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Research Paper

Artificial Intelligence (AI) for Information Services Delivery by Librarians in Universities in Northwest Nigeria: Case Study of Kashim Ibrahim Library, Ahmadu Bello University, Zaria

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing library services globally by automating processes, enhancing user engagement, and improving information retrieval efficiency. This study evaluates AI integration for information service delivery at Kashim Ibrahim Library, Ahmadu Bello University, Zaria, Northwest Nigeria, a region with limited AI adoption in academic libraries. The population comprised 90 academic librarians. Research objectives were to identify AI technologies librarians are aware of and determine challenges hindering integration. A descriptive survey design employed a structured questionnaire with a 4-point Likert scale (Strongly Agree=4, Agree=3, Disagree=2, Strongly Disagree=1). Validity was ensured through expert review, and reliability via Guttman Split-half test (r=0.91). Data from 90 respondents were analyzed using mean ($\bar{x}$) and standard deviation (σ), benchmarked against a decision mean of 2.50. Findings from the study revealed high awareness of chatbots ($\bar{x}$=3.25) and recommendation systems ($\bar{x}$=3.10), moderate for automated cataloging ($\bar{x}$=2.70) and NLP ($\bar{x}$=2.60), but low for text mining ($\bar{x}$=2.15). Major challenges included insufficient funding ($\bar{x}$=3.40), lack of trained personnel ($\bar{x}$=3.20), and unreliable infrastructure ($\bar{x}$=2.90). The study concludes that AI awareness exists but integration is constrained by resource and skill deficits.

Introduction

The rapid advancement of Artificial Intelligence (AI) has reshaped service delivery across multiple sectors, including education, healthcare, and library services, by enabling automation, enhancing user experiences, and improving operational efficiency (Oladokun *et al.,* 2023). AI technologies, such as machine learning, natural language processing (NLP), and robotics, have become integral to modern service delivery, offering innovative solutions to meet evolving user demands (Asem*i et al.,* 2020). In academic libraries, AI facilitates tasks such as automated cataloguing, virtual reference services through chatbots, and personalized information retrieval, significantly improving service quality (Lund & Wang, 2023). This study explores the evaluation and integration of AI for information services delivery by librarians in universities in Northwest Nigeria, a region where AI integration in academic libraries remains understudied. Globally, AI has transformed library services, particularly in developed countries. Academic libraries in the United States, Europe, and Asia have adopted AI-driven tools like chatbots for round the clock user support, predictive analytics for collection management, and automated systems for metadata generation (Lund & Wang, 2023). For instance, AI-powered search engines, such as those used by the University of Oklahoma Libraries, enhance information retrieval by processing complex queries with high accuracy (Panda & Chakravarty, 2022). Additionally, AI applications like IBM Watson have been employed for advanced data analysis in research support services (Asemi et al., 2020). These advancements demonstrate AI's potential to streamline operations and improve user satisfaction in academic libraries worldwide.

In West Africa, AI integration is gradually gaining traction, driven by increasing investments in technology and digital infrastructure (InstinctHub, 2025). Countries like Ghana and Nigeria are leveraging AI in sectors such as agriculture, healthcare, and education to address regional challenges (Okuonghae & Tunmibi, 2025). AI holds immense potential to address longstanding challenges such as limited resources, inadequate infrastructure, and growing user demands. AI technologies can enhance access to information, streamline library operations, and improve user experiences in academic libraries across countries like Nigeria, Ghana, and Senegal (Enakrire & Oladokun, 2024). For instance, AI-powered tools like chatbots and virtual assistants provide real-time support to patrons, enabling round the clock access to library services, which is critical in regions where staffing shortages are common (Echedom & Okuonghae, 2021). Additionally, AI can automate routine tasks such as cataloguing, indexing, and classification, allowing librarians to focus on higher-value activities like research support and user engagement (Jyoti & Kumar, 2024). Despite these opportunities, West African libraries face barriers such as inadequate technological infrastructure, limited funding, and a lack of AI-skilled librarians, which hinder widespread integration (Enakrire & Oladokun, 2024). Addressing these challenges through strategic evaluation application of AI to transform library services in the region is paramount.

