show seamless escalation boosting resolution (Rodriguez & Mune, 2022). Theoretical backing from TAM predicts higher uptake with training, while opinions call for policies addressing ethics. Vincze (2017) positioned chatbots as millennial engagers, reducing anxiety via natural dialogues. Future trajectories involve multilingual hybrids and bias mitigations for inclusivity (Chase, 2024). Overall, strategic utilization promises redefined reference, bridging gaps between potential and practice. Nwosu, Ihejirika and Aribatise (2025) therefore notes that Librarians are no longer solely responsible for organizing and retrieving information; instead, they are now key players in teaching users how to critically assess AI-generated content and navigate complex digital ecosystems.

Methodology

This study adopted the survey research design. The population of the study comprised of 1000 Librarians from tertiary institutions (polytechnics and universities) in Nigeria. A sample of 60 academic librarians across Niger and Rivers States were selected through the purposive sampling technique. The reason for the adoption of the purposive sampling method was to select participants who are familiar with library AI and ICT tools. The observation checklist and questionnaire on a four-point Likert scale were the research instruments used for data collection. Data collected was analyzed using descriptive statistics of mean scores (2.50 as benchmark for agreed/acceptance) and standard deviation

Results and Discussion

Research Question 1: What types of AI chatbots are available for virtual reference services in academic libraries**?**

Table 1: Observation Checklist on types of AI chatbots available for virtual reference services in academic libraries

S/N	Items	Available	Not Available
1	Rule-based chatbots that follow predefined scripts for simple queries like library hours.		x

2	NLP-enabled chatbots (e.g., Dialogflow) that understand natural language inputs.	x
3	Generative AI chatbots (e.g., ChatGPT-based) for contextual reference responses.	x
4	Hybrid chatbots combining human handover with automated initial triage.	x
5	Pixel-like interactive chatbots simulating reference interviews.	x
6	Open-source chatbots customizable for library-specific knowledge bases.	x
7	Commercial platforms (e.g., LibAnswers with AI) for integrated virtual reference	x

The table shows results from librarians in academic libraries about types of AI chatbots for virtual reference services. From the data, every single item from rule-based chatbots that handle simple questions like library hours to commercial platforms like LibAnswers with AI got marked only under not available, meaning none of these chatbots were found in place during the check. This points to a full lack across all categories, so librarians deal with queries through old ways like email or phone without any AI help from chatbots to answer fast or work around the clock. It means users wait longer for help since no automatic tools step in first, and librarians handle everything by hand, which can tire them out when many people ask the same basic things. This therefore implies that all seven types of AI chatbots for virtual reference services were not available, showing no adoption in these academic libraries.

This result was supported by other studies. In a study by Agim, et al (2025), researchers looked at artificial intelligence use in Nigerian academic libraries and found very low take-up due to missing skills, money problems, and weak tech setup, with chatbots hardly in place for reference help, much like the table's no-availability marks across all types. Chase (2024) checked 31 library chatbots worldwide through reviews and scans but noted many academic spots, especially outside top places, lack even basic ones because of start-up hurdles and training gaps, backing the full absence seen here for rule-based to generative kinds. Mckie and Narayan (2019) surveyed university libraries and saw only a few with chatbots, pointing to infrastructure blocks and policy issues that stop wide use.

Research question 2: To what extent are AI chatbots utilized for virtual reference services in academic libraries**?**

Table 2: Mean Responses on extent AI chatbots are utilized for virtual reference services in academic libraries

S/N	Items	Mean	SD	Remarks
1	AI chatbots handle routine queries like database access instructions.	1.85	0.62	Very Low Extent
2	Chatbots provide 24/7 support for after-hours reference needs.	2.40	0.65	Low Extent
3	Integration of chatbots on library websites for immediate user queries.	1.75	0.58	Very Low Extent
4	Use of chatbots to manage high-volume FAQs during peak times.	2.20	0.68	Low Extent
5	Chatbots escalate complex queries to human librarians seamlessly.	1.90	0.60	Very Low Extent
6	Deployment of multiple chatbot instances across library platforms (e.g., apps, social media).	2.45	0.70	Low Extent
7	Regular tracking of chatbot interactions for service analytics	1.65	0.55	Very Low Extent
	Grand Mean	**2.03**		**Disagree**

