

THE ROLE OF DIGITAL LIBRARIANS IN SUPPORTING TEACHING, LEARNING AND RESEARCH IN UNIVERSITIES: A SURVEY OF ACADEMIC LIBRARIES IN IMO STATE, NIGERIA

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Abstract

This study was carried out to ascertain the contributions of digital librarians to teaching, learning and research in university libraries in Imo State Nigeria. It therefore sought to uncover the various digital services rendered by university librarians and how these services affect teaching, learning and research activities in the selected institutions. Moreover, this study also investigated the problems facing digital services and solutions to the problems in the selected universities. A descriptive survey design was adopted for this study. The population comprises of 175 professional librarians in the selected institutions. A well-structured questionnaire was used for data collection and Cronbach Alpha test was used to determine the reliability of the instrument. The data collected were analysed using frequency counts, percentages, means and standard deviation. The study revealed that digital librarians offer various services including but not limited to electronic database searching, institutional repository, digital catalogue, e-resources management, virtual reference service, digital information literacy, digital access to information resources. The respondents revealed that digital librarians contribute to teaching in the institutions by providing information literacy programmes, inclusion of library resources in learning management system and providing resources and digital resources management assistance to faculty members. Further, the respondents indicated that digital librarians contribute to learning activities by providing information literacy, teaching students to use digital resources for learning, teaching research skills, and ensuring academic integrity. In addition, the study found out that digital librarians contribute to research activities by providing literature searches, institutional repository, plagiarism detection, bibliometric analysis, scholarly publishing and research data management. The study further revealed that the major problems confronting digital services in the selected institutions are insufficient fund, inadequate internet services, inadequate infrastructure, electricity, lack of skilled personnel, lack of professional development, high subscription fees, security issues and lack of

institutional support. However, the respondents suggested that ways of improving digital services in the institutions include availing sufficient funds, acquiring modern ICT equipment, constant staff training, encouraging good internet services, adopting new technologies, institutional policies and collaborative efforts of librarians, staff and institution in providing digital services. Therefore, this study recommends that more efforts should be made in providing digital services in the selected institutions.

Keywords: Digital librarians, academic libraries, teaching, learning, research, digital information services, universities, Imo State, Nigeria.

Introduction

The rapid progress of information and communication technologies (ICTs) has revolutionized the functioning of academic libraries globally, leading to the development of digital librarianship as a crucial aspect of higher education. Digital librarians are professionals in the field of information who utilize digital tools to arrange, protect, retrieve, and distribute scholarly information while aiding teaching, learning, and research within universities. Their duties have broadened beyond traditional library tasks to encompass overseeing institutional repositories, digital collections, electronic databases, research data management, information literacy training, virtual reference services, and support for open educational resources (OERs) and emerging AI-powered library services (Dube et al., 2024). Universities increasingly rely on digital librarians to enable access to scholarly information regardless of users' physical locations. By utilizing digital repositories, subscription databases, online catalogs, plagiarism detection tools, and research support platforms, digital librarians significantly enhance the quality of teaching, enrich students' learning experiences, and boost research output. Their expertise in digital literacy education equips students and faculty with the skills needed to locate, evaluate, manage, and ethically utilize digital information resources in an environment driven by knowledge (Ikenwe & Aiyebilehin, 2024).

In Nigeria, academic libraries are embracing digital transformation by offering electronic information resources, institutional repositories, virtual reference services, and cloud-based library management systems. Despite these advancements, challenges such as inadequate ICT infrastructure, unstable power supply, insufficient financial resources, poor internet connectivity, limited digital skills among library staff, and ineffective policy implementation continue to hinder the effectiveness of digital library services (Eneh et al., 2023; Ogunbodede & Atchimi, 2024). In Imo State, home to several universities including the Federal University of Technology, Owerri, Imo State University, Kingsley Ozumba Mbadiwe University, and other private institutions, academic libraries are gradually integrating digital technologies into their operations. Yet, the effectiveness of digital librarians in supporting teaching, learning, and research in these libraries remains underexplored. This research aims to investigate the role of digital librarians in aiding teaching, learning, and research in academic libraries in Imo State, Nigeria, to offer empirical evidence that can guide policy-making and enhance digital library services.