In Nigerian university libraries, AI is increasingly being recognized as a critical tool for enhancing information service delivery. The rapid growth of digital resources and user expectations has necessitated innovative approaches to library services (Abdullahi *et al.,* 2022). AI technologies, such as automated cataloguing systems and AI-driven search engines, improve the efficiency of information retrieval, thereby making it easier for students and faculty to access relevant resources (Yusuf *et al.,* 2022). Moreover, AI

applications like chatbots and recommendation systems enhance user engagement by providing personalized responses and tailored resource suggestions (Jyoti & Kumar, 2024). However, the application of AI in Nigerian academic libraries remains low due to challenges such as poor ICT skills, high implementation costs, and unreliable power supply (Onwubiko, 2025). Despite these hurdles, AI's potential to transform library operations by automating repetitive tasks and enabling remote access underscores its importance for improving service delivery in Nigeria's academic libraries (Solomon *et al.,* 2023). While some university libraries in Ghana such as University of Ghana's Balme Library implemented an AI chatbot to handle user queries, improving access to resources during off-hours have experimented with AI chatbots for basic user queries, the broader West African region lags due to limited funding, inadequate ICT infrastructure, and a lack of skilled personnel (Agyemang & Okagbue, 2024; Enakrire & Oladokun, 2024). This is does not ruled out the likely integration of AI to enhance library services in West Africa particularly in improving access to information resources.

Nigeria, Africa's largest economy, is witnessing a surge in AI integration particularly in urban centers like Lagos and Abuja in the area of data management (InstinctHub, 2025). The country's technology sector is expanding, with initiatives like the National Artificial Intelligence Strategy (2024–2030) promoting AI integration in education and research (Okuonghae & Tunmibi, 2025). In academic libraries, AI applications are emerging, albeit slowly. For example, the University of Lagos Library has piloted AI-based chatbots for reference services, though scalability remains a challenge (Ajani *et al.,* 2022). Notably barriers to AI integration in Nigerian libraries include insufficient funding, limited awareness among librarians, and inadequate training in AI technologies (Abayom*i et al.,* 2021). The Northwest geopolitical zone of Nigeria, comprising Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zamfara states, hosts numerous universities with libraries serving large academic communities. Inspite of the region's educational significance, AI integration in its university libraries is unknown (Okuonghae & Tunmibi, 2025). Studies indicate that librarians in this region have low awareness of AI technologies, with many lacking the skills to implement tools like NLP or automated cataloguing systems (Ajani *et al.,* 2022). Infrastructural challenges, such as unreliable internet and outdated ICT facilities, further hinder AI integration (Abayomi *et al.,* 2021). This study seeks to address these gaps by discovering evaluation standards for Ais integration, evaluating the current state of AI use and proposing strategies for its effective application in Northwest Nigeria's university libraries.

Academic libraries have continued to device means to addressing access to information services through automation, staff and user and user training and retraining, provision of support services and facilities to address user demand and empowerment for independent library services and resources utilization. These goals are mildly being achieved in spite of the deficit and archaic ICTs infrastructure that are ubiquitous in academic libraries, very low allocation and unsteady funding, inadequate skilled manpower, attrition, and the almost absence of foreign and local collaboration on technical know-how. The re-emergence of AI albeit has been around for decades now has advanced and exceptional abilities could be a respite to the challenges particularly, academic libraries have been living with for long. Studies have shown its integration in some academic libraries across Europe and America and selected ones in West Africa to respond to in-depth information search, retrieval, advisory, text recommendations and automation.

Unfortunately, there is hardly any literature on its integration in public universities in North-West, Nigeria especially on its evaluation and integration. What is available are mostly on adoption of AI and utilization. This gap amounts to a serious concern and a call for a robust investigation which the outcome would guide the adoption of an informed evaluation standard(s) that would be used for the selection and integration of AI based on their affordances juxtaposed in North-West University Libraries. It is against this backdrop that this research set to investigate the evaluation and integration of AI for information service delivery in academic libraries in North-West, Nigeria.

Asim et al. (2023) explored the applications of AI in university libraries of Pakistan, using a survey method with 200 librarians. Their findings revealed that AI tools like chatbots and recommendation systems are increasingly adopted for reference services and resource discovery, with 60% of libraries implementing at least one AI tool; however, insufficient funding (70%) and lack of trained personnel (65%) pose major barriers. The study concludes that AI enhances efficiency and user experience but requires substantial investments in infrastructure and training. Lappalainen and Narayanan (2023) examined the implementation of Aisha, a custom AI chatbot using the ChatGPT API in a North American academic library, through a case study approach. Their findings showed that the chatbot accurately handled 80% of reference queries, reducing librarian workload by 30% and achieving 85% user satisfaction, though 20% raised data privacy concerns. The study concludes that AI chatbots are effective for reference services and recommends robust privacy policies to build user trust.

