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ARTIFICIAL INTELLIGENCE SKILLS AND UTILIZATION AMONG LIBRARIANS IN UNIVERSITIES IN KATSINA STATE, NIGERIA

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Abstract

This study investigated Artificial Intelligence (AI) skills and utilization among librarians in universities in Katsina State, Nigeria. A descriptive survey research design was adopted, and the population comprised 104 professional librarians working in university libraries in the state, all of whom were studied using a census approach. Data were collected through a structured questionnaire and analyzed using mean, standard deviation and Chi-square statistics at a 0.05 level of significance. The findings revealed that librarians possessed moderate levels of AI-related skills, with higher competence in basic automated library operations and limited proficiency in advanced AI applications. The utilization of AI technologies in library services was found to be low, with emphasis on routine automated systems rather than intelligent services. Major factors influencing AI skills and utilization included lack of training opportunities, inadequate ICT infrastructure and insufficient funding. The Chi-square analysis showed a significant relationship between librarians' AI skills and their utilization of AI tools, indicating that skill level is a key determinant of effective AI adoption. The study concludes that improving librarians' AI competencies through targeted training is essential for enhancing AI utilization in university libraries. The study recommended that libraries management should organize regular AI focused training and workshops to enhance librarians' practical skills and confidence in using AI tools.

Keywords: Artificial intelligence, AI skills, AI utilization, librarians.

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Introduction

The rapid advancement of digital technologies has significantly transformed information environments across sectors worldwide. Among these technologies, Artificial Intelligence (AI) stands out as a catalyst for innovation in how information is created, organized, accessed, and delivered. AI refers to the imitation of human intelligence processes by machines, especially computer systems, to perform tasks such as reasoning, learning, problem-solving, and decision-making (Russell & Norvig, 2022). In library settings, AI technologies are increasingly being applied in areas such as cataloguing, information retrieval, digital reference services, and personalized user recommendations (Ifijeh & Yusuf, 2020).

Globally, libraries have started leveraging AI to enhance service delivery, automate routine tasks, and improve access to information resources (Kaur & Kaur, 2021). AI-powered chatbots, for instance, are now used for virtual reference services, while machine learning algorithms support intelligent information retrieval and collection management. These innovations not only improve efficiency but also transform the role of librarians from traditional custodians of information to facilitators of intelligent knowledge access (Rahman & Karim, 2022). However, the effectiveness of AI technologies in libraries largely depends on the skills, knowledge, and attitudes of librarians toward adopting and utilizing such tools, librarians need to possess these skills if they desire to be relevant in the information space.

Possessing relevant skills such as familiarity with AI-driven search engines, natural language processing tools, plagiarism detection software, and metadata augmentation

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systems determines librarians' ability to effectively integrate AI into their work (Achugbue, 2025). Skills are not limited to technical competence but also include the ability to critically assess AI outputs and to guide users in leveraging these technologies responsibly (Yusuf, Oshinaike, Suleiman, & Omoniyi, 2025). A low level of skill acquisition inevitably constrains adoption and limits the impact of AI in academic libraries.

Statement of the Problem

Artificial Intelligence (AI) has become an essential technological tool for enhancing information management, retrieval, and dissemination in libraries. Libraries are increasingly adopting AI-based systems for cataloguing, reference services, information retrieval, and decision-making processes. However, in many developing countries, including Nigeria, the adoption and utilization of AI technologies in university libraries remain limited. This may be due to inadequate skills, poor awareness, lack of infrastructure, or resistance to change among library professionals. University libraries are expected to play a leading role in supporting research, learning, and innovation, the researchers observed that most librarians do not possess adequate AI-related skills as such, their ability to integrate AI applications into library operations is constrained, they rely on traditional methods of service delivery, leading to inefficiencies, slower information retrieval, which lead to dissatisfaction. There is also a dearth in literature regarding AI utilization which created a knowledge gap in understanding the use of AI in libraries and the extent of readiness and challenges faced when using the tools.

Therefore, this study seeks to investigate Artificial Intelligence skills and utilization among librarians in universities in Katsina State, Nigeria.

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Research Questions

The following research questions are formulated to guide the study:

1. What is the level of artificial intelligence skills possessed by librarians in universities in Katsina State?
2. What is the extent of utilization of artificial intelligence tools by librarians in universities in Katsina State?
3. What are the major challenges affecting the AI skills and utilization among librarians in universities in Katsina State?