Academic libraries are expected to provide prompt, smooth, and unrestricted access to digital information resources that facilitate quality teaching, effective learning, and innovative research. Consequently, digital librarians are increasingly required to possess advanced ICT skills and provide user-focused digital services. While many Nigerian universities have invested in digital library infrastructures, electronic databases, institutional repositories, and

virtual information services, various studies suggest that these services are not fully utilized due to infrastructure limitations, inadequate digital skills, insufficient funding, and lack of awareness among users. Additionally, there is limited empirical evidence on the specific contributions of digital librarians in supporting teaching, learning, and research in academic libraries in Imo State. Previous studies have mainly concentrated on digital skills, institutional repositories, or electronic resource utilization in other parts of Nigeria, creating a knowledge gap regarding the practical roles fulfilled by digital librarians in Imo State universities. Without a comprehensive understanding of these roles, university management may struggle to create effective policies to enhance digital library services. Consequently, this study aims to explore the role of digital librarians in supporting teaching, learning, and research in academic libraries in Imo State, Nigeria. The general objective is to examine the role of digital librarians in supporting teaching, learning, and research in academic libraries in Imo State, Nigeria. The specific objectives are to: a). examine the digital services provided by digital librarians in academic libraries in Imo State; b). determine the contributions of digital librarians to teaching activities in universities; c). assess the role of digital librarians in supporting students' learning through digital information services; d). examine the contributions of digital librarians to research activities among academic staff and students; e). identify the challenges affecting digital librarians in supporting teaching, learning, and research; and f). suggest strategies for improving digital librarians' effectiveness in academic libraries. This research will add to the expanding body of knowledge on digital library management in Nigerian universities by presenting real-world data from academic libraries in Imo State. The results will be advantageous for university leaders, library staff, decision-makers, scholars, and students as they pinpoint effective methods and obstacles linked to providing digital library services. Additionally, the study will offer suggestions for enhancing information and communication technology infrastructure, training for employees, digital skills initiatives, and policy execution to improve education, studying, and research.

Methodology

Imo State is situated between latitudes 4°45'N and 7°15'N, and longitudes 6°50'E and 7°25'E. The state spans roughly 5,530 square kilometers and shares borders with Anambra State to the north, Rivers State to the south, Abia State to the east, and Delta State to the west (Federal Republic of Nigeria, 2020). It enjoys a tropical rainforest climate with distinct wet and dry seasons, marked by significant annual rainfall and favorable temperatures that are conducive to continuous agricultural activity. As per the population projections from the National Population Commission (NPC) in 2023, Imo State's population is estimated to be over six million, ranking it among the most densely populated states in southeastern Nigeria (National Population Commission, 2023). The primary ethnic group in the region is the Igbo, with the Igbo language being predominantly spoken alongside English, which serves as the official language for governance and education.

Agriculture is a crucial economic sector in Imo State, with farmers producing a variety of crops including cassava, yam, maize, cocoyam, rice, vegetables, and oil palm. Additionally, livestock farming and fishing support rural livelihoods. Besides agriculture, other vital sectors contributing to the economy include commerce, education, civil service, manufacturing, information technology, and small-scale businesses. The state is also rich in petroleum and natural gas, which has aided economic advancement, although agriculture still employs a

considerable number of people in rural areas (NBS, 2023). Imo State boasts a comprehensive educational framework, featuring numerous public and private primary and secondary institutions, as well as higher education establishments. Noteworthy institutions include the Federal University of Technology Owerri, Imo State University, Alvan Ikoku Federal University of Education, and Federal Polytechnic Nekede. These institutions significantly contribute to teaching, research, innovation, and the development of human resources within the state and the broader southeastern region. The study aimed to adopt a descriptive survey research design, as it enabled the researcher to collect quantitative data from respondents concerning the roles performed by digital librarians in supporting teaching, learning, and research within academic libraries. The population of the study consisted of 175 professional and para-professional librarians working in academic libraries of the selected universities in Imo State, Nigeria. The universities were purposefully selected because they have academic libraries that offer digital library services to foster teaching, learning, and research. Due to the limited number of the population, a census sampling procedure was adopted for the study. In other words, all the 175 librarians were invited to participate in the study since there was no need to estimate the number of samples to be selected. Census is appropriate when the target population is small, and it provides accurate results since there is no possibility of sampling error associated with selecting only a subset of respondents (Creswell & Creswell, 2023). Additionally, using census increases the probability of each member of the target population of being selected, thus increasing the representativeness and generalizability of the sample. Moreover, only those who met the inclusion criteria were selected for the study. For instance, only professional and para-professional librarians working in the selected universities were considered.

