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ADOPTION AND UTILIZATION OF ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR EFFECTIVE ONLINE REFERENCE SERVICES DELIVERY IN UNIVERSITY LIBRARIES IN NORTH-CENTRAL, NIGERIA

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Abstract
The study investigates the adoption and utilization of Artificial Intelligence (AI) tools for effective online reference service delivery in University Libraries North-Central, Nigeria. The study adopted cross-sectional survey research design. The population of the study was 33 reference librarians, who had the experience of working in the reference section. The purposive sampling technique was used. The instrument for data collection was a structured questionnaire. Data collected were analysed using descriptive statistics of frequency, mean and standard deviation. The findings of the study revealed that ChatGPT and Grammarly were the only AI tools adopted. The findings also revealed low usage of AI tools for reference services, answering of reference query was the only AI service used, Librarians had positive perception about use of AI in reference services. The challenges that hindered the use of AI were; limited technical infrastructure in libraries, financial constraints of libraries, high cost of adoption and maintenance of AI tools, lack of AI skills among library staff. The study concluded that the adoption and use of AI tools in the libraries studied is low, implying a need for modalities to be put in place to enhance the adoption and use of AI tools. The study recommended training of staff on the use of AI, provision of adequate funds for the purchase of AI infrastructures among others.
Keywords: Adoption, Utilization, Artificial Intelligence, Online Reference Services Delivery, University Libraries, North-Central, Nigeria

Introduction

Artificial Intelligence (AI) has become a driving force behind innovation, taking a leading role in all facets of human endeavors, dominating academic research discussion as well as information delivery services in Libraries. Its adoption has extended across numerous fields, professions, and multiple sectors, including education, healthcare, agriculture, military, business and information services. The benefits of Artificial Intelligence (AI) are widely recognized, including enhanced efficiency, increased productivity, improved customer services, informed decision-making, personalized experiences, and reduced risks and errors (Owolabi et al., 2022; Oyetola et al., 2023). Academic libraries, though slower in adopting AI, are gradually catching up. The idea of integrating AI into libraries has existed since 1985, but interest has surged in the last five years (Huang, Cox & Cox, 2023). Reference services (Traditional and online), have long been a cornerstone of libraries and information centers, serving as a vital bridge between users and the vast reservoir of information resources available.

Traditionally, reference services have been offered by persons at a designated desk known as the reference desk, within the library building, and can also be reached through telephone or mailed correspondence, with much dalliance before delivery. To meet the information needs of the

users in a changing technological environment online reference service is a natural solution which is supposed to be an advancement of the traditional reference service (Nguyen, 2020).

Online reference service is referred to as the provision of reference services involving computer-based collaboration between library user and librarian over a digital network. Over time, the major role that digital reference services have attempted to improve is the communication between the Librarian and the users. The effectiveness of online reference service delivery in academic libraries can be significantly improved through the strategic use of synchronous and asynchronous communication tools. These two modes of digital interaction offer flexibility, timeliness, and personalization as well as critical elements for meeting the dynamic information needs of students, faculty, and researchers in today's academic environment.

Synchronous online reference services involve real-time, interactive communication between users and librarians. Tools such as live chat, video conferencing (e.g., Zoom, Google Meet), and instant messaging platforms fall under this category. These services allow for immediate feedback, dynamic clarification of user queries, and a more personalized experience (Xu, Chu, & Du, 2021). Students may face information literacy challenges or need help navigating digital databases, real-time interaction can provide guided assistance. It reduces misunderstandings and allows librarians to offer step-by-step help, which is particularly useful for complex research questions. Moreover, real-time communication compensates for the absence of physical consultations, especially in remote learning scenarios that have become more prevalent due to infrastructural challenges or disruptions like the COVID-19 pandemic (Zhou, Wu & Li, 2021). This responsiveness builds user trust and increases the perceived value of library services. While, asynchronous services, on the other hand, allow users and librarians to communicate without needing to be online simultaneously. These include services like email, web forms, and ticketing systems. These platforms are especially valuable in environments with inconsistent Internet access or limited library staffing as is often the case in parts of North-Central Nigeria (Oyelude, 2021).