The table comes from answers by librarians on how much AI chatbots get used for virtual reference services in academic libraries. There was very little to no real practice across all seven items, where items 1, 3, 5, and 7 fall in the very low extent range with mean scores 1.99 that AI chatbots handle routine queries like database access instructions, Integration of chatbots on library websites for immediate user queries, Chatbots escalate complex queries to human librarians seamlessly, and Regular tracking of chatbot interactions for service analytics. Similarly, items 2, 4,and 6 hit low extent with means from 2.00-2.49 that Chatbots provide 24/7 support for after-hours reference needs, Use of chatbots to manage high-volume FAQs during peak times, and Deployment of multiple chatbot instances across library platforms (e.g., apps, social media). The grand mean of 2.03 signaled overall low extent among librarians that chatbots are utilized for reference services in the libraries

The very small use of AI chatbots across all virtual reference service items were supported by some studies. A study by Edelwor and Imhonopi (2017) found low use of AI chatbots for tasks like reference services with poor training and setup which hold back daily work. Nawaz and Saldeen (2020) found that there was low chatbot deployment in reference, and

analytics tracking. There was also low extent overall use due to limited resources and policy gaps. Vincze (2017) reported very low use and integration of AI chatbots features in virtual reference, indicating agreement on poor use due to trust issues and tech lacks.

Research Question 3: How effective do librarians perceive AI chatbots in resolving queries for virtual reference services in academic libraries**?**

Table 3: Mean Responses on how effective librarians perceive AI chatbots in resolving queries for virtual reference services in academic libraries

S/N	Items	Mean	SD	Remarks
1	AI chatbots resolve basic directional queries (e.g., location of resources) accurately.	3.20	0.60	Highly Effective
2	Chatbots provide reliable answers to frequently asked reference questions.	2.75	0.65	Effective
3	They improve response time compared to human-only virtual services.	3.10	0.70	Highly Effective
4	Chatbots enhance user satisfaction through instant, context-aware replies.	2.60	0.55	Effective
5	They free librarians for in-depth research consultations.	3.30	0.58	Highly Effective
6	Overall query resolution rate meets library service standards.	2.85	0.62	Effective
7	User feedback on chatbot interactions is generally positive.	3.40	0.50	Highly Effective
	Grand Mean	**3.03**		**Strongly Agree**

The table gathers views from librarians on how well they see AI chatbots working to solve queries in virtual reference services for academic libraries. Items 1, 3, 5, and 7 were in the highly effective range that AI chatbots resolve basic directional queries (e.g., location of resources) accurately, they improve response time compared to human-only virtual services, they free librarians for in-depth research consultations, and User feedback on chatbot interactions is generally positive. Similarly, items 2, 4, and 6 were in effective range which shows that Chatbots provide reliable answers to frequently asked reference questions, Chatbots enhance user satisfaction through instant, context-aware replies, and Overall query resolution rate meets library service standards. The grand mean of 3.03 with highly effective remarks shows strong perceived value of AI chatbots in query resolution for virtual reference services

Some studies supports this result. Agim, et al (2025) study revealed that librarians expressed highly favorable ratings on the tools' effectiveness, particularly highlighting their strong performance in addressing simple directional and factual queries such as resource locations or policy clarifications, while also noting substantial time-saving advantages that allow staff to redirect efforts toward more specialized consultations. Also a study by Mckie and Narayan (2019) revealed consistent endorsements of AI effectiveness with particular reference for high accuracy in delivering precise reference information and boosting user satisfaction through reliable, and context-sensitive interactions. A similar study by Rodriguez and Mune(2022) show that respondents assigned high evaluative preference to the technology's capacity for expediting responses and alleviating staff burdens by automating routine tasks, thereby enabling focus on advanced research support; affirming librarians' recognition of chatbots' robust promise in elevating virtual reference efficiency.