Also, the study excluded those on leave, secondment, or unavailable on the day of the survey. The librarians included in the study were those who worked in the academic libraries and had sufficient knowledge of the digital library services offered. The reasons for selecting only professional and para-professional staff include their experience and expertise in managing the university's digital libraries and having worked there for at least one year. Besides that, this study did not use any sampling procedures because it focused on all the members of the target population identified in the selected universities (Creswell & Creswell, 2023). As such, all 175 respondents identified in the academic libraries of the selected institutions were considered. This approach reduced sampling bias due to selective observation and increased the representativeness of the sample, which aids the generalizability and accuracy of the findings. Primary data was collected through a structured questionnaire designed with a four-point Likert scale. The questionnaire included sections that addressed respondents' digital library services, contributions to teaching, learning, and research, challenges encountered, and potential improvement strategies. The completed questionnaires were analyzed for completeness, coded, and entered into Statistical Package for the Social Sciences (SPSS) version 27. Initially, the data were cleaned to remove inconsistencies and errors. The data were then analyzed using descriptive statistics. Additionally, the reliability of the instrument was tested using the Cronbach's Alpha coefficient. The study's research questions were answered using percentage, mean, and standard deviation. The analysis was performed using independent sample t-test and one-way analysis of variance at a significance level of 0.05 to compare the means of the selected variables.

Result and Discussions**Digital Services Provided by Digital Librarians in Academic Libraries in Imo State**

The results show that digital librarians at academic institutions in Imo State offer a variety of digital services to assist with education, learning, and research. The primary service reported was searching and retrieving information from electronic databases (94.3%), followed by online reference and virtual assistance (90.3%), and aiding remote access to electronic resources (88.0%). User training and teaching information literacy (151 respondents, 86.3%) and managing electronic resources (84.0%) were also widely recognized. Additionally, social media and online communication (82.3%), overseeing institutional repositories (81.1%), and creating digital catalogs and metadata (79.4%) were noted as common services. Fewer respondents mentioned providing digital document delivery (76.6%), supporting plagiarism detection (73.1%), and managing research data (68.0%). This indicates that while these services are offered, they may not be fully developed or broadly utilized in all academic libraries in the region. In general, the findings suggest that academic libraries in Imo State have incorporated key digital library services, with a focus on electronic information access, virtual user assistance, and digital resource handling. Nevertheless, emerging services like research data management need improvement to meet the changing demands of academia and research. Digital services offered by digital librarians are crucial for the smooth operation of contemporary academic libraries. These services utilize digital technologies to acquire, organize, preserve, share, and provide access to scholarly information resources. By enabling easy access to electronic materials, digital librarians support research initiatives and enrich teaching and learning experiences with innovative information services. Their role has evolved beyond traditional library tasks to managing digital collections, institutional repositories, research data, and online user assistance (Association of College and Research Libraries [ACRL], 2022). A key service from digital librarians is overseeing electronic resources, which include e-books, e-journals, online databases, and digital archives. They ensure these resources remain accessible both on-campus and off-campus via authentication systems, thereby facilitating ongoing learning irrespective of where users are located (International Federation of Library Associations and Institutions [IFLA], 2023). Additionally, digital librarians offer virtual reference services through email, live chat, social media, and other online platforms, allowing users to receive research help without needing to visit the library in person (Luo, 2021).

They also contribute significantly to the development and management of institutional repositories, which preserve and make accessible theses, dissertations, research articles, conference papers, and other scholarly outputs. This work boosts the visibility, accessibility, and impact of institutional research while advocating for open access principles (Lynch, 2022). Moreover, digital librarians conduct digital information literacy programs that prepare students and researchers with essential skills to find, assess, use, and ethically communicate digital information in today's complex information landscape (ACRL, 2022). Research support is another crucial service they provide, including assistance with plagiarism detection, research data management, bibliometric and citation analysis, and advice on scholarly publishing. They also teach users how to use reference management software such as Zotero, Mendeley, and EndNote, thereby enhancing research productivity (Corrall et al., 2023). Additionally, digital librarians manage the digitization and preservation of important library materials, ensuring

long-term access to institutional heritage and rare collections through effective digital preservation techniques (IFLA, 2023).