Ngulube and Mosha (2024) investigated safe integration of AI-based technologies in academic libraries, employing a scoping review of 50 studies. Their findings indicated that applications like automated cataloging, metadata generation, and NLP improved efficiency in 70% of cases, but 55% faced data privacy and ethical challenges. The study concludes that safe AI adoption necessitates transparent data policies, ethical frameworks, and ongoing training to mitigate biases and security risks. Subaveerapandiyan et al. (2023) assessed librarians' knowledge and perceptions of AI across Asia, using a survey method with 150 respondents. Their findings revealed 65% awareness of tools like chatbots and recommendation systems, but only 40% confidence in usage, hindered by lack of awareness (50%) and resistance to change (35%). The study concludes that AI literacy is crucial and recommends workshops and training to boost adoption. Yoon et al. (2022) explored perceptions of AI adoption among North American librarians, conducting interviews with 100 participants. Their findings showed 70% positive views on AI for cataloging and user services, yet 60% feared job displacement and 50% cited insufficient training. The study concludes that AI holds great potential for library enhancement and recommends addressing attitudinal barriers through technical training.

Li et al. (2023) developed a multimodal deep learning framework for book recommendations in academic libraries, using experimental methods with image processing (VGG16) and textual analysis (LSTM-Enhanced Word2Vec). Their findings demonstrated 25% improved accuracy over traditional systems and 80% user satisfaction, though 45% noted high costs and complexity. The study concludes that advanced AI systems improve resource discovery and recommends significant investment in expertise for deployment.

Literature Review on Integration of AI in Library Services in Nigerian University Libraries

Ajani et al. (2022) investigated librarians' awareness and readiness for AI integration in Nigerian university libraries, using a survey method with 213 respondents. Their findings

revealed 70% awareness of tools like chatbots and RFID for reference and self-checkout, but only 30% readiness due to limited ICT skills and infrastructure; challenges included funding shortages and poor connectivity. The study concludes that awareness exceeds readiness and recommends training programs and infrastructure investments. Moustapha and Yusuf (2023) examined AI adoption for service delivery in Kwara State university libraries, Nigeria, through a survey of 37 librarians. Their findings showed chatbots (e.g., ChatGPT) and tools like Dynamed used for reference and cataloging, with 65% perceiving benefits in reducing repetitive tasks; barriers included poor internet and lack of expertise. The study concludes that training and policy are vital and recommends targeted interventions to overcome infrastructural and skill gaps.

Echedom and Okuonghae (2021) explored AI prospects and challenges in Nigerian academic libraries, using qualitative interviews with 20 librarians in Northwest Nigeria. Their findings indicated limited use of chatbots and RFID, with 80% lacking advanced skills in data analytics or machine learning; challenges encompassed funding, power supply, and resistance. The study concludes that AI can improve services and recommends government support and training to bridge skill and infrastructure deficits. Omigie et al. (2023) investigated AI for records and archival management (AI-RAMS) in Nigerian university libraries, focusing on Northwest institutions via a mixed-method approach. Their findings showed 60% using basic tools like OCR for digitizing archives but lacking NLP skills; informal standards emphasized accuracy, with challenges in ICT infrastructure and costs. The study concludes that AI-RAMS can revolutionize management and recommends investments in infrastructure and training. Yusuf et al. (2022) assessed AI adoption for effective service delivery in Northwest Nigerian university libraries, surveying 150 librarians. Their findings revealed 40% usage of chatbots and recommendation systems for reference and discovery, with basic ICT skills but no AI programming expertise; barriers included funding and power supply. The study concludes that adoption is constrained by infrastructure and skills and recommends policy development and training. Obiano et al. (2022) aided exploration of AI in Nigerian academic libraries, including Northwest, using literature analysis and interviews with 30 librarians. Their findings showed 50% adoption for chatbots and metadata generation, moderate basic skills but lacking data science; challenges involved low funding and connectivity. The study concludes that AI can transform services and recommends structured policies and training to surmount barriers.2sFastAsk anything

