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Librarians' Perception and Readiness in Adopting AI Technology in Academic Libraries

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ABSTRACT

This research aims to analyze the knowledge and perceptions of librarians towards artificial intelligence (AI) technology in academic libraries in Rivers State, Nigeria. The research method used a survey approach involving 39 randomly selected librarians from academic institutions. Data were collected through a structured questionnaire and analyzed using descriptive statistics. The results showed that the majority of librarians had a basic understanding of AI and were aware of its potential to improve the efficiency of library services, such as procurement of library materials, prediction of search trends, and data management. However, several significant challenges were identified, including limited technological infrastructure, concerns about replacing traditional roles, and lack of training related to AI. The conclusion of this study is the importance of planning and capacity building strategies to ensure successful integration of AI in academic libraries. This research provides valuable insights for professional associations and policy makers in formulating strategies for adopting AI in libraries, as well as highlighting the need for training and competency development for librarians to face the digital era.

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1. INTRODUCTION

Artificial intelligence (AI) focuses on creating systems designed to perform tasks that usually demand native intelligence, including solving problems, making decisions, and processing natural language. These systems leverage data to learn and adapt dynamically, enhancing their functionality over time. Critical issues such as data privacy, security, and ethical implications remain significant obstacles to its full-scale adoption. Therefore, it is imperative for libraries to monitor AI advancements and align their services to meet emerging technological trends (Lund et al., 2020, Okunlaya et al., 2022). Ex-Libris highlights the unparalleled ability of AI systems to identify and process patterns at a scale beyond human capability (Ex-Libris, 2019).

Historically, libraries have been heralded as pillars of information and knowledge access. Yet, their adoption of automation and digital technologies has lagged behind other sectors, prompting calls for modernization to capitalize on digital advancements. This slower pace of transformation can be attributed to unique challenges, including constrained budgets, the imperative to preserve physical collections, and the necessity to accommodate patrons with varying levels of digital literacy (Awamleh & Hamad, 2022). Additionally, the fundamental ethos of librarianship centered on preservation and equitable access rather than profit has contributed to the measured approach toward digitization. Despite these obstacles, libraries are progressively overcoming barriers and adopting innovative digital solutions to enhance information access and knowledge dissemination (Alenezi, 2023; Meng et al.,2023). However, the integration of AI is not without its challenges, as issues related to data privacy, security, and ethical management remain prominent concerns that libraries must address (Asemi et al., 2020).

The field of artificial intelligence (AI) advances rapidly, and revolutionizes how people interact with technology. AI involves developing intelligent systems capable of perceiving, reasoning, and replicating human behavior (Hassani et al., 2020; Korteling et al., 2021). As AI technologies become more integrated into libraries, librarians face a growing need to acquire skills in data and AI literacy (Mani et al., 2021). Many libraries, the world over, have applied AI to various aspects of their library operations (Hussain, 2023; Owolabi et al., 2022). For instance, machine learning is being used for tasks such as automated resource categorization, collection management, cataloging, data entry, and generating personalized recommendations based on user activity, including search and borrowing histories (Cordell, 2020). Furthermore, tools like voice assistants, virtual assistants, and chatbots are increasingly employed in educational institutions to enhance library services, improve user engagement, and provide better support (Mckie & Narayan, 2019).

Several studies investigated the role of artificial intelligence (AI) in libraries. Libraries can provide innovative services such as advanced information retrieval and streamlined support for library activities through the aid of artificial intelligence, although significant challenges to AI adoption in African academic libraries, including unreliable electricity, a widening skills gap, fears of job displacement, and inadequate infrastructure (Yusuf et al., 2022). Similarly, AI poses concerns to traditional library systems while emphasizing its potential to revolutionize library services (Massis, 2018; Okunlaya et al., 2022).