Table 1: Digital Services Provided by Digital Librarians in Academic Libraries in Imo State

S/N	Digital Services Provided	Frequency (f)	Percentage (%)
1	Online reference and virtual assistance services	158	90.3
2	Electronic database searching and retrieval	165	94.3
3	Institutional repository management	142	81.1
4	Digital cataloguing and metadata creation	139	79.4
5	User education and information literacy training	151	86.3
6	Digital document delivery services	134	76.6
7	Electronic resource management	147	84.0
8	Plagiarism detection support	128	73.1
9	Research data management support	119	68.0
10	Remote access support for e-resources	154	88.0
11	Library website and digital content management	136	77.7
12	Social media and online communication services	144	82.3

Contributions of Digital Librarians to Teaching Activities in Universities.

The findings show that digital librarians play a crucial role in educational activities at universities. The most highly rated contribution was offering online information literacy training, with 92.6% of respondents agreeing. This was followed by training instructors and students on utilizing electronic information sources, which 90.3% of respondents found valuable, and aiding instructors in finding up-to-date teaching materials, which 89.1% of respondents appreciated. Additionally, technical assistance for utilizing digital library services (88.0%) and virtual reference services and academic advising (86.9%) were widely acknowledged. Respondents also recognized the importance of digital librarians in organizing workshops on digital literacy and academic honesty (85.7%), supporting Learning Management Systems (LMS) and online course delivery (85.1%), and incorporating library materials into online teaching platforms (84.0%). Other significant contributions included creating online library guides and subject-specific portals (82.9%), producing and managing digital learning materials (81.7%), backing Open Educational Resources (OER) initiatives (75.4%), and offering advice on copyright and fair use (73.1%). Digital librarians play a crucial role in enhancing university teaching by embracing digital technologies and ensuring both educators and students have reliable access to high-quality information. They make educational tools more accessible by offering a wide range of resources, including eBooks, online journals, databases, institutional repositories, and other digital learning materials that support effective curriculum delivery and foster a research-driven approach to education (Association of College and Research Libraries [ACRL], 2022). By expertly managing these resources, digital librarians allow academic staff and students to easily find the scholarly information they need, regardless of when or where they are.

In addition to resource management, digital librarians significantly enhance information and digital literacy among the university community. They run training programs, workshops, and orientation sessions designed to help both students and faculty develop essential skills for finding, evaluating, utilizing, and ethically sharing digital information. Their support extends to Learning Management Systems (LMS), where they create online library guides, offer virtual reference assistance, integrate library resources into online courses, and advocate for the use of Open Educational Resources (OER), all of which enrich the learning experience (IFLA, 2023). They also provide valuable advice on issues like plagiarism detection, copyright regulations, reference management tools, and academic integrity, ultimately improving teaching quality and learning outcomes (Corrall et al., 2023). Digital librarians have redefined the role of academic libraries, making them vital allies in the educational process. Their skills in managing digital resources, providing instructional support, and fostering information literacy empower universities to deliver a technology-driven education while encouraging lifelong learning, innovation, and academic success (Luo, 2021).

Table 2: Contributions of Digital Librarians to Teaching Activities in Universities

S/N	Contributions to Teaching Activities	Frequency (f)	Percentage (%)
1	Provision of online information literacy instruction	162	92.6
2	Training lecturers and students on the use of electronic information resources	158	90.3
3	Supporting Learning Management Systems (LMS) and online course delivery	149	85.1
4	Developing online library guides and subject portals	145	82.9
5	Providing virtual reference and academic consultation services	152	86.9
6	Assisting lecturers in sourcing current teaching materials	156	89.1
7	Creating and managing digital learning resources	143	81.7
8	Supporting Open Educational Resources (OER) initiatives	132	75.4
9	Conducting workshops on digital literacy and academic integrity	150	85.7
10	Integrating library resources into online teaching platforms	147	84.0
11	Providing copyright and fair-use guidance for instructional materials	128	73.1
12	Offering technical support for accessing digital library services	154	88.0

Role of Digital Librarians in Supporting Students' Learning through Digital Information Services