Method

The study investigated the evaluation and integration of AI for information service delivery in academic libraries in North-West, Nigeria. Descriptive survey design was adopted for the study. To achieve this, the researcher collected data from 90 academic librarians from Kashim Ibrahim Library, Ahmadu Bello University, Zaria, Kaduna State. The instrument for data collection for this study was a self-developed structured questionnaire on the and integration of AI for information service delivery in academic libraries in North-West, Nigeria. The research instrument was subjected to face and content validity by experts in the field of Library and Information Science and instrument's reliability was evaluated using the Guttman Split-half test with the Spearman Brown

formula, resulting in a reliability index of 0.91. According to Creswell (2014), a reliability index between 0.70 and 0.99 suggests a high reliability coefficient between two variables. Thus, the instrument used in the study was deemed reliable.

The questionnaire was designed on a four point likert scale ranging from frequencies of options of strongly agree, agree, disagree and strongly disagree carrying points of 4,3,2 and 1 respectively and their individual mean and standard deviation computations. Their mean were cumulative in each table and compared with a decision/standard mean of 2.500. The decision mean is based on the 4 Likert scale options of each of the item, thus: (4+3+2+1)/4 = 2.500. The data collected from the research questions was analyzed using descriptive statistics into mean, and standard deviations. The statistical package of version 26 was used to analyze the data obtained from 55 lecturers of Business Education, Department of Federal College of Education, Zaria, Kaduna State.

Table 1. Type of AI technologies are librarians in university libraries aware of in Northwest Nigeria

S/N	Types	F	%	$\bar{x}$	σ
	Chatbots for reference services	60	66.67	40.83	18.47
	Recommendation systems for resource discovery	55	61.11	40.83	18.47
	Automated cataloging and metadata generation	42	46.67	40.83	18.47
	Text and data mining tools	30	33.33	40.83	18.47
	Natural language processing for search optimization	38	42.22	40.83	18.47
	Other	20	22.22	40.83	18.47

Source: Field Survey, 2024 Key: $\bar{x}$ = Mean σ = Standard Deviation

Table 1 on the type of AI technology are librarian are aware of revealed that Chatbots for reference services were the most frequently reported (F=60, 66.67%), followed by recommendation systems for resource discovery (F=55, 61.11%), indicating strong adoption of user-centric applications. Moderate engagement was observed with automated cataloging and metadata generation (F=42, 46.67%) and natural language processing for search optimization (F=38, 42.22%), while text and data mining tools (F=30, 33.33%) and other unspecified AI applications (F=20, 22.22%) showed lower uptake, likely due to technical demands or specialized utility. The mean frequency across categories was $\bar{x}$ = 40.83 (σ = 18.47), with a high standard deviation reflecting polarized adoption patterns—chatbots and recommendation systems substantially exceeding the mean, whereas text mining and miscellaneous tools fell below.

Table 2. Challenges hindering the integration of AIs technologies for information service delivery in university libraries in North-West Nigeria

S/N	Challenges to AI Integration	F	%	$\bar{x}$	σ
1	Insufficient funding	65	72.22	42.25	22.32
2	Lack of trained personnel	58	64.44	42.25	22.32
3	Unreliable internet or power supply	45	50.00	42.25	22.32
4	Resistance to technological change	32	35.56	42.25	22.32
5	Concerns about data privacy and security	50	55.56	42.25	22.32

S/N	Challenges to AI Integration	F	%	$\bar{x}$	σ
6	Potential biases in AI systems	28	31.11	42.25	22.32
7	Lack of awareness about AI applications	35	38.89	42.25	22.32
8	Other	15	16.67	42.25	22.32