Asynchronous tools enable users to submit queries at any time, and librarians can respond thoughtfully with well-researched answers, links to resources, or attachments. This mode also allows the documentation of interactions for future reference, enabling better continuity and tracking of user information needs. For university libraries in resource-limited settings, asynchronous services offer a sustainable way to provide continuous support without overburdening librarians. Given the irregular power supply and internet access issues common in the region, asynchronous communication provides a critical fallback option when synchronous channels are unavailable (Ocholla, 2020). When synchronous and asynchronous services are integrated, they provide a comprehensive, user-centered model of online reference service. Libraries can triage requests, addressing urgent queries through live chat while handling more in-depth or low-priority questions through email. AI tools such as automated chatbots can further bridge the two modes, offering 24/7 preliminary assistance and routing complex questions to human librarians (Cox, Pinfield & Rutter, 2019).

Academic libraries have increasingly integrated AI tools to enhance user experience, automate repetitive tasks, and provide real-time, responsive services. These tools-ranging from AI-powered chatbots and virtual assistants to intelligent search engines and recommendation systems are transforming traditional library operations into dynamic, interactive, and user-centered digital platforms (Lau, 2020). AI enhances online reference services by offering immediate responses to queries, identifying user intent through natural language processing (NLP), and delivering accurate, context-aware information (Cox et al., 2019). Slow response to user's reference queries, poor service delivery and in activeness of references librarians were the key attributes of traditional reference services in academic libraries

The evolution of reference services from traditional face-to-face interactions to digital platforms has necessitated the adoption of AI to meet the increasing demands for timely, personalized, and remote access to information. Institutions such as the Massachusetts Institute of Technology (MIT), University of Helsinki, and University of Cambridge have integrated AI technologies into their library systems to improve user interactions and streamline service delivery (Walsh & Rana, 2021). These libraries utilize AI not only to provide 24/7 reference support but also to manage large volumes of information queries efficiently, making library services more accessible and responsive in the digital age.

In Africa, the adoption of AI in academic libraries is still in its developmental stage. While the potential for AI to revolutionize library services is acknowledged, infrastructural limitations, lack of technical expertise, low funding, and insufficient policy frameworks often hinder widespread adoption (Ocholla, 2020). Many academic institutions on the continent are still grappling with the basic challenges of digitization and internet access, which affects their ability to explore and invest in AI technologies. Nevertheless, there is growing interest in the continent, particularly in countries like Kenya, South Africa, and Nigeria, where pilot projects and partnerships are beginning to explore the practical use of AI in library environments. In Nigeria, the push for digital transformation is gaining momentum through national initiatives such as the National Digital Economy Policy and Strategy (2020–2030), which emphasizes the use of emerging technologies, including AI, to improve service delivery in public institutions. University libraries are expected to align with these national priorities by modernizing their services and infrastructure. However, research shows that the actual adoption and utilization of AI tools in Nigerian university libraries is limited and uneven, with many institutions lacking the necessary support and readiness to fully integrate these technologies (Oyelude, 2021).

Focusing on the North-Central geopolitical zone of Nigeria which includes states such as Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and the Federal Capital Territory University Libraries in this region are crucial academic hubs for teaching, learning, and research. However, they face unique challenges such as insufficient ICT infrastructure, inadequate funding, and limited staff training, which affect their capacity to adopt and effectively use AI tools for online reference services. As students and researchers increasingly demand real-time digital support, the gap between service expectations and delivery methods is widening.

In the North-Central Nigerian context, there is limited empirical evidence on how AI tools are being adopted and utilized, what challenges libraries face, and how effective these tools are in practice. This study, therefore, seeks to investigate the adoption and utilization of AI tools for effective online reference service delivery in university libraries within North-Central Nigeria. It aims to assess the current state, explore challenges and prospects, and provide insights that could inform institutional strategies and policy interventions for digital transformation in academic libraries.

Statement of the Problem

The emergence of Artificial Intelligence (AI) technologies has revolutionized various aspects of information service delivery in academic libraries, particularly in enhancing the responsiveness, efficiency, and reach of online reference services. Globally, academic libraries have increasingly adopted AI tools such as chatbots, virtual reference assistants, and intelligent search systems to provide real-time, personalized, and automated responses to users' information needs (Cox, Pinfield & Rutter, 2019). These technologies have not only improved the speed of service delivery but also expanded access beyond physical and temporal constraints (Lau, 2020).