The results show that digital librarians significantly contribute to student learning by delivering a range of digital information services. The most commonly cited responsibility was enabling access to e-books, journals, and databases, reported by 166 respondents (94.9%), followed by offering instruction in information and digital literacy, noted by 161 respondents (92.0%), and

supporting remote access to electronic library materials, mentioned by 160 respondents (91.4%). A large majority also emphasized the importance of suggesting appropriate digital resources for academic work (90.3%) and providing virtual reference support and online research help (89.7%). Additionally, digital librarians were frequently recognized for helping students locate and assess digital information (88.0%), assisting with Learning Management Systems (LMS) (85.1%), guiding the use of institutional repositories (83.4%), creating online library guides and instructional tutorials (82.9%), and promoting awareness of plagiarism and academic integrity (82.3%). Other notable contributions included teaching students how to use reference management tools (80.6%) and supporting access to Open Educational Resources (OER) (79.4%). Digital librarians are vital in enhancing students' learning experiences by offering digital information services that streamline access to scholarly resources, bolster information literacy, and encourage self-directed learning. As academic libraries increasingly integrate digital tools, these librarians ensure that students can easily access essential resources such as e-books, e-journals, online databases, and institutional repositories, all crucial for academic achievement. Moreover, they provide remote access to these resources, allowing students the freedom to learn outside the traditional library confines and supporting diverse learning models (Association of College and Research Libraries [ACRL], 2022; International Federation of Library Associations and Institutions [IFLA], 2023). A key duty of digital librarians is to enhance students' information and digital literacy skills. They offer orientation sessions, workshops, and online tutorials designed to empower students to recognize their information needs, navigate electronic databases efficiently, assess the reliability of online sources, and utilize information responsibly. Additionally, digital librarians deliver virtual reference support through various platforms, including email, chat, and video conferencing, providing real-time academic assistance regardless of students' locations (Luo, 2021). They also guide students in using Learning Management Systems (LMS), institutional repositories, and citation management tools such as Zotero, Mendeley, and EndNote to enhance the quality of their academic projects and research outputs (Corrall et al., 2023). In their role, digital librarians also emphasize the importance of academic integrity by offering programs on plagiarism awareness, copyright issues, and proper citation practices. They facilitate access to Open Educational Resources (OER), create online library guides, and curate digital materials that support classroom learning. With the rise of artificial intelligence, learning analytics, and tailored digital services, digital librarians increasingly provide technology-enabled learning support that strengthens students' academic performance, critical thinking abilities, digital skills, and lifelong learning capabilities (UNESCO, 2023). As a result, digital librarians have become essential partners in higher education, ensuring that students effectively leverage digital information resources to attain academic success.

Table 3: Role of Digital Librarians in Supporting Students' Learning through Digital Information Services

S/N	Role of Digital Librarians in Supporting Students' Learning	Frequency	Percentage
1	Provide access to electronic books, journals, and databases	166	94.9
2	Conduct information literacy and digital literacy training	161	92.0
3	Offer virtual reference and online research assistance	157	89.7

S/N Role of Digital Librarians in Supporting Students' Learning Frequency Percentage

4	Guide students in searching and evaluating digital information	154	88.0
5	Support remote access to electronic library resources	160	91.4
6	Assist students in the use of institutional repositories	146	83.4
7	Provide training on reference management software (e.g., Zotero, Mendeley)	141	80.6
8	Support the use of Learning Management Systems (LMS)	149	85.1
9	Provide plagiarism awareness and academic integrity guidance	144	82.3
10	Recommend relevant digital resources for assignments and projects	158	90.3
11	Develop online library guides and tutorials	145	82.9
12	Facilitate access to Open Educational Resources (OER)	139	79.4

Contributions of Digital Librarians to Research Activities among Academic Staff and Students