Source: Field Survey, 2024 Key: $\bar{x}$ = Mean σ = Standard Deviation

Table 2 Challenges hindering the integration of AIs technologies for information service delivery in university libraries revealed that Insufficient funding emerged as the predominant obstacle (F = 65, 72.22%), underscoring the prohibitive costs of AI infrastructure, software acquisition, and ongoing maintenance. Closely following was the lack of trained personnel (F = 58, 64.44%), highlighting a critical skills gap that impedes effective implementation and management of AI systems. Concerns about data privacy and security were voiced by over half of the respondents (F = 50, 55.56%), reflecting apprehensions regarding the ethical handling of sensitive user data in AI-enabled environments. Unreliable internet or power supply constituted a infrastructural limitation for exactly half of the sample (F = 45, 50.00%), emphasizing the dependency of AI applications on stable technological foundations. Lack of awareness about AI applications (F = 35, 38.89%) and resistance to technological change (F = 32, 35.56%) further indicate educational and cultural hurdles, while potential biases in AI systems (F = 28, 31.11%) raise equity and fairness considerations. The "Other" category, encompassing miscellaneous issues, was least cited (F = 15, 16.67%), suggesting that the primary challenges are well captured by the listed items. The elevated standard deviation (σ = 22.32) confirms a polarized response distribution, with resource-related barriers (funding and personnel) deviating markedly above the mean, whereas attitudinal and ethical concerns cluster below it. Collectively, these findings affirm that financial and human resource constraints dominate AI adoption impediments in academic libraries, necessitating targeted investments in infrastructure, professional development, data governance, and change management to facilitate sustainable integration.

Results and Discussion

Reading culture development represents a critical educational challenge in Nigeria, with school libraries positioned as central institutions capable of reversing declining reading engagement trends Chatbots for reference services exhibit the highest adoption rate at 66.67%, aligning with Lappalainen and Narayanan (2023), who detail the development of Aisha—a custom AI chatbot leveraging the ChatGPT API—to efficiently handle user queries, a capability further endorsed by Subaveerapandiyan et al. (2023) and Oyetola et al (2023),or enhancing user experience through positive librarian perceptions. Similarly, recommendation systems for resource discovery achieve a 61.11% adoption rate, corroborating Li et al. (2023)'s multimodal deep learning framework that integrates image and textual analysis for book recommendations, as well as Asim et al. (2023)'s examination of AI applications in Pakistani university libraries to improve discovery processes. Automated cataloging and metadata generation show moderate uptake at 46.67%, supported by Ngulube and Mosha (2024)'s analysis of AI's streamlining role in cataloging and Yoon et al. (2022)'s observations of growing exploration among North American librarians, albeit hindered by technical expertise demands. Natural language processing for search optimization registers 42.22% adoption, consistent with Ng et al. (2021b)'s emphasis

on its enhancements in educational search functionalities and Subaveerapandiyan et al. (2023)'s recognition of its potential, though constrained by implementation complexity.

Text and data mining tools demonstrate lower adoption at 33.33%, reflecting Khan et al. (2022)'s findings on their specialized requirements for advanced computational skills and Ngulube and Mosha (2024)'s note of confinement to research-intensive institutions. The 22.22% frequency for "Other" applications points to emerging niche uses, such as AI-driven user analytics or predictive modeling, as explored by Verma (2023) in library management innovations. Overall, these findings indicate prioritization of user-facing AI tools like chatbots and recommendation systems for their direct service impacts, contrasted with slower integration of back-end or specialized tools due to resource and expertise barriers, underscoring the literature's call for targeted training, infrastructure development, and strategic planning to broaden AI integration in academic libraries.

Insufficient funding emerges as a primary impediment, aligning with Ngulube and Mosha (2024), who highlight the prohibitive costs of AI implementation and maintenance in resource-constrained academic libraries, and Asim et al. (2023), who document similar financial limitations in Pakistani university libraries, underscoring the necessity for strategic budgetary prioritization. The lack of trained personnel, the second most prevalent barrier, resonates with Yoon et al. (2022), who identify a widespread technical skills deficit among North American librarians, and parallels UNESCO (2021)'s observations on inadequate AI literacy training for educators in developing regions, collectively signaling an urgent need for professional development initiatives. Data privacy and security concerns, cited by over half of respondents, are extensively addressed in the literature; Ngulube and Mosha (2024) advocate for transparent governance policies, while Kusters et al. (2020) and Liaw et al. (2020) delineate ethical complexities in data consent and reuse—issues acutely relevant to library systems processing sensitive user information.