Tait and Pierson highlight the potential for Library and Information Science (LIS) education to position itself at the intersection of human behavior, information ethics, and the responsible use of AI and robotics (Tait & Pierson, 2022). Cox, Pienfield and Rutter identify several areas where AI can significantly impact libraries, including machine-readable collections, advanced information retrieval tools, research generation, scholarly

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communication, and educational support (Cox et al., 2019).

McKie, Narayan and Kocaballi stress the influence of human-like traits and perceived personalities in voice assistants on user interactions and information retrieval (McKie, Narayan & Kocaballi, 2022). Yao, Zhang and Chen demonstrate the versatility of AI-driven robots like Xaiotu, which can address various library needs and provide virtual reference services (Yao et al., 2015). Kaushal and Yadav explore the integration of chatbot technology with existing library systems, highlighting its potential to enhance scholarly communication and research support (Kaushal & Yadav, 2022). Meanwhile, Modiba addresses challenges in records management due to the absence of efficient systems, advocating for the adoption of AI technologies such as automated digitization, classification, rapid information retrieval, and disposal (Modiba, 2021).

Massis contends that although AI is sometimes perceived as a challenge to conventional institutions like libraries, it also presents vast opportunities for improving library services (Massis, 2018). Asemi, Ko and Nowkarizi examines multiple facets of AI, including pattern recognition, expert systems, robotics, and natural language processing (Asemi et al., 2021). He underscores the significance of expert systems in library functions such as cataloging, classification, and reference services, demonstrating their potential to enhance efficiency and productivity. Similarly, Grbin highlight the essential role of librarians in the design and execution of automation solutions (Grbin et al., 2022). They advocate for librarians to be actively supported in collaborating with researchers, leveraging their specialized expertise to contribute meaningfully to machine learning projects. Harisanty provide a multidimensional perspective on AI adoption in libraries, examining insights from leaders, practitioners, and researchers (Harisanty et al., 2024).

De Leon, Flores and Alomo examined the adoption of Artificial Intelligence (AI) in Filipino academic libraries, analyzing librarians' perspectives, challenges, and opportunities (De Leon et al., 2024). The findings revealed that Filipino librarians view AI as a tool for enhancement rather than disruption, expressing a strong interest in training and incorporating AI into their daily tasks. Similarly, Subaveerapandiyan and Gozali examined the attitudes and awareness of AI among Indian library professionals (Subaveerapandiyan & Gozali, 2024). The findings revealed a general awareness of AI as a technology that enhances library services, and operations.

Huang investigated the use of AI applications in Taiwanese academic libraries through a mixed-method survey involving 472 academic librarians (Huang, 2024). The study highlighted the types of AI applications adopted and the factors influencing their integration, alongside challenges hindering broader adoption. Oyetola highlight the diverse perspectives among librarians regarding the adoption of AI technology in university libraries (Oyetola et al., 2023). While many recognize AI's potential to improve library operations by reducing human errors in repetitive tasks, concerns over job displacement persist as a major challenge. Similarly, Wood and Evans found that most respondents expected AI to have a significant impact on libraries over the next 30 years, particularly in resource discovery and referencing (Wood & Evans, 2018). Honghai argues that AI serves as a complement rather than a replacement for reference librarians, enabling them to meet the evolving technological demands of users (Honghai, 2020). The study underscores AI’s capability to rapidly process large volumes of data from various sources, allowing libraries to offer more personalized services.

Library and Information Science (LIS) professionals express several concerns about AI, including fears of job displacement, limited advancements specifically applicable to libraries, and issues surrounding privacy and data security. Cox, Pienfield and Rutter emphasize the need to harness AI to maximize societal benefits while ensuring fair and equitable access to

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information (Cox et al., 2019). Similarly, Garcia-Febo highlights the importance of libraries adopting a proactive stance in addressing these challenges (Garcia-Febo, 2019). The author advocates for the establishment of policies and guidelines that promote the ethical and responsible implementation of AI technologies.