Research Hypothesis

To guide the study, the following null hypothesis was formulated.

H_{01}: There is no significant relationship between librarians' level of artificial intelligence skills and utilization of AI tools in university libraries in Katsina State.

Literature Review

Artificial Intelligence refers to systems or machines that imitate human intelligence to perform tasks and can improve themselves based on the data they collect (Russell & Norvig, 2021). Within library and information science, AI applications include automated cataloguing, semantic search engines, chatbots for reference services, recommendation systems, and predictive analytics for user behaviour (Zeng & Salaz, 2020). Such tools enable libraries to deliver personalized, efficient, and scalable services, reducing response time and enhancing user experience. Librarians' proficiency in AI is increasingly seen as a core competency in modern librarianship. According to Tenopir *et al*. (2020), AI skills empower librarians to implement intelligent systems, manage big data, and support

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research that depends on complex information infrastructures. AI literacy also enables librarians to ethically engage with algorithmic processes, ensuring fairness, accuracy, transparency, and user privacy (Srinivasan, 2022). Without these skills, librarians may be unable to participate fully in the digital transformation of academic libraries.

Recent studies highlight a growing trend of AI adoption in libraries worldwide. Xiao and Asher (2018) observed that libraries in North America and Europe increasingly utilize AI in digital repositories and reference chatbots. Similarly, research in Asian academic libraries shows integration of machine learning tools for resource recommendation and automated metadata generation (Li & Wang, 2019). However, disparities exist between developed and developing regions due to variations in infrastructure, funding, and professional development opportunities. In Africa, studies indicate that technological adoption in libraries faces significant barriers. Okello-Obura and Kigongo-Bukenya (2019) report that librarians often lack formal training in advanced technologies, resulting in low confidence and limited practical implementation. Infrastructure challenges such as unreliable electricity, inadequate internet bandwidth, and scarce access to modern computing facilities further exacerbate the problem. In the Nigerian context, Ojedokun (2023) notes that while some academic libraries are advancing digital services, there remains a critical gap in AI-specific competencies among library professionals.

Oni, Adebayo, and Yusuf (2023) carried out a study on the adoption of artificial intelligence technologies in academic libraries across South-West Nigeria. The study employed a descriptive survey design using a structured questionnaire distributed to 312 professional librarians. Data were analysed using descriptive statistics and regression

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analysis. Findings revealed that librarians possessed moderate AI literacy, with higher exposure to basic tools such as machine translation, plagiarism detection software, and automated cataloguing systems, while advanced tools like natural language processing and machine learning-based recommendation systems were rarely used. The study also found that institutional support, particularly training opportunities and funding, had a significant positive influence on librarians' ability to adopt AI applications in service delivery. While this study provided valuable evidence on AI adoption among librarians, it was limited to the South-West region of Nigeria, leaving out other geo-political zones. The contextual realities of Northern Nigeria, such as infrastructural deficiencies and limited ICT policies in universities, were not considered.

Another study conducted by Ibrahim and Bello (2024) examined artificial intelligence awareness and utilisation among librarians in selected federal universities in Northern Nigeria. The researchers adopted a mixed-methods approach, combining survey questionnaires administered to 185 librarians with in-depth interviews involving ten library directors. Quantitative data were analysed using SPSS, while qualitative data were thematically analysed. The findings indicated that librarians demonstrated low to moderate awareness of AI concepts, with utilisation largely restricted to plagiarism detection, automated indexing, and chatbots for user enquiries. Barriers identified included inadequate training, poor ICT infrastructure, and minimal administrative support. Interestingly, the study revealed that younger librarians under 35 years were more open to experimenting with AI tools than their older counterparts, suggesting a generational dimension in AI adoption. Although the study provided region-specific insights into

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Northern Nigeria, it grouped several federal universities together without paying attention to the peculiarities of individual states.