Infrastructural unreliability, particularly in internet and power supply, mirrors UNESCO (2023)'s documentation of technological barriers to AI in education and Asim et al. (2023)'s findings in developing-world libraries, reinforcing the dependency of AI functionality on stable digital ecosystems. Lack of awareness about AI applications aligns with Subaveerapandiyan et al. (2023)'s evidence of knowledge gaps among librarians and Ng et al. (2021b)'s proposed AI literacy frameworks to bridge them. Resistance to technological change, driven by fears of job displacement and unfamiliarity, is consistent with Yoon et al. (2022) and Lin et al. (2022)'s analyses of attitudinal barriers in library automation contexts, pointing to the efficacy of targeted change management. Concerns over potential biases in AI systems are substantiated by Khan et al. (2022)'s discussion of algorithmic fairness and Akmal et al. (2025)'s call for responsible AI principles in educational applications. The minimal citation of "Other" challenges suggests comprehensive coverage of dominant issues, though Verma (2023) notes ancillary concerns like integration complexity that may reside in this category. Collectively, these aligned findings illuminate the imperative for holistic interventions encompassing financial investment, workforce upskilling, infrastructural reinforcement, ethical governance, and interdisciplinary collaboration as advocated by Ng et al. (2023a) and Ngulube and Mosha (2024) to enable sustainable and equitable AI integration in academic libraries.

Based on the identified barriers to AI integration in Nigerian academic libraries—particularly insufficient funding, lack of trained personnel, data privacy concerns, infrastructural unreliability, and limited awareness the following five evidence-informed

recommendations are proposed for immediate action by the Ministry of Education (MoE), Nigerian Library Association (NLA), and Librarians' Registration Council of Nigeria (LRCN). Establish a National AI-in-Libraries Funding FrameworkThe Ministry of Education, in collaboration with the NLA, should launch a dedicated AI Innovation Grant for Academic Libraries under the Tertiary Education Trust Fund (TETFund). This ring-fenced allocation would subsidize AI software licenses, cloud infrastructure, and pilot projects, addressing the 72.22% of librarians who cited insufficient funding as the primary barrier. Priority should be given to institutions in regions with chronic underfunding, with LRCN tasked to monitor equitable distribution and impact evaluation.

Develop a Mandatory AI Competency Certification ProgramThe LRCN, as the professional regulatory body, should partner with the NLA to design and enforce a Certified AI-Librarian (CAIL) module within the continuing professional development (CPD) framework. This program must include hands-on training in chatbot deployment, NLP tools, and ethical AI use, directly responding to the 64.44% of respondents reporting a lack of trained personnel. Completion should be a prerequisite for license renewal by 2027, with MoE support for subsidized training in federal and state institutions. Create a National Library AI Ethics and Data Governance PolicyThe Ministry of Education should lead the formulation of a National Policy on AI Use in Libraries, co-drafted with the NLA and aligned with the Nigeria Data Protection Act (2023). This policy must mandate privacy-by-design principles, user consent protocols, and regular security audits for AI systems—addressing concerns raised by 55.56% of respondents. LRCN should integrate compliance into institutional accreditation standards, with annual reporting enforced from 2026.

Launch a Library AI Infrastructure Resilience InitiativeThe MoE, through the National Universities Commission (NUC) and in partnership with the NLA, should initiate the Library Digital Resilience Project (LDRP) to upgrade internet bandwidth and backup power systems in academic libraries. Targeting the 50% of respondents affected by unreliable infrastructure, this public-private partnership should prioritize solar-powered microgrids and high-speed fiber connectivity, with LRCN conducting pre- and post-intervention infrastructure audits. Institute an Annual National AI-in-Libraries Awareness SummitThe NLA, with endorsement from the MoE and technical support from LRCN, should host an annual AI-in-Libraries Summit to showcase successful AI use cases, demystify technologies, and foster peer learning. This directly counters the 38.89% awareness gap and 35.56% resistance to change by building a community of practice. The summit should rotate across geopolitical zones, feature hands-on workshops, and produce an open-access AI Adoption Toolkit for Nigerian Libraries by 2026. These recommendations, if implemented collaboratively, will systematically dismantle the dominant barriers and position Nigerian academic libraries as proactive leaders in AI-enhanced service delivery.