However, in Nigeria, particularly in the North-Central region, there is a noticeable low in the adoption and effective utilization of AI in university libraries as observed by the researchers.

While the need for digital transformation is widely acknowledged, many libraries continue to rely on traditional and often inefficient methods of delivering online reference services, such as email responses and underutilized static FAQ pages (Oyelude, 2021). This delay and inefficiency in reference service delivery compromise user satisfaction and diminish the library's relevance in a fast-paced digital academic environment, could this be the reason for the lag of the adoption and utilization of AI in the Academic Libraries in the North-Central, Nigeria.

As students and researchers increasingly demand seamless, real-time, and remote access to academic support, the gap between user expectations and current service capabilities in many North-Central, Nigerian University Libraries continues to widen. Unless these libraries effectively adopt and utilize AI tools to modernize their online reference services, they risk becoming obsolete in meeting the evolving needs of their academic communities. Thus, this study seeks to address the critical question of how AI tools are currently being adopted and utilized in the delivery of online reference services in University Libraries in North-Central, Nigeria.

Research Objectives

The objective was to investigate the Adoption and utilization of Artificial Intelligence (AI) tools for effective online reference service delivery in University Libraries in North-Central Nigeria. The specific objectives are to:

1. identify the types of AI tools currently adopted for online reference services in University Libraries in North-Central, Nigeria.
2. identify the types of reference services provided using AI in University Libraries in North-Central, Nigeria.
3. identify the level of utilization of AI tools by library staff for online reference service delivery in University Libraries in North-Central, Nigeria
4. identify the perceptions of librarians towards the use of AI tools in online reference services in University Libraries in North-Central, Nigeria.
5. identify the challenges faced by university libraries in adopting and utilizing AI tools in University Libraries in North-Central, Nigeria.

Research Questions

The study answered the following questions.

1. What types of AI tools are currently adopted for online reference services in North-Central Nigerian University Libraries?
2. What are the types of online reference services provided using AI in North-Central Nigerian University Libraries?
3. What are the levels of utilization of IT tools by library staff in delivering online reference services in North-Central Nigerian University Libraries?
4. What are the perceptions of librarians towards the use of AI tools in online reference services in North-Central Nigerian University Libraries?
5. What challenges do university libraries face in the adoption and utilization of AI tools for online reference services in North-Central Nigerian University Libraries?

Review of Related Literature

According to Irizarry-Nones, Palepu, and Wallace (2017), artificial intelligence is the programming and development of computers to carry out tasks requiring human intellect, such as speech recognition, decision-making, visual perception, language translation, conversing, and emotional emotions. The technology that gives robots the ability to plan, learn, reason, solve problems, move, and, to some extent, be creative is known as artificial intelligence, according to

Heath (2018). Omame and Alex-Nmecha (2020), artificial intelligence is a branch of computer science that focuses on how computers learn (Machine Learning), interpret information, and perceive the world via their eyes, including character recognition, image analysis, 3D perception, and eye function modelling.

According to Katz (2022), reference services are a "personal assistance provided to users seeking information, whether the information is located within the library or elsewhere". This definition emphasizes the user-centered and service-oriented nature of reference work, encompassing both physical and digital information sources. In his words, they are personal assistance provided by library staff to users in their pursuit of information, including guiding them to suitable resources, answering questions, and aiding in the use of library tools and databases.

Luo, Zhang and Godwin (2022) describe reference services as "a dynamic process of interaction between users and information professionals, aimed at connecting users to needed information through various communication technologies and tools". This definition reflects the evolving nature of reference services in the digital age, especially with the integration of AI and virtual tools. They identify major types of reference services provided in libraries, including; traditional which involve direct interactions between librarians and users at the reference desk. While still in practice, their usage has declined due to the rise of digital alternatives and Virtual Reference Services (VRS) otherwise known as (online reference services) which provide virtual responses to user's queries. These include email, chat, and web-based interactions where librarians assist users remotely. The integration of AI tools and chatbots has further expanded Synchronous and Asynchronous Services.