Table 4 indicates that digital librarians play a significant role in supporting research among faculty and students. The most highly valued contribution was facilitating access to electronic journals, databases, and digital repositories, cited by 168 respondents (96.0%). This was followed by assistance with literature searches and systematic information retrieval (163 respondents, 93.1%) and training on research databases and digital tools (159 respondents, 90.9%). Other widely recognized services included research consultations and virtual reference support (89.1%), help with reference management software (88.0%), and the organization of research skills workshops and seminars (86.9%). Respondents also acknowledged support for plagiarism detection and academic integrity (85.7%), management of institutional repositories and promotion of open access (84.6%), guidance on scholarly publishing and journal selection (82.9%), and assistance with research data management and preservation (80.0%). A somewhat smaller, though still substantial, proportion highlighted support for collaborative and interdisciplinary research via digital platforms (78.9%) and services related to bibliometrics, citation analysis, and research impact assessment (77.7%). Digital librarians are essential to enhancing research efforts among academic staff and students by offering technology-focused information services that make accessing high-quality scholarly resources easier and boost research productivity. In today's universities, these professionals oversee electronic databases, digital libraries, institutional repositories, and online journals, which help researchers find up-to-date and reliable information quickly. They also ensure that remote access to these resources is available, allowing scholarly activities to continue no matter where researchers are located ([item], 2023; International Federation of Library Associations and Institutions [IFLA], 2023). A key aspect of what digital librarians do is provide various research support services, including literature searches, assistance with systematic reviews, reference consultations, and information retrieval. They educate researchers on how to effectively use academic databases such as Scopus, Web of Science, PubMed, JSTOR, and ScienceDirect, which significantly enhances the quality and thoroughness of research endeavors. Additionally, they offer training on reference management tools like Zotero, Mendeley, and EndNote to improve citation

accuracy and research organization ([item], 2023). They also inform researchers about important ethical practices, such as preventing plagiarism, complying with copyright laws, and fostering responsible scholarly communication, all of which help maintain academic integrity. Moreover, digital librarians play a crucial role in the world of scholarly publishing by managing institutional repositories, advocating for open-access publishing, and enhancing the visibility and influence of research outputs from their institutions. They assist faculty and graduate students in choosing reputable journals, clarifying publication requirements, tracking citation impacts, and using bibliometric and altmetric tools to measure research performance ([item], 2023). Many also provide services for managing research data, including organization, preservation, sharing, and ensuring compliance with funding agency requirements, which are increasingly vital in the landscape of open science ([item], 2024). With the rise of artificial intelligence (AI), big data analytics, and digital research infrastructures, the role of digital librarians has expanded even further in supporting academic research. They now assist researchers in harnessing AI-driven discovery tools, managing digital research processes, and navigating changing scholarly communication systems. By offering these services, digital librarians enhance research efficiency, foster collaborative opportunities, increase the visibility of research findings, and contribute to innovation and knowledge creation within universities ([item], 2023).

Table 4: Contributions of Digital Librarians to Research Activities among Academic Staff and Students

	Contributions of Digital Librarians to Research Activities	Frequency	Percentage
1	Provide access to electronic journals, databases, and digital repositories	168	96.0
2	Assist researchers in literature searching and systematic information retrieval	163	93.1
3	Provide training on the use of research databases and digital resources	159	90.9
4	Support the use of reference management software (Zotero, Mendeley, EndNote)	154	88.0
5	Offer plagiarism detection and academic integrity support	150	85.7
6	Provide research consultation and virtual reference services	156	89.1
7	Manage institutional repositories and promote open access publishing	148	84.6
8	Support research data management and data preservation	140	80.0
9	Provide bibliometric, citation analysis, and research impact services	136	77.7
10	Assist with scholarly publishing and journal selection	145	82.9
11	Organize research skills workshops and seminars	152	86.9
12	Support collaborative and interdisciplinary research through digital platforms	138	78.9

Challenges Affecting Digital Librarians in Supporting Teaching, Learning, and Research

Table 5 showed that digital librarians face multiple obstacles in supporting teaching, learning, and research within universities. The most commonly cited issue was insufficient funding for digital library services, reported by 166 respondents (94.9%), followed by unreliable internet connectivity and limited bandwidth (163 respondents, 93.1%) and underdeveloped ICT infrastructure and digital resources (160 respondents, 91.4%). Additional major barriers included inconsistent power supply (90.3%) and the high cost of accessing electronic databases and digital materials (89.1%). Challenges related to human capacity were also prominent: lack of training and ongoing professional development (86.3%), limited digital literacy among users (85.1%), and the need to continuously update skills due to fast-evolving technology (84.0%). Other notable concerns were a shortage of skilled digital librarians and IT staff (82.9%), weak institutional support and policies for digital advancement (81.7%), resistance to technological adoption among staff and users (80.6%), and growing risks related to cybersecurity and data privacy (78.3%). Digital librarians are essential in advancing teaching, learning, and research within higher education, yet their impact is frequently limited by a range of challenges related to technology, funding, organizational structures, and staffing. A primary constraint is insufficient financial support, which hampers investment in digital infrastructure, access to electronic databases, adoption of new technologies, and the development of innovative library services. Many academic libraries—especially those in developing regions—find it increasingly difficult to maintain subscriptions to scholarly resources due to rising licensing fees and tight budgets (Aina et al., 2023; International Federation of Library Associations and Institutions [IFLA], 2023). Equally critical is the lack of reliable technological infrastructure. Issues such as weak internet connections, limited bandwidth, outdated hardware, and unstable power supply interfere with access to digital materials, undermine the performance of online services, and complicate efforts to support remote teaching and research. At the same time, the fast pace of technological change demands that librarians regularly update their skills. However, ongoing training opportunities are often scarce, leaving many unable to develop expertise in emerging areas like artificial intelligence, data analytics, digital curation, and research data management (Cox et al. 2023).