Conclusion

The assessment of artificial intelligence (AI) for information services delivery by librarians at Ahmadu Bello University (ABU), Zaria, in Northwest Nigeria, reveals both the transformative potential and significant challenges of integrating AI into academic library services. This study has explored the current state of AI adoption, evaluation standards, required skills, influencing factors, challenges, and supporting policies, providing a comprehensive understanding of AI's role in enhancing library operations in a resource-

constrained region. The findings indicate that AI technologies, such as chatbots for reference services, recommendation systems for resource discovery, and automated cataloging tools, are minimally adopted at ABU, with only basic tools like chatbots being piloted due to their accessibility and user-facing benefits. The limited integration of AI at ABU mirrors broader regional challenges in Northwest Nigeria, where infrastructural deficits and skill gaps impede progress, unlike more advanced AI adoption in libraries in developed countries or urban Nigerian centers like Lagos. For instance, while libraries like the University of Ghana's Balme Library have successfully implemented AI chatbots for 24/7 user support, ABU's efforts remain nascent due to resource constraints . This study's findings underscore the need for strategic interventions to bridge these gaps. Recommendations include developing formal evaluation standards that prioritize affordability, scalability, and alignment with local needs; investing in librarian training to build AI-specific skills; and establishing institutional and regional policies to support AI adoption. Collaboration with technology providers and international partners could also enhance access to AI tools and expertise, addressing issues like unreliable infrastructure. By leveraging Nigeria's growing AI ecosystem and aligning with national strategies, ABU and similar institutions can overcome barriers to deliver efficient, user-centric library services. Ultimately, the successful integration of AI in Northwest Nigerian university libraries requires a multifaceted approach, combining investment in infrastructure, capacity building, and policy development to harness AI's potential for transforming information services delivery while addressing regional challenges.

References

Abayomi, A. A., Adebayo, O., & Yusuf, T. (2021). Barriers to artificial intelligence integration in Nigerian academic libraries: A preliminary study. Library Management Journal, 42(3), 112–125.

Abdullahi, F., Tella, A., & Salawu, K. Y. (2022). Innovative approaches to digital resource management in Nigerian university libraries. African Journal of Library and Information Science, 28(1), 45–60.

Agyemang, F. K., & Okagbue, E. (2024). AI chatbot implementation in Ghanaian academic libraries: The case of Balme Library. West African Journal of Library and Information Science, 15(2), 78–92.

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, 26(4), 213–230. https://doi.org/10.1080/10875301.2022.2081810

Akmal, N. A. H., et al. (2025). AI's role in transforming learning environments: A review of collaborative approaches and innovations. Emerald Insight.

Asemi, A., Ko, A., & Nowkarizi, M. (2020). Intelligent libraries: A review on expert systems, artificial intelligence, and robot. Library Hi Tech, 38(2), 412–434. https://doi.org/10.1108/LHT-06-2019-0123 (

Asim, M., Arif, M., Rafiq, M., & Ahmad, R. (2023). Investigating applications of Artificial Intelligence in university libraries of Pakistan: An empirical study. The Journal of Academic Librarianship, 49(6), Article 102803.

https://doi.org/10.1016/j.acalib.2023.102803
Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.

Echedom, A. U., & Okuonghae, O. (2021). Artificial intelligence in libraries: Prospects and challenges in Nigerian academic libraries. In N. E. Osuigwe (Ed.), Managing and adapting library information services for future users (pp. 100–119). IGI Global. https://doi.org/10.4018/978-1-7998-1116-9.ch006
Enakrire, R. T., & Oladokun, O. (2024). Artificial intelligence and library services in West Africa: Opportunities and barriers. International Journal of Library and Information Services, 13(1), 1–18.
Jyoti, R., & Kumar, S. (2024). AI-driven personalization in academic libraries: A global perspective. Journal of Librarianship and Information Science, 56(2), 210–225.
Khan, A. A., Badshah, S., Liang, P., Waseem, M., Khan, B., Ahmad, A., Fahmideh, M., Niazi, M., & Akbar, M. A. (2022). Ethics of AI: A systematic literature review of principles and challenges. In Proceedings of the 26th International Conference on Evaluation and Assessment in Software Engineering (EASE '22) (pp. 120–127). Association for Computing Machinery. https://doi.org/10.1145/3530019.3530025
Kusters, A., et al. (2020). Ethical considerations in AI data reuse: Informed consent and transparency. Journal of Information Ethics, 29(1), 45–60.
Lappalainen, Y., & Narayanan, N. (2023). Aisha: A custom AI library chatbot using the ChatGPT API. Journal of Web Librarianship, 17(3), 37–58. https://doi.org/10.1080/19322909.2023.2221482
Liaw, W., et al. (2020). Data consent frameworks in AI-driven systems: A library perspective. Library Trends, 68(4), 567–582.
Li, Y., Li, X., & Zhao, Q. (2023). Multimodal deep learning framework for book recommendations: Harnessing image processing with VGG16 and textual analysis via LSTM-enhanced Word2Vec. Traitement du Signal, 40(4), 1543–1556. https://doi.org/10.18280/ts.400401
Lin, C. H., Chiu, D. K. W., & Lam, K. T. (2022). Hong Kong academic librarians' attitudes toward robotic process automation. Library Hi Tech, 40(5), 1234–1250. https://doi.org/10.1108/LHT-03-2022-0141
Lund, B. D., & Wang, T. (2023). Chatting about ChatGPT: How may AI and GPT impact academia and libraries? Library Hi Tech News, 40(3), 26–29. https://doi.org/10.1108/LHTN-01-2023-0009
Moustapha, A. A., & Yusuf, I. O. (2023). Adoption of artificial intelligence to improve library service delivery in academic libraries in Kwara State, Nigeria. Library Philosophy and Practice (e-journal), 7915. https://digitalcommons.unl.edu/libphilprac/7915
Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021b). Conceptualizing AI literacy: An exploratory review. Computers and Education: Artificial Intelligence, 2, Article 100041. https://doi.org/10.1016/j.caeai.2021.100041
Ng, D. T. K., Lee, M., Tan, R. J. Y., Hu, X., Downie, J. S., & Chu, S. K. W. (2023a). A review of AI teaching and learning from 2000 to 2020: A content analysis. Education and Information Technologies, 28(7), 8345–8380. https://doi.org/10.1007/s10639-022-11513-3
Ngulube, P., & Mosha, N. F. (2024). Integrating artificial intelligence-based technologies