Studies on the types of reference services provided using Artificial Intelligence (AI) in academic libraries reveal that AI tools are gradually being integrated to enhance service delivery, albeit in limited capacities (Abba, 2024; Ocholla, 2020). Among the various services, answering reference queries appears to be the most common application of AI, as tools like ChatGPT and AI-powered chatbots are employed to provide real-time responses and assist users in locating information (Tella, 2020). Video based Reference Services which is a form of digital reference includes the visual element, which may be an antidote to the communications problems inherent in the more text-based services. Librarians and users are able to use both text and speech for reference transactions. Instead of a window for the textual exchange, there is a window in which librarians and users can see each other while conducting a face-to-face interview. Web or other electronic sources can 'be pushed' to users via another window. This technology provides distance learning, as well as research and reference applications (Ocholla, 2020). Digital Reference Robots which involves the use of artificial intelligence in rendering digital reference service. Abba (2024) notes that it is most often used to respond to reference questions during the unavailability of the reference librarian. It involves the use of software to search the databases.

According to the Chartered Institute of Library and Information Professionals (CILIP, 2021), new technologies are changing not only people's everyday lives but also worldwide trends and many other facets of society. Traditional jobs requiring significant change require new skills, opportunities, and challenges. Librarians and their responsibilities in the contemporary library environment are all impacted by this new revolution. Incorporating cutting-edge technology like artificial intelligence into their core services was difficult for many university libraries in Nigeria (Akinola, 2023). After a global pandemic broke out in 2020, there has been an increased requirement for deploying cutting-edge technology to support library service operations (Owolabi et al., 2022). Libraries in Nigeria should implement AI for several reasons, including changing user behaviour, improving the information environment, and more. Using intelligent Internet-connected gadgets, employing digital high-tech products in homes, and incorporating AI helpers into daily activities are additional advancements in the technological era (Poole, 2020). Libraries

may maintain their relevance in the future, accept additional duties and services, and avoid becoming out of the current by utilising machine learning for library applications. However, in the library's journey, overcoming the obstacles to AI adoption is crucial (Oniovoghai, Idiodi and Urhiewhu, 2023).

The concept of artificial intelligence is broad and may be used to all facets of libraries to make them more intelligent. The introduction of artificial intelligence (AI) into institutions for the delivery of services has reportedly opened doors for major issues impacting traditional library routine services to be promptly handled, according to Oniovoghai, Idiodi and Urhiewhu (2023). The quality of library services in the information age must be improved, according to Tella (2020), if libraries are to orient themselves to make use of the potential of artificial intelligence. Due to the quicker access to information, this application in libraries will help give better search and information services, exciting both library personnel and users. Akinyemi (2023) said enhancement of many librarians' job duties, including cataloguing, indexing, information retrieval, reference, and other jobs, has been made possible by using artificial intelligence (AI) in library services delivery. Speech recognition, machine translation, and library robots are just a few of its uses. The University of Lagos is currently the only institution in Nigeria to have implemented the use of artificial intelligence in some library services and operations, and the use of artificial intelligence in library services and operations is still not widely known among library professionals, according to Tunde et al. (2022). Libraries are putting themselves in a position to benefit from cognitive computing applications in general and artificial intelligence applications in particular, which are of potential value as a tool for improving the quality of library services. Furthermore, Kristin (2016) clarifies that libraries might alter concentration and attention through AI applications. AI provides a helpful shortcut for using this information and achieving better results. The methods for implementing artificial intelligence in library services in Nigeria are listed

Several barriers contribute to this slow adoption of AI in Nigerian university libraries, including inadequate ICT infrastructure, limited funding, lack of skilled personnel, and insufficient awareness or training on AI applications in library services (Ocholla, 2020). Moreover, there is a lack of empirical studies focusing on the actual deployment, usage patterns, and effectiveness of AI tools in reference services within this specific region. Without a clear understanding of how AI tools are being used, it is difficult to design strategies that can improve their adoption and utilization for better service delivery.

Research Methodology

The study adopted descriptive survey research design, which allowed the researcher to collect data at a particular time from different institutions among librarians. The population of the study consisted of all reference librarians from Federal University Lafia, Nasarawa State (5), Joseph Sarwauan Tarka University, Benue State (3), University of Jos, Plateau State (3), Federal University of Technology Minna (4), Benue State University Markudi (4), Plateau State University, Bokkos (3), Kwara State University, Malete (2), University of Ilorin (4) and Ibrahim Badamasi Babangida University, Lapai (3). The total population of the study was 31 reference librarians.