Methodology

The study adopted descriptive survey research design. This design was considered appropriate because it enables systematic collection of data from a defined population in order to describe existing conditions, opinions, skills, and practices relating to this study. The population of the study comprised all librarians working in university libraries in Katsina State namely, Federal University Dutsi-Ma, Federal University of Transport Daura, Umaru Musa Yar'adua University Katsina and Alqualam University Katsina. According to records obtained from the respective university libraries, the total population was 104 librarians. Due to the manageable size of the population, a census approach was adopted, and all 104 librarians were included in the study without sampling. Data were collected using a structured questionnaire adapted from previously validated instruments that measured artificial intelligence skills and utilisation of AI tools in library services. Data collected were analyzed using descriptive statistics, specifically mean and standard deviation, to answer the research questions. A criterion mean of 2.50 was used as the decision point, mean scores of 2.50 and above were regarded as agreement, while scores below 2.50 indicated disagreement. Inferential statistics was used to test hypotheses at a 0.05 level of significance.

Presentation of Results and Interpretation

Research Questions One. 1: What is the level of artificial intelligence skills possessed by librarians in universities in Katsina State?

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Table 1: Level of Artificial Intelligence Skills Possessed by Librarians in Universities in Katsina State

S/N	Item	N	Mean($\bar{x}$)	Std. Dev.	Decision
1	I possess basic computer literacy required for AI application.	104	3.10	0.82	Accepted
2	I am skilled in using plagiarism detection software (e.g., Turnitin).	104	3.06	0.88	Accepted
3	I can operate automated cataloguing and indexing systems.	104	2.86	0.91	Accepted
4	I have knowledge of AI-based recommendation tools in libraries.	104	2.58	1.01	Accepted
5	I am skilled in natural language processing or chatbot systems.	104	2.37	1.04	Rejected
	Grand Mean		**2.79**	**0.93**	**Moderate Skills**

Source: Field Survey, 2025

Table 1 reveals that all five items, ranging from basic computer literacy ($\bar{x}$ = 3.10, SD = 0.82) to natural language processing and chatbot skills ($\bar{x}$ = 2.37, SD = 1.04), recorded varying mean scores, with lower averages observed in advanced AI applications. The overall mean of 2.79 indicates a moderate level of artificial intelligence skills among librarians in universities in Katsina State. This suggests that while respondents demonstrated competence in foundational digital tools such as plagiarism detection and automated cataloguing, there remains a noticeable skills gap in more complex AI-driven applications, highlighting the need for continuous training and professional development.

This result aligns with the findings of Aharony (2019) and Tenopir et al. (2020), who reported that while librarians are increasingly aware of AI concepts, many lack the

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practical expertise required to implement advanced AI-driven services. Similarly, Nkiko and Ojo (2021) observed that librarians in Nigerian academic libraries often possess general ICT skills but have limited exposure to specialized AI training. The implication is that awareness of AI does not necessarily translate into functional competence, especially in environments with limited professional development opportunities.

Research Questions Two. 2: What is the extent of utilization of artificial intelligence tools by librarians in universities in Katsina State?

Table 2: Extent of Utilization of Artificial Intelligence Tools by Librarians in Universities in Katsina State.

S/N	Item	N	Mean($\bar{x}$)	Std. Dev.	Decision
1	I regularly use plagiarism detection software in academic services.	104	3.10	0.83	Accepted
2	I often apply automated cataloguing and indexing systems.	104	2.92	0.89	Accepted
3	I utilize AI-powered search engines and databases for information.	104	2.88	0.92	Accepted
4	I make use of chatbots or virtual assistants in library services.	104	2.43	1.01	Rejected
5	I engage AI-driven recommendation systems for users.	104	2.28	1.05	Rejected
	Grand Mean		**2.72**	**0.94**	**Moderate Utilization**

Source: Field Survey, 2025

Table 2 reveals that the extent of utilization of artificial intelligence tools by librarians in universities in Katsina State is moderate. Items such as plagiarism detection software ($\bar{x}$ = 3.10, SD = 0.83) recorded high mean scores, indicating frequent use in academic integrity services. Moderate utilization was observed in automated cataloguing ($\bar{x}$

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= 2.92, SD = 0.89) and AI-powered search engines ($\bar{x}$ = 2.88, SD = 0.92). However, advanced applications such as chatbots ($\bar{x}$ = 2.43, SD = 1.01) and AI-driven recommendation systems ($\bar{x}$ = 2.28, SD = 1.05) recorded low mean scores, highlighting minimal usage. The overall mean of 2.72 indicates that while librarians have integrated some AI tools into service delivery, advanced AI applications remain underutilized, signaling the need for targeted institutional investment and specialized training.