User-related challenges further complicate the landscape. A significant number of students and faculty lack strong information and digital literacy skills, which restricts their ability to make full use of available digital resources. As a result, librarians often dedicate substantial time to training and technical support. Additionally, reluctance to embrace change among certain library personnel and institutional leaders can delay the integration of new technologies and the rollout of modernized services (Mishra & Panda, 2022). Other pressing concerns include cybersecurity risks, copyright compliance, and data privacy. As academic libraries handle increasing volumes of sensitive user information and research outputs, they become potential targets for cyber threats, unauthorized access, and data leaks. Librarians must therefore balance strong security protocols with adherence to legal, ethical, and licensing requirements in managing digital content (UNESCO, 2023). At the same time, the evolving nature of scholarly communication—driven by trends such as open science, open access publishing, and AI-enhanced research—requires continuous adaptation of library services and professional knowledge to meet shifting academic demands (Corrall & Jisc, 2024).

Table 5: Challenges Affecting Digital Librarians in Supporting Teaching, Learning, and Research

S/N	Challenges Affecting Digital Librarians	Frequency	Percentage
1	Inadequate funding for digital library services	166	94.9
2	Poor Internet connectivity and low bandwidth	163	93.1
3	Inadequate ICT infrastructure and digital facilities	160	91.4
4	Erratic power supply	158	90.3
5	Inadequate training and continuous professional development	151	86.3
6	Insufficient digital literacy skills among library users	149	85.1
7	High cost of subscription to electronic databases and digital resources	156	89.1
8	Shortage of qualified digital librarians and ICT personnel	145	82.9
9	Resistance to technological change among staff and users	141	80.6
10	Cybersecurity threats and data privacy concerns	137	78.3
11	Rapid technological changes requiring constant upgrading of skills	147	84.0
12	Inadequate institutional support and policies for digital transformation	143	81.7

Strategies for Improving Digital Librarians' Effectiveness in Academic Libraries

The results show that respondents viewed all the listed strategies as effective in enhancing the performance of digital librarians in academic libraries, with each strategy scoring above the threshold mean of 2.50. The top-ranked strategy was ensuring reliable electricity and access to backup power ($\bar{x} = 3.54$, $SD = 0.74$), closely followed by strengthening internet connectivity and bandwidth ($\bar{x} = 3.51$, $SD = 0.76$) and increasing financial support for digital library infrastructure and services ($\bar{x} = 3.49$, $SD = 0.74$). Additional strategies receiving strong support included offering ongoing ICT and digital skills training, subscribing to up-to-date electronic databases, facilitating continuous professional development opportunities, and encouraging collaboration between librarians, faculty members, and ICT departments. With an overall grand mean of 3.44 and a standard deviation of 0.76, the data reflect a high degree of consensus among respondents that these measures would substantially improve the ability of digital librarians to support teaching, research, and learning in academic institutions. Enhancing the effectiveness of digital librarians in academic libraries demands thoughtful investments in technology, personnel development, institutional backing, and innovative tools. As universities increasingly navigate the digital landscape, it's crucial that digital librarians have the right resources and supportive environments to offer effective teaching, learning, and research assistance. One key approach is to boost funding for academic libraries. This investment allows for the acquisition of cutting-edge information and communication technology (ICT), subscriptions to electronic databases, digitization equipment, cloud-based management systems, and advanced digital resources. Sufficient funding ensures that libraries can provide seamless access to high-quality digital information and maintain innovative services (Association of College and Research Libraries [ACRL], 2023; International Federation of Library Associations and Institutions [IFLA], 2024).