Research Question 4: What challenges hinder the utilization of AI chatbots for virtual reference services in academic libraries**?**

Table 4: Mean Responses on challenges that hinder the utilization of AI chatbots for virtual reference services in academic libraries

S/N	Items	Mean	SD	Remarks
1	Difficulties customizing chatbots for library-specific content and needs.	2.80	0.75	Agree
2	Low user trust and acceptance of AI over human librarians.	3.20	0.70	Strongly Agree
3	Limitations in handling complex or context-dependent queries.	2.90	0.80	Agree
4	Privacy and data security risks with user interactions.	3.10	0.78	Strongly Agree

5	High costs and infrastructure challenges (e.g., connectivity in developing regions).	3.30	0.65	Strongly Agree
6	Need for frequent updates and maintenance of AI models.	3.05	0.82	Strongly Agree
7	Lack of librarian training and skills for chatbot management	3.40	0.72	Strongly Agree
	Grand Mean	**3.11**		**Strongly Agree**

The table pulls together ratings from librarians on challenges that block AI chatbots from getting used in virtual reference services at academic libraries. Items 1, 4, and 7 sit in the agree range showing fair consensus that difficulties customizing chatbots for library-specific content and needs, privacy and data security risks with user interactions, and lack of librarian training and skills for chatbot management as challenges. Similarly, items 2, 3, 5, and 6 has strongly agree levels which indicated Low user trust and acceptance of AI over human librarians, Limitations in handling complex or context-dependent queries, High costs and infrastructure challenges (e.g., connectivity in developing regions), and Need for frequent updates and maintenance of AI models. The grand mean of 3.11 shows a strongly agree that confirms all listed challenges that majorly hinder AI chatbot use in virtual reference services.

The result is in agreement with some authors study. Guy, et al (2023) uncovered widespread strong agreement on several critical challenges impeding artificial intelligence adoption, including severe financial constraints that limit procurement and scaling, inadequate technical infrastructure such as unreliable servers and networks, heightened concerns over data privacy and security breaches during user interactions, and significant skill gaps among staff who lack the expertise to implement and manage AI systems. Also, Vincze (2017) found that librarians expressed strong consensus on key obstacles such as substantial difficulties in customizing AI tools to fit unique library workflows and content needs, persistent trust deficits from users preferring human interactions over machine outputs, and the ongoing burden of maintenance requirements including frequent model retraining and updates. Similarly, Edelwor and Imhonopi (2017) study elicited strong affirmations of major impediments like deficient infrastructure encompassing poor internet connectivity and outdated hardware, frequent power outages disrupting continuous operations, and acute shortages of specialized expertise needed for setup and troubleshooting. The study positioned these infrastructural and competency voids as foremost blockers to deploying virtual reference chatbots, stressing their role in preventing seamless integration and sustained functionality in library services.

Conclusion

The study reveals that while no types of AI chatbots are available for virtual reference services in academic libraries among the libraries surveyed, their utilization remains at a very low extent. However, librarians perceive these tools as highly effective for resolving queries, though major challenges such as customization difficulties, low user trust, privacy risks, high costs, infrastructure limitations, maintenance needs, and skill gaps strongly hinder adoption, highlighting a clear gap between potential benefits and real-world barriers that keeps libraries reliant on traditional human-led services despite growing tech expectations from users.

Recommendations

The following recommendations address the identified issues:

1. Academic libraries should partner with tech developers to introduce and deploy at least basic rule-based and generative AI chatbots tailored for virtual reference to address the complete absence of available types.
2. Library management needs to pilot small-scale integrations of AI chatbots on websites and social platforms with training sessions to raise utilization from very low levels across all service aspects.
3. Librarians ought to receive awareness programs showcasing successful chatbot cases to build confidence in their high perceived effectiveness for query handling and time savings.
4. Institutions must invest in staff training workshops, secure funding for infrastructure upgrades, and form policies on privacy and maintenance to overcome the strong challenges blocking AI chatbot rollout.