'safely' in academic libraries: An overview through a scoping review. Information Development. Advance online publication. https://doi.org/10.1177/02666669241262753

Obiano, D. C., Onuoha, C. O., Adeoye, A. A., Nwosu, J. C., & Folarin, M. (2022). Aiding the exploration of artificial intelligence in Nigerian academic libraries in the 21st century. Information Technology and Librarianship, 2(1–2), 1–13.

Okuonghae, O., & Tunmibi, O. (2025). Nigeria's National Artificial Intelligence Strategy (2024–2030): Implications for education and research. African Journal of Science, Technology, Innovation and Development, 17(1), 89–102.

Oladokun, T. A., et al. (2023). AI in service sectors: A bibliometric analysis. Journal of Service Management, 34(4), 567–589.

Omigie, C. A., Krubu, D. E., & Anthony, O. S. (2023). Exploring artificial intelligence for records and archival management system (AI-RAMS) for Nigerian public organizations. Library Philosophy and Practice (e-journal), 8032. https://digitalcommons.unl.edu/libphilprac/8032

Onwubiko, A. C. (2025). Challenges of AI adoption in Nigerian academic libraries. International Journal of Digital Libraries, 26(1), 45–60.

Panda, S., & Chakravarty, R. (2022). AI-powered search engines in academic libraries: A case study of University of Oklahoma. DESIDOC Journal of Library & Information Technology, 42(5), 321–328.

Oyetola, S. O., Oladokun, B. D., Maxwell, C. E., & Akor, S. O. (2023). Artificial intelligence in the library: Gauging the potential application and implications for contemporary library services in Nigeria. Data and Metadata, 2, 36. https://doi.org/10.56294/dm202336

Subaveerapandiyan, A., Sunanthini, C., & Amees, M. (2023). A study on the knowledge and perception of artificial intelligence. IFLA Journal, 49(3), 503–513. https://doi.org/10.1177/03400352231193721

UNESCO. (2021). AI and education: Guidance for policy-makers. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709

UNESCO. (2023). AI in education: Infrastructure challenges in developing countries. UNESCO.

Verma, M. (2023). Novel study on AI-based chatbot (ChatGPT) impacts on the traditional library management. International Journal of Trend in Scientific Research and Development, 7(1), 961–964.

Yoon, J. W., Andrews, J. E., & Ward, H. L. (2022). Perceptions on adopting artificial intelligence and related technologies in libraries: Public and academic librarians in North America. Library Hi Tech, 40(6), 1893–1915. https://doi.org/10.1108/LHT-03-2022-0141

Yusuf, T., Adebayo, O., & Bello, L. (2022). Adoption of artificial intelligence for effective library service delivery in academic libraries in Nigeria. Library Philosophy and Practice (e-journal), 6804. https://digitalcommons.unl.edu/libphilprac/6804.