This finding corroborates studies conducted by Okello-Obura and Kigongo-Bukenya (2019) who reported that African academic libraries are still at an early stage of AI adoption, largely using automation rather than intelligent systems. Similarly, Ojedokun (2023) noted that many university libraries are yet to fully integrate AI technologies into service delivery despite their growing relevance.

Research Question 3: What factors influence the artificial intelligence skills and utilization among librarians in universities in Katsina State, Nigeria?

Table 3: Factors that Influence the Artificial Intelligence Skills and Utilization among Librarians in Universities in Katsina State.

S/N	Item	N	Mean($\bar{x}$)	Std. Dev.	Decision
1	Inadequate training and professional development opportunities limit librarians' AI skills	104	3.42	0.61	Accepted
2	Lack of institutional support affects the utilization of AI tools in	104	3.31	0.66	Accepted
3	Insufficient funding hinders the acquisition of AI technologies in libraries	104	3.27	0.70	Accepted
4	Inadequate ICT infrastructure (internet, power supply, hardware) affects AI utilization	104	3.38	0.63	Accepted
5	Low awareness of AI applications relevant to librarianship limits utilization	104	3.15	0.74	Accepted

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6	Resistance to technological change among library staff affects AI adoption	104	2.89	0.81	Accepted
7	Lack of management policy and strategic plans for AI adoption affects utilization	104	3.22	0.68	Accepted
8	Limited collaboration with ICT professionals affects effective use of AI tools	104	2.76	0.85	Accepted
	Grand Mean		**3.18**	**0.71**	**Accepted**

Source: Field Survey, 2025

Table 3 show that the highest mean score ($\bar{x}$ = 3.42, SD = 0.61) was recorded for inadequate training and professional development opportunities, suggesting that lack of structured AI-related training is the most critical factor affecting librarians' competence and usage of AI tools. This was closely followed by inadequate ICT infrastructure ($\bar{x}$ = 3.38, SD = 0.63) and lack of institutional support ($\bar{x}$ = 3.31, SD = 0.66), highlighting systemic and organizational challenges. The grand mean of 3.18 further confirms that institutional, infrastructural, and human capacity-related factors collectively influence AI skills and utilization among librarians in universities in Katsina State.

This finding is consistent with the study of Similarly, Li and Wang (2019) who found that funding constraints and infrastructural limitations as major barriers to AI adoption in academic libraries.

Research Hypothesis: There is no significant relationship between librarians' level of artificial intelligence skills and their utilization of AI tools in university libraries in Katsina State

Table 4: Chi-Square Analysis of the Relationship between Artificial Intelligence Skills and Utilization (N = 104)

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Variables	X^2Cal.	df	X^2Crit.	Sig. (p-value)	Decision
AI Skills × AI Utilization	18.64	4	4.49	0.001	Reject H_0

Table 4 revealed that the calculated Chi-square value (χ^2 = 18.64) is greater than the critical Chi-square value (χ^2 = 9.49) at 4 degrees of freedom and 0.05 level of significance. In addition, the p-value (0.001) is less than the significance level of 0.05.Based on these results, the null hypothesis is rejected. This implies that there is a statistically significant relationship between librarians' artificial intelligence skills and their utilization of AI tools in university libraries in Katsina State, Nigeria.

Recommendations

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

1. The libraries management should organize regular AI focused training and workshops to enhance librarians' practical skills and confidence in using AI tools.
2. The Universities management and libraries should invest in modern ICT infrastructure, including reliable internet connectivity and AI supportive technologies, to enhance AI utilization.
3. Adequate funding should be allocated for AI related initiatives, and partnerships with ICT professionals and technology organizations should be encouraged to support effective implementation.

Conclusion

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This study examined the artificial intelligence skills and utilization among librarians in universities in Katsina State, Nigeria. The findings revealed that while librarians possess moderate awareness and basic AI-related skills, the utilization of advanced AI technologies in library services remains limited. The study also established a significant relationship between librarians' AI skills and their utilization of AI tools, indicating that inadequate competencies hinder effective adoption. Institutional, infrastructural, and training-related challenges further constrain AI integration. Overall, the study concludes that strengthening librarians' AI skills is essential for improving the effective utilization of AI technologies in university libraries.

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