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Utilization of Artificial Intelligence in Healthcare Information Management and Services: Opportunities and Challenges

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Abstract

The paper examines the integration of Artificial Intelligence (AI) into healthcare information management and services. It highlights the transformative potential and the ethical challenges of AI utilization in healthcare information management. The paper observed that librarians are positioned as key stakeholders in the process of AI use in healthcare service delivery. They work to ensure responsible health data practices, supporting access to information and collaborating with healthcare workers to mitigate AI risks. Multiple AI-based applications that are suitable to healthcare information management were identified, including diagnostic AI tools, predictive analytics, chatbots and automated health information retrieval systems which are crucial to enhancing efficiency. Despite these benefits, the paper observed significant challenges, particularly in relation to data privacy and confidentiality, algorithmic bias and lack of regulatory compliance and trust. The complexity of data flows and third-party integrations further heightens the risk of unauthorized access to health information, data breaches and inequitable outcomes. To address these challenges, the paper proposes three ways forward which include strengthening governance frameworks to safeguard AI generated health data, building inclusive datasets and applying vigilant monitoring to mitigate algorithmic bias, and enhancing regulatory compliance through transparent governance and accountability measures. Librarians and healthcare workers can work together to achieve equitable, secure and sustainable AI-driven healthcare information systems by balancing innovation with responsibility. These approaches showcase the critical role of librarians in advocating for ethical standards and ensuring that AI applications in healthcare services align with existing laws and regulations.

Keywords: Artificial Intelligence (AI), Healthcare Information Management, Librarianship, Ethical Considerations

Introduction

Healthcare is a system of maintaining and restoring physical and mental well-being through the provision of medical services. It also involves the procedure of preventive services through programs and policies to improve public health and quality of life. However, information is considered as valuable asset in healthcare services at local and national levels. Library and information professionals contribute to healthcare information management using latest technologies and systems. Healthcare information management and services are the cornerstones of effective healthcare practices. They involve routine activities that ensure proper information handling for the benefits of both the patients and health care service providers. Information management within the context of healthcare services is the process of collecting, organizing, storing, maintenance and delivery of health information in a way that ensures its accuracy, accessibility, security and usefulness for health decision-making, operations and knowledge creation (Omer, 2023).

As opined by Ma, Stahl and Knotts (2018) librarians are involved in healthcare information management to ensure that the flow of information within health services is efficient, reliable and purposeful. They develop a process which emphasizes the delivery of the right, accurate, relevant and up-to-date information for healthcare decision and problem solving. The operational efficiency of health service delivery institutions such as hospitals and clinics in both rural and urban centres is directly influenced by the flow of information and its better utilization (Oladipo, 2014). For example, in rural areas where infrastructure, funding and skilled personnel are often limited, health information services plays a key role by ensuring the maximization of what is available and the health priority needs. In urban centres, the flow of effective health information helps to streamline the complex systems of the urban setting and prevent any health bottlenecks such as overcrowded hospitals and clinics.

Saberi, Macheich and Adda (2025) pointed out that several components play a critical role in health information management and services as health workers need access to information. For instance, librarians systematically gather health data from multiple sources like online medical platforms, hospitals and laboratories in order to provide comprehensive understanding of health trends, diseases and outbreaks. They organize and store the data in a standard formats by using classification systems and storing it in a physical location or electronic record system, archives and databases for easy access and retrieval. In health information management and services, access and retrieval make it possible for healthcare providers and researchers to obtain accurate and useful information data when needed. The data may include patient's medical history, type of treatment or any epidemiological data that could be useful for health care decisions and problem solving. Health care data security and preservation are especially important given the sensitivity of health information. Librarians facilitate the process of safeguarding information and prevent unauthorized and ensure long-term availability of data and information as well as maintaining legal compliance like accountability and confidentiality (Katz, 2024). However, the process of disseminating health care information confirmed the fact that information is not only collected and stored but actively utilized for clinical decisions, community awareness and health policies.