Based on these considerations, this study aims to achieve three specific objectives: first, to assess librarians' knowledge and understanding of artificial intelligence (AI); second, to explore their attitudes and perceptions regarding the adoption and use of AI in library services; and third, to identify the key competencies and skills necessary for librarians to effectively integrate and utilize AI technologies in their professional practice.

2. METHODS

This study used a descriptive research design to describe the knowledge, perception, and readiness of librarians towards artificial intelligence (AI) technology in academic libraries. The descriptive design was chosen because the purpose of the study was to explain a particular phenomenon without manipulating variables (Atmowardoyo, 2018). Such a design allows researchers to gather quantifiable information that can be used for statistical inference on the target population through data analysis (Lo, 2023).

The study population consisted of librarians who were members of the Nigerian Library Association (NLA), Rivers State Chapter. The sample was selected using simple random sampling, with a total of 39 respondents spread across academic institutions in the region. This sample size was considered representative of the librarian population in Rivers State. The research instrument was a structured questionnaire consisting of 38 statements with a 4-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). The questionnaire was validated by experts in Library and Information Science at Rivers State University, Port Harcourt, to ensure its relevance and reliability. Reliability testing was conducted through a trial on 10 librarians outside the research area, resulting in a Cronbach's Alpha value of 0.86, indicating a high level of reliability.

Data were collected through an electronic survey distributed to respondents via email and online platforms, a method that has become increasingly prevalent in academic research due to its efficiency and broad reach (Evans & Mathur, 2018). The questionnaire was distributed to 45 librarians, and 39 of them successfully completed the questionnaire completely (response rate 86.7%). Secondary data were also collected from relevant literature, including journal articles, books, and online sources related to AI in libraries. Data were analyzed using descriptive statistics, including mean and standard deviation (SD). Statements with a mean value below 2.5 were considered insignificant, while statements with a mean value above 2.5 were considered to have a significant influence or relevance.

3. RESULTS AND DISCUSSION

3.1. What is the level of AI-related knowledge among Library and Information Science (LIS) professionals?

This study aims to explore the level of knowledge of librarians regarding artificial intelligence (AI) technology in academic libraries. Knowledge of AI is one of the main factors in preparing librarians to face the digitalization era. Data collected through a structured questionnaire revealed respondents' views on various AI applications in library services.

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Table 1. AI-related knowledge of Library and Information Science (LIS) professionals.

Statements	Mean	SD
AI is used to find articles	2.84	0.90
AI is used in optical character recognition and the preservation of documents	2.73	1.11
AI is used in indexing	2.88	1.00
AI is used in reference services in libraries	3.83	1.06
AI predicts readers' book search trends	3.61	0.89
AI is used in the acquisition of library materials	3.74	1.06
AI is used in library decision support systems	3.51	0.97
AI is used in language translation	2.95	0.80
AI is used in the writing of systematic literature reviews	3.46	1.11
AI is used in search engines	3.34	0.68
AI is used in library databases	3.55	1.13
AI is used in library security and surveillance	3.05	0.96
AI is used in bibliographies and anthologies	3.10	0.93
AI is used to find citations	3.56	0.94
AI is used in research data management	3.26	0.93
AI is used in content summarization	3.09	0.96

The findings from the questionnaire reveal key insights into the awareness and perception of AI technologies among LIS professionals. Table 1 highlights the level of awareness regarding AI's application in libraries, indicating that the respondents were familiar with its use in the field. The results further demonstrate a consensus among participants that AI plays a crucial role in improving the effectiveness and efficiency of library services. Respondents agreed that AI empowers libraries to deliver enhanced and dynamic services, meeting the evolving needs of their users.

The growing awareness of artificial intelligence (AI) among library professionals reflects its transformative potential in enhancing library operations and services. AI is widely regarded as valuable in automating routine and labor-intensive tasks such as reference services, acquisitions, citation management, and predicting users' search behaviors. It also supports cataloging and classification processes that have traditionally required significant human effort (Chaoying, 2021). AI's capabilities extend to supporting research by offering subject expertise, enabling swift and precise information retrieval, and analyzing large datasets to uncover patterns, trends, and predictions that enhance the research process.