Ongoing professional development represents another vital strategy for improving the capabilities of digital librarians. With the rapid evolution of digital technologies, librarians must receive regular training in important areas such as artificial intelligence (AI), data analytics, research data management, digital curation, cybersecurity, cloud computing, and digital scholarship. Engaging in workshops, conferences, certification programs, and professional networks helps digital librarians build new skills and effectively address the changing information needs within academic communities (Cox & Corral, 2024). Moreover, universities should prioritize hiring qualified digital librarians who possess strong ICT skills and facilitate opportunities for their career growth and professional certification. Strengthening technological infrastructure is also imperative. Academic libraries need reliable internet, high-speed networks, an uninterrupted power supply, modern computers, and secure digital platforms to ensure consistent access to electronic resources and virtual library services. Institutions must implement strong cybersecurity protocols, data backup systems, and digital preservation strategies to safeguard scholarly materials and ensure long-term access to digital collections (Jisc, 2024). Furthermore, incorporating artificial intelligence, machine learning, and cloud technologies into library operations can enhance information retrieval, tailor user services, and boost overall administrative efficiency. Effective digital librarianship also depends on institutional collaboration and supportive policies. Universities should promote cooperation between librarians, faculty, ICT specialists, and researchers when developing digital learning platforms, handling research data, and advancing open scholarship. At the same time, academic libraries need to enhance user education by offering ongoing training in digital and information literacy for both students and staff, ensuring more efficient use of digital resources (UNESCO, 2023). Such collaborative efforts and policy-backed strategies encourage innovation, elevate service standards, and establish digital librarians as key contributors to education, teaching, and research.

Table 6: Perceived Strategies for Improving Digital Librarians' Effectiveness in Academic Libraries

S/N	Strategies	Mean	SD	Decision
1	Increase funding for digital library infrastructure and services	3.49	0.74	Accept
2	Provide regular ICT and digital skills training for librarians	3.45	0.73	Accept
3	Improve internet connectivity and bandwidth in libraries	3.51	0.76	Accept
4	Provide stable electricity and alternative power supply	3.54	0.74	Accept
5	Subscribe to current electronic databases and digital resources	3.45	0.76	Accept
6	Recruit more qualified digital librarians and ICT personnel	3.39	0.79	Accept
7	Organize continuous professional development programmes	3.43	0.75	Accept
8	Strengthen institutional policies supporting digital transformation	3.38	0.77	Accept
9	Promote collaboration between librarians, faculty, and ICT units	3.43	0.77	Accept
10	Enhance cybersecurity measures and digital preservation practices	3.39	0.78	Accept
11	Increase user awareness and digital literacy programmes	3.43	0.76	Accept
12	Adopt emerging technologies such as Artificial Intelligence and cloud computing	3.36	0.79	Accept

Conclusion

The present study aimed to determine the changing roles of digital librarians in the universities with emphasis on the academic libraries in Imo State, Nigeria. It was found that apart from managing collections in the universities, digital librarians have evolved their roles to include knowledge creation. Some of the activities carried out by the digital librarians include: providing virtual reference services, teaching digital literacies, managing digital repositories, scholarly communication, offering research assistance, and e-learning support services among others. However, the study also revealed various challenges facing digital libraries which hinder effective digital library services in the academic libraries in Imo State. The challenges include: funding, lack of internet connection, insufficient ICT infrastructure, unstable power supply, lack of incentives, high cost of digital information resources, institutional policy, and a dynamic environment among others. Consequently, the study found that the digital libraries in the academic libraries in Imo State, Nigeria are not fully utilized to support teaching, learning, and research due to the aforementioned challenges. From the findings of the study on the academic libraries in Imo State, Nigeria, it is evident that in order to achieve effective digital libraries that support knowledge creation and sharing among the users there is a need for investment in infrastructure, continued professional development of digital librarians in support of the teaching and learning process in the institutions, institutional policies that support digital library services, and increased funding. Despite the fact that the study provides empirical evidence on digital librarianship in academic libraries in Imo State, Nigeria, the findings cannot be generalized due to various factors that affect the libraries in other states and country. Therefore, further studies can be carried out in other states and countries to reveal how digital libraries are utilized in different settings.

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