On the other hand, the role of Artificial Intelligence (AI) in healthcare information management and services is increasingly important in the digital age (Kumah, 2025). In the current healthcare information landscape, AI transforms how patients, healthcare service practitioners, and institutions share and communicate information. This is a new form of digital interactions which librarians directly support the flow of health information, evidence-based practice and patient care system using the latest technologies. AI is a digital system designed to perform challenging tasks and sophisticated undertakings that typically simulate human intelligence. In health care information environment, AI is being adopted to simulate human intelligence in order to improve access to health information and reshape healthcare delivery (Europen Commission, 2025). AI systems facilitate the analysis of vast amount of health information quickly and accurately. Health information is the foundation of effective healthcare, it includes the followings:

Types of Healthcare Information	Description
Diagnosis Information	• Patient history • Laboratory test results • Radiology images (X-rays, MRI, CT scans) • Pathology reports • Clinical notes from physicians
Treatment Information	• Prescriptions and medication records • Surgery and procedure notes • Therapy plans (e.g., physiotherapy, chemotherapy) • Care protocols and guidelines • Progress notes on treatment response
Patient Monitoring Information	• Vital signs (blood pressure, heart rate, temperature, oxygen saturation) • Continuous monitoring data (ICU charts, wearable device outputs) • Follow-up visit records • Nursing observations and shift reports • Remote monitoring system data
Administrative Information	• Patient registration and demographic data • Appointment schedules • Billing and insurance claims • Staff rosters and duty allocations • Resource utilization (beds, equipment and hospital supplies)

The role of AI in the management of information related to diagnosis, treatment, patient monitoring and administrative responsibilities cannot be overemphasized. AI is adopted to enhance the efficiency of healthcare processes and outcomes. Therefore, in modern healthcare services, information management includes the application of digital and electronic devices such as electronic health records and telemedicine which can be enhanced by AI powered tools for speed and clear information flow.

Multiple AI-Based Applications in Healthcare Information Management

There are various types of AI applications and tools that support healthcare information management practices. These tools perform tasks such as managing and analyzing health information that traditionally require human intelligence. The tools leverage algorithms that recognize patterns in datasets and produce meaningful outputs (Nivedhaa, 2024). For example, AI will enhance pattern recognition by automatically generating metadata in a large health information database or recognize outlines and arrangements like names, dates and subjects. It can also classify and tag health information and contents more accurately and efficiently than manual inventory or catalogue. This process not only enhances information search but also enables for the discovery of related health materials that would have been difficult to retrieve.

The functions of healthcare libraries are to facilitate access and enhance the relevancy of health information as well as strategic application. Thus, a range of AI tools that perform various tasks to support the work of librarians in healthcare environment exist. AI powered literature search and retrieval capabilities, recommendation systems and predictive analysis are essential in healthcare information management and service delivery. Librarians utilize intelligent search tools to improve precision and recall which enables healthcare practitioners to quickly find the accurate and evidence-based information from a large health or medical databases, electronic records and online platforms (Ma, Stahl and Knotts, 2018). The AI powered information systems facilitate recommendations by suggesting related health articles, citations and research networks within health communities. This ensures that health workers have access to resources that are important to their work. The multiple AI applications that improve knowledge discovery and optimize information resources in healthcare information services are highlighted below:

Application	Example Tools	Use in Healthcare Information Services
AI-powered literature search and retrieval	EBSCO Discovery AI, PubMed AI, Semantic Scholar, Dimensions AI	Improves precision in retrieving medical research articles and evidence-based resources
Automated indexing and cataloguing	OCLC WorldShare Metadata AI, Ex Libris Alma (AI-enhanced), AutoMeSH Indexer	Automatically assigns subject headings (e.g., MeSH) and organizes digital/print medical collections
Clinical decision support integration	UpToDate AI search, IBM Watson Health integration, ClinicalKey	Provides clinicians and researchers with evidence-based resources linked to library holdings
AI-driven recommendation systems	Scite.ai, Research Rabbit, Connected Papers	Suggests related articles, citation contexts, and research networks to users
Chatbots and virtual library assistants	LibChat AI, EBSCO Ask-a-Librarian Bot, LibraryH3lp AI	Assists users with search queries, guides access to resources, and provides 24/7 library support
Plagiarism detection and research integrity	iThenticate, Turnitin, Grammarly AI	Ensures originality and integrity of scholarly publications and medical theses
Text and data mining	Iris.ai, VOSviewer (AI clustering), Elsevier Text Mining Suite	Extracts trends, drug interactions, and disease patterns from large sets of medical literature
Semantic search and knowledge graphs	Yewno Discover, Meta AI (Chan Zuckerberg), Scholarcy	Links related concepts across databases and enhances discovery of hidden medical knowledge
Predictive analytics for resource use	Ex Libris Analytics, EBSCO Usage Consolidation AI, Elsevier Pure	Analyzes borrowing, downloads, and usage patterns to predict future resource needs
Speech-to-text and transcription	Otter.ai, Nuance Dragon Medical One, Sonix AI	Converts lectures, conferences, and seminars into searchable text archives
AI-driven systematic review assistants	Rayyan.ai, Covidence AI, RobotAnalyst	Screens and organizes thousands of articles quickly for systematic reviews
Medical image repositories with AI tagging	Zebra Medical Vision, PathAI, Google Cloud Medical Imaging Suite	Manages, classifies, and retrieves medical images for teaching and research

Librarian-Healthcare Workers Collaboration to Reduce AI Risks in Healthcare Information Management

Collaboration is defined as the process in which two or more entities work together toward a shared objective or goal. It involves pooling their knowledge, skills and resources leading to outcomes that are more effective and innovative than what could be achieved individually. Nwafor-Orizu (2020) stressed the importance of collaboration between librarians and health professionals to ensure effective healthcare services. This collaboration is considered crucial to minimizing AI risks in healthcare information management and services. In health information management, AI risks comprised data privacy breaches, misinformation and inaccurate outputs, algorithmic bias and over reliance on AI leading to reduce human effort. As such, both the librarians and health practitioners bring complementary expertise needed to ensure safe, ethical and effective use of AI systems. The librarians' expertise in information management covers data integrity, copyright and ethical access to health information, while healthcare practitioners contribute clinical knowledge and medical perspectives. Clinical knowledge that could help minimize AI risks includes evidence-based medicine, diagnostic reasoning, ethical and regulatory compliance. Thus, librarians and health workers can collaborate to ensure that validated clinical guidelines are applied to verify AI outputs, cross-check AI-assisted diagnoses, prevent errors and ensure AI tools align with established safety standards in healthcare practice (Kumah, 2025).

It is obvious that, as shown by Azkagina and Irawati (2024), Garcia-Milian et al (2013) hat the collaboration between librarians and health professionals requires a specific guidelines or models. A model is a structured framework that guides how librarians and healthcare workers interact, share responsibilities and collaborate to achieve ethical use of AI systems in health information management. There are various models of collaboration that can help reduce AI risks in health information management as follows:

1) ***Interdisciplinary Team Model:*** this is where librarians and health professionals work together as equal members of a team (Garcia-Milian et al, 2013). They work together to share expertise, evaluate AI tools, verify data sources and ensure outputs align with evidence-based medical practices. In this model, librarians contribute skills in information organization; metadata and ethical data use, while healthcare workers provide clinical judgment and patient-centered insights which help create a balanced approach to AI risk reduction.
2) ***Embedded Librarian Model:*** this is another model that can be adopted in the collaboration process (Azkagina and Irawati, 2024), The model shows how librarians can be integrated into healthcare environments such as hospitals, clinics or research units to provide information support services. Librarians can identify potential gaps in AI-driven systems, guide the selection of reliable datasets and train health workers on proper use of information resources.

In general, collaboration models promote sustained interaction and communication between librarians and healthcare professionals. They enhance trust and guarantee that healthcare AI systems remain precise, ethical and useful.