Several studies have emphasized the diverse applications of AI in libraries, particularly in technical services. For example, AI has been shown to enhance cataloging, classification, indexing, referencing, and acquisitions (Golub, 2021; Mahmud, 2024). It also improves the functionality and accuracy of digital library search engines (Agwunobi & Umoren, 2019). Furthermore, AI has been associated with advancements in information literacy instruction, personalized learning, and instructional support (Honghai, 2020; Yueh et al., 2020), Its application extends to areas such as library marketing strategies and content generation, offering new possibilities for engagement and knowledge creation (Omehia & Mmejim, 2020; Hilt, 2017).

3.2. What are the attitudes and perspectives of librarians towards artificial intelligence?

In addition to technical knowledge, librarians' attitudes and perspectives towards AI are also the main focus of this study. Positive attitudes towards AI can encourage the adoption of this technology in libraries, while psychological or practical barriers can slow down

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implementation. Therefore, a deep understanding of librarians' views towards AI is essential to formulating effective adoption strategies.

Table 2. Attitudes and perspectives of LIS professionals towards AI.

Statements	Mean	SD
AI robots can work alongside librarians in the future	2.51	1.07
AI can bridge librarian performance gaps	2.58	1.02
AI makes library staff lazy	3.59	0.90
Budgeting is an issue in adopting AI in libraries	3.20	0.94
The lack of LIS professionals' skills and knowledge is the reason for not adopting AI in libraries	3.30	1.09
AI is a threat to librarians' employment	3.82	1.20
AI robots can fill librarian shortages	3.13	1.18
Librarian roles can be performed more effectively by AI robots	3.00	1.04
The scarcity of vendors specializing in AI is the reason for not adopting AI in libraries	3.28	0.91
The high energy demand for AI technology is the reason for not adopting AI in libraries	3.55	0.82

Table 2 illustrates the views of Library and Information Science (LIS) professionals regarding artificial intelligence (AI). The findings highlight apprehensions about potential declines in productivity and risks to job security linked to AI integration. Additionally, several challenges to adopting AI in library settings were identified, including the high energy requirements of AI technologies, insufficient AI expertise among LIS professionals, a scarcity of specialized AI vendors, and budgetary limitations impeding implementation.

The findings on library professionals' attitudes and perceptions toward AI reveal a strong appreciation for the convenience and efficiency it offers. Librarians believe AI can significantly simplify tasks, potentially bridging performance gaps among professionals. Despite these concerns, the findings also reveal a generally positive attitude toward AI, particularly in terms of its capacity to enhance operational efficiency and streamline routine tasks.

Many librarians acknowledged that AI could play a crucial role in bridging performance disparities among staff by automating repetitive functions and accelerating service delivery (Chen & Shen, 2020; Yu et al. 2019). This recognition of AI's potential aligns with existing literature, which underscores its adaptability, efficiency, and capacity to support innovative library services. Nonetheless, for libraries to fully benefit from AI technologies, it is essential to address persistent structural barriers, including inadequate technical skills, high operational costs, limited vendor options, and insufficient institutional funding (Nguyen, 2020; Oladokun et al., 2023).

3.3. What competencies and skills are essential for LIS professionals to thrive in the era of AI?

In the AI era, LIS professionals are required to have relevant technical competencies and skills to remain competitive and relevant. These skills include not only technical abilities such as programming and data management, but also the ability to adapt to new technologies. Identifying these essential skills is an important step in preparing librarians for the future.

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Table 3. Competencies and skills essential for LIS professionals in the era of AI.