The purposive sampling technique was used. Purposive sampling is a technique to select a specific group of individuals or units for analysis. Participants are chosen "on purpose," not randomly. It is also known as judgmental sampling or selective sampling. This sampling technique is chosen because the researchers wanted to use only those that have in-depth knowledge of the reference services in the selected libraries. They were also chosen because they had served or are serving as reference librarians. The study used a questionnaire as the instrument for data collection. The data collected through a structured questionnaire was analysed using descriptive statistics of frequency, mean and standard deviation. The mean of 2.5 was used as the benchmark

for decision making.

Data Presentation and Analysis
A total of 33 copies of the questionnaire were distributed, 31(93.93%) were returned valid and used for analysis

Table 1: Types of AI Tools Currently Adopted for Online Reference Services

S/N	AI tools	FULafia	JOSTUM	UJ	FUTMinna	PLSB	KWASU	IBBU	UniIlorin	BSU
1	Chatbot	X	X	X	X	X	X	X		X
2	ChatGPT	√	√	√	√	√	√	√	√	X
3	LibKey	X	X	X	X	√	X	X	X	X
4	Robots	X	X	X	X	X	X	X	X	X
5	Grammarly	√	√	√	√	√	√	√	√	√
6	Research Rabbit	X	X	X	√	X	√	X	X	√

Key: A – Adopted, NA - Not Adopted

The table 1 reveals a limited adoption of artificial intelligence (AI) tools among the librarians. ChatGPT and Grammarly were the only AI tools adopted for online reference services. In contrast, the remaining tools; Chatbot, LibKey, Robots, and Research Rabbit were not adopted at all for online reference service. The findings agreed with Abba (2024) who investigated the level of adoption of artificial intelligence (AI) to support library services delivery in university libraries in Africa. The study found that the only few university libraries in Africa have adopted AI technologies such as Chatbot, ChatGPT, LibKey from ThirdIron, robots, RFID technology and Grammarly. Bakiri, Mbembati, and Tinabo (2023) in a study found the level of adoption to be low.

Table 2: Types of reference service provided using AI in University Libraries in North-Central, Nigeria

S/N	Types of reference services	Utilized	Not Utilized
1	Answering of reference query	√	X
2	Current awareness services	X	√
3	Selective dissemination of information	X	√
4	Virtual reference service	X	√
5	Referral services	X	√
6	Instructional reference services	X	√

Key: U – Utilised, NU - Not Utilized

Table 2 clearly indicated that the majority of respondents indicated that they use AI for answering reference queries on online reference services provided. However, for all other types of reference services, current awareness services, selective dissemination of information, virtual reference services, referral services, and instructional reference services, there was a complete lack of AI usage, with 100% of respondents reporting no use of AI for these purposes.

Table 3: Level of utilization of AI tools by library staff for online reference service in North-Central, Nigeria

S/N	Utilization of AI tools	Mean	STD	Decision
1	Chatbot used as a virtual assistant	1.16	1.134	Low utilization
2	ChatGPT used for answering reference questions	3.16	1.261	High utilization
3	LibKey is used for accessing full-text articles	1.34	1.218	Low utilization
4	Robots used for shelving	1.54	1.334	Low utilization
5	Grammarly is used for the formulation of replies to queries	2.46	1.276	High utilization
6	Research Rabbit is used for finding related research papers	1.78	1.324	Low utilization
	Pooled Mean	**1.91**	**1.257**	

Table 3 shows that ChatGPT used for answering reference questions has the highest with 3.16 mean score, followed by Grammarly used for formulation of replies to queries with a mean score of 2.46. Then, research Rabbit used for finding related research papers with a 1.78 mean score, followed by Robots used for shelving with a 1.54 mean score, followed by LibKey used for accessing full-text articles with 1.34 and finally Chatbot used for virtual assistant with the lowest mean score of 1.16.