Challenges and Ethical Considerations

Challenges and ethical considerations in AI application in health information management refer to the difficulties and moral issues that arise when integrating artificial intelligence into the collection, storage and use of health data. However, the identified challenges and issues are presented as follows.

1) ***Data Privacy and Confidentiality****:* One of the greatest challenges of applying AI in healthcare information management is protecting patient privacy. AI systems rely on large volumes of sensitive health data, which if not adequately safeguarded, may be exposed to unauthorized access, hacking or misuse (Katz, 2024). There is also complexity of data flows and third-party integrations in AI systems. Third-party integrations in AI systems involve the connection and interaction of an AI tool with external applications, platforms or services that are developed and managed by other organizations. In healthcare information management, this means that an AI system may rely on outside software or databases. For example, linking an AI diagnostic tool with a hospital's electronic health record system, integrating a chatbot with a patient portal or using cloud-based services provided by tech companies to store and analyze health data can have potential riks. This is because third-party providers may have different security standards, which increases the chance of data breaches, unauthorized access or misuse of patient information
2) ***Algorithmic Bias:*** this has to do with systematic errors or unfair outcomes that occur when an AI system's decisions are influenced by their designs or flaws in the data they are trained on (Katz, 2024). In healthcare information management, algorithmic bias can appear when AI tools are trained on datasets that do not adequately represent the diversity of the population. For example, an AI diagnostic model trained mainly on data from urban hospitals in developed countries may perform poorly when applied to rural or underrepresented communities. This can lead to misdiagnosis or inequitable healthcare decisions. The challenge lies in the fact that these biases are often hidden within complex algorithms which makes them difficult to detect and correct. Ethically, algorithmic bias undermines equity in healthcare, as it may disadvantage certain groups based on factors such as race, gender, socioeconomic status or geography.
3) ***Lack of Regulatory Compliance and Trust****:* Lack of regulatory compliance and trust is a significant challenge in applying AI to healthcare information management because it affects both the acceptance and the safe use of

technology (Mennella et al, 2024). Healthcare is one of the most highly regulated sectors, with strict rules on patient privacy, data protection, and safety standards. However, many AI applications are developed faster than regulations can adapt which generates monitoring challenges. For instance, AI-driven tools may collect or process sensitive patient data in ways that do not fully align with existing laws like the National Health Act. Therefore, when regulations are unclear or inconsistently enforced, both librarians and healthcare workers may struggle to ensure compliance, leading to legal risks and ethical concerns in AI application.

Conclusions

The integration of Artificial Intelligence (AI) into healthcare information management and services provides transformative opportunities. Librarians are increasingly involved in healthcare information management, supporting access, organization and ethical use of data while collaborating with healthcare workers to reduce AI risks. Multiple AI-based applications, such as virtual assistants, predictive analytics and automated systems enhance efficiency in healthcare services, yet various challenges remain. These challenges are data privacy and confidentiality concerns, algorithmic bias and lack of regulatory compliance and trust that must be addressed to ensure that AI technologies serve the healthcare system effectively. Also, this paper observed that sustainable progress in AI utilization in health information management depends on collaboration between librarians and healthcare professionals which will enhance transparency, and adherence to standards.

The Way Forward

Considering the observations made in this paper, the following measures were recommended:

1) **To overcome the challenge of data privacy and confidentiality in AI utilization, librarians and health workers should** work together to apply data security standards for both internal and third-party systems. They should apply regular health data audits and close supervision of data flows. Librarians should also ensure uniform encryption, authentication and responsible cloud management of health related data and information.
2) **There is also need for** building inclusive datasets that represent diverse populations. This can be achieved when librarians and healthcare workers are involved in bias detection and health data governance as well as engaging in vigilant monitoring and validation of AI models.
3) There is need for government to align AI systems with existing health laws and international standards. This can be achieved by promoting transparent AI governance through accountability measures, stakeholder engagement, clear communication and consistent enforcement of AI regulations within healthcare services.

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