Statements	Mean	SD
Internet applications	3.50	0.88
Programming skills	3.49	0.85
Computing and networking	3.63	0.84
Cyber security and network management	3.75	0.74
Data quality control	3.78	0.69
Electronic communication	3.75	0.78
Hardware and software	3.81	0.71
Data mining	3.14	1.00
Data curation	3.73	0.67
Database management systems	3.51	0.88
Designing AI mechanisms	2.88	1.13
Data analysis and algorithms	3.36	1.00

Table 3 outlines the essential skills and competencies needed by library professionals to thrive in the AI-driven era. These include proficiency in hardware and software, expertise in data quality control, and adeptness in electronic communication. Key technical skills encompass cybersecurity and network management, data curation, computing, and networking. Mastery of database management systems, internet applications, programming, and AI mechanism design is also emphasized. Additionally, LIS professionals are expected to possess capabilities in data analysis, algorithms, and data mining to effectively navigate the demands of the AI era.

The findings related to the competencies required of librarians in the era of artificial intelligence (AI) underscore the growing importance of AI in shaping the present and future of library services. Respondents in this study emphasized the urgent need for librarians to acquire a diverse set of AI-related skills in order to remain effective and relevant in a rapidly evolving digital environment. Among the most frequently cited competencies were data quality control, electronic communication, data analytics, library management systems, computing, networking, cybersecurity, and programming. These technical proficiencies are seen as foundational to enabling librarians to work alongside intelligent systems, ensure the integrity and accuracy of digital information, and facilitate seamless access to library resources through technologically enhanced platforms.

In addition to technical expertise, the findings highlight the necessity of proficiency in internet-based applications and data mining techniques, which are essential for retrieving, organizing, and interpreting large volumes of information efficiently. Such competencies allow librarians not only to manage digital collections but also to anticipate user needs through predictive analytics and user behavior modeling. Furthermore, as libraries continue to evolve into knowledge hubs integrated with smart technologies, the ability to adapt to and apply AI tools becomes increasingly critical for strategic decision-making and service innovation.

These results are in line with previous studies that have underscored the importance of information and communication technology (ICT) competencies for LIS professionals in the digital age (Oyedokun et al., 2018). Khan & Bhatti (2017) further emphasize the need for deep professional expertise in managing digital libraries, including familiarity with metadata standards, content curation, and user interface design. Moreover, the significance of soft skills, such as communication, presentation, marketing, and leadership, is also well-documented in the literature, with researchers like Kulkarni et al. (2017) arguing that such abilities are indispensable for librarians seeking to navigate complex organizational

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environments and advocate effectively for the integration of AI technologies in their institutions.

4. CONCLUSION

This study explored librarians' perspectives, revealing that they often demonstrated characteristics of early technology adopters and showed a strong willingness to incorporate artificial intelligence (AI) into library services. The findings indicated that these professionals were aware of the necessary skills for AI implementation, reflecting their enthusiasm and preparedness to take an active role in its adoption. However, the research also identified concerns about AI potentially threatening job security, with fears that automation could replace many traditional roles within the profession. The study indicates the recognition among LIS professionals of the influence of AI across various library services, as demonstrated by its positive impacts in multiple library-related applications. It is worth noting, however, that the research was conducted specifically among LIS professionals in Rivers State, Nigeria, and may affect generalizing the findings to other states and regions. Consequently, this study serves as an important preliminary exploration, laying the groundwork for future research. Broader studies with larger, more diverse samples could be conducted to expand the scope and understanding of the application of artificial intelligence in libraries.

The study highlights critical barriers hindering the widespread adoption of AI in libraries. Key challenges include insufficient AI-related skills, limited financial resources, high energy demands, and a lack of specialized AI vendors. Despite these hurdles, LIS professionals recognize the essential competencies needed for successful AI integration. This underscores the need to embed AI education into LIS curricula, equipping professionals to address emerging challenges. The findings provide actionable insights for policymakers and LIS practitioners, paving the way for improved library services and operational effectiveness. Furthermore, this research contributes to the growing body of knowledge on AI in LIS, serving as a cornerstone for future studies in this dynamic area.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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