Table 4: Perceptions of librarians towards the use of AI tools in online reference services in North-Central, Nigeria

S/N	Perception	Mean	STD	Decision
1	AI adoption improves performance in the library	3.34	1.324	Positive Perceptions
2	AI adoption enhances productivity in the library	2.91	1.388	Positive Perceptions
3	AI adoption improves information retrieval services	2.93	1.279	Positive Perceptions
4	AI adoption improve reference services	3.46	1.459	Positive Perceptions
5	AI adoption is threat to job of reference librarians	3.82	1.477	Positive Perceptions
	Pooled Mean	**3.29**	**1.385**	

Table 4 shows the highest mean score of 3.82 indicating a strong agreement with the perception that AI poses a threat to the jobs of reference librarians, suggesting a significant concern about job security. This is followed by a mean of 3.46 for the belief that AI improves reference services, showing a strong acknowledgment of its usefulness in enhancing service delivery. The perception that AI improves overall library performance also received a high mean score of 3.34, reflecting substantial support for its impact on efficiency. On the other hand, the perception that AI enhances productivity and improves information retrieval services received relatively lower mean scores of 2.91 and 2.93 respectively, indicating moderate agreement and highlighting areas where AI's benefits may not yet be fully realized or understood. The findings agreed with Safana, and Fari (2024) explored the awareness and perception of library staff on the Application of AI for information services delivery in some University Libraries in Katsina State. The findings also revealed positive perceptions of AI by the library staff especially towards improving their performance, and enhancing productivity.

Table 5: Challenges of the use of AI tools in online reference services in North-Central, Nigeria

S/N	Challenges	Mean	STD	Decision
1	Limited technical infrastructure in libraries	3.50	1.508	Challenge
2	Financial constraints of libraries	3.75	1.427	Challenge
3	Data privacy concerns of AI tools	3.15	1.461	Challenge
4	Lack of AI Skills among Library Staff	3.32	1.372	Challenge
5	High cost of adoption and maintenance of AI tools	3.63	1.357	Challenge
6	Issues of erratic power supply in libraries	3.28	1.546	Challenge
	Pooled Mean	**3.44**	**1.445**	

Table 5 shows the highest mean score of 3.74 indicating a strong agreement on challenges faced in adoption and the use of AI tools and financial constraints of libraries. This is followed by a mean of 3.63 High cost of adoption and maintenance of AI tools showing a strong agreement on the challenges faced. Then the mean of 3.50 indicated limited technical infrastructure in libraries, lack of AI skills among library staff with a mean of 3.32, followed by issues of erratic power supply in libraries with a mean of 3.28 and finally data privacy concerns of AI tools with the mean of 3.15. This finding agreed with Isiaka (2023) who explored application and use of Artificial Intelligence (AI) for library services delivery in academic libraries in Kwara State, Nigeria. The study found the following challenges; lack of technical skills by library staff, lack of adequate funds, epileptic power supply, need for technical expertise, lack of AI experts, and high cost of adoption and maintenance.

Summary of Findings

The following are the summary of findings of the study:

1. The study revealed that ChatGPT and Grammarly were the only AI tools adopted but at a lower rate in North-Central, Nigeria.
2. The study shows that answering of reference queries was the only service used by AI in North-Central, Nigeria.
3. The findings of the study revealed that there is low usage of AI tools for reference services in North-Central, Nigeria.
4. The study revealed that librarians had positive perception about the use of AI in online reference services in North-Central, Nigeria.
5. The study shows that challenges hindered the use of AI were; limited technical infrastructure in libraries, Financial constraints of libraries, High cost of adoption and maintenance of AI tools, lack of AI Skills among library staff.

Conclusion

The study concluded that the adoption and use of AI for online reference services in the studied libraries was low. Basically, ChatGPT and Grammarly were the tools adopted and used. However, the perception of reference librarians towards the use of AI in online reference services was positive, implying that AI has prospects in online reference service delivery. In as much as there were challenges that hindered the adoption and use such as Limited technical infrastructure in libraries, Financial constraints of libraries, High cost of adoption and maintenance of AI tools, and Lack of AI Skills among library staff. Reference librarians can adopt and use AI tools for services delivery if provided with the needed skills and infrastructures.

Recommendations

Based on the findings, the study recommends the following:

1. AI infrastructure should be made available across the libraries by University management to enhance high adoption in North-Central, Nigeria.
2. The University management should provide other reference services like Virtual reference service and referral services using AI tools apart from answering of reference query using AI in North-Central, Nigeria.
3. Management should provide training on the use of AI tools should be given to library staff to enhance the usage of AI tools for reference services in North-Central, Nigeria.
4. Librarians should maintain their positive perception about use of AI in reference services in North-Central, Nigeria.
5. More technical infrastructure should be provided in the libraries, adequate financial support, and training on AI skills among library staff should be provided by university administration in North-Central, Nigeria.

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