



Use of AI Chatbots among Librarians: Implications for Future Library Services

Lawrence, Arumuru

Lecturer, Department of Library and Information Science

Faculty of the Social Sciences, Delta State University, Abraka. Nigeria

arus.lawrence@gmail.com

ABSTRACT

The purpose of this study was to examine the use of AI chatbots among librarians in Nigerian university libraries and assess their potential impact on future library services. The study was conducted to investigate the current usage levels of AI chatbots, their potential for enhancing service delivery in the future, and the challenges associated with their implementation. Guided by the Technology Acceptance Model, an ex post facto research design was employed. Data were collected through a questionnaire distributed to a purposive sample of 278 librarians (28%) from a population of 989 across six states in Nigeria's geopolitical zones. Of the distributed questionnaires, 200 responses (72%) were completed and analyzed using descriptive statistics, including frequency, percentage, and mean. The criterion mean of 2.50 was established for interpreting the data, with findings indicating a low current usage level of AI chatbots among librarians (Aggregate $x = 1.92$, Crit. $x = 2.50$). The study revealed promising prospects for AI chatbots in Nigerian university libraries, including their potential to significantly automate routine tasks (91%), improve accessibility to library resources (81%), enhance outreach programs (76%), provide multilingual support (71%), offer personalized user support (66%), and support research activities (65%). However, several challenges were identified, such as difficulties in customizing AI chatbots for specific library needs (96%), issues with user acceptance and trust (94%), limitations in handling specific topics (86%), the need for regular software updates (85%), and concerns regarding privacy and security (80%). The study recommends that university administrators and library leaders invest in modern technological infrastructure and provide comprehensive training for librarians to ensure effective implementation and management of AI systems. Addressing these challenges and capitalizing on the potential of AI chatbots could transform future library services in Nigerian universities.

Keywords: Chatbot in Libraries, AI Applications, Level of Usage, Future Prospects, Library Services, Service Delivery, AI Skills

Received: 2 October 2024, Revised 25 February 2025, Accepted 18 March 2025

Copyright: with Authors

1. Introduction

The introduction of artificial intelligence in various industries has revolutionised activities across all sectors, including university libraries. A chatbot is an AI software that might be considered an HCI-type model (1). Confronted with text or voice, the chatbot utilises natural language processing and sentiment analysis to communicate in a human-like manner with humans or with other chatbots (2). In other words, chatbots are artificial conversation entities, interactive agents, smart bots, or digital assistants. (3) One doesn't just interact with a social chatbot for the functionality of responding to various requests; rather, this interaction is made possible by a feeling of being intimate. (4,5,6)

2. Chatbots in Libraries

The use of artificial intelligence-based chatbots that interact with users in real time is a phenomenon that can both benefit and threaten libraries simultaneously. These conversational agents bring more value to information access, user experience, and operational processes.

The most interesting chatbots are primarily text-based and user-guided, often utilising closed-source tools with access portals built mostly on top of library Web pages or integrated with social software.(7). Among the various services, chatbots have potential applications in reference services. (8)

University libraries in Nigeria have played a leading role in the transition from computerised catalogues to digital lending and virtual references. The most recent advancement in this continuous evolution process is the adoption of AI chatbots, which aim to increase clients' engagement with the services offered by libraries (9). Chatbots can also ease the burden of basic or routine questions, allowing library staff to focus their attention on more demanding inquiries and duties. (10)

The implementation of AI chatbots in Nigerian universities' libraries represents a strategic initiative designed to improve the delivery of services within the higher education sector, which is marked by continuous technological advancements. Nigerian universities are witnessing an increase in student enrollment alongside a rising demand for information facilitated by technology, thereby necessitating the establishment of efficient and effective library services. The utilization of AI chatbots can significantly enhance the user experience since these digital assistants are available around the clock, offering invaluable support for students who may seek assistance outside of regular library hours. According to Edelwor and Imhonopi (11), one of the key advantages of employing chatbots is their adaptability. They can assist with straightforward inquiries, such as the library's location and operational hours, as well as more intricate research-related questions and suggest relevant reading materials. This functionality is particularly beneficial for Nigerian university libraries, which frequently encounter a substantial volume of routine inquiries. Thus, many of these repetitive interactions can be efficiently handled by the chatbot, allowing librarians to concentrate their time and efforts on more complex and significant tasks, including information literacy instruction, material selection, and support for students with disabilities. Beyond enhancing overall productivity, AI chatbots have a substantial impact on various aspects of the user experience in Nigerian university libraries. Library services can be accessed at the student's or researcher's convenience, utilizing their preferred device at any time and from any location with the help of chatbots. This level of convenience is especially vital in a country where physical library facilities may face challenges due to infrastructural and geographical limitations. In this manner, chatbots play a

crucial role in ensuring that every student, regardless of their location or circumstances, has equal access to essential library services, mitigating the disparities as mentioned earlier. Moreover, the integration of chatbots can also enhance the personalization of library services. Chatbots can generate a list of suggested books, articles, and databases tailored to the students' behaviors and specific interests in various subjects. This personalized approach enables libraries to amplify the effectiveness of their services, increase their relevance, and transform the learning experience into something more engaging. Such targeted service delivery can significantly improve access for students and researchers to the most pertinent information within Nigerian university libraries, which may otherwise be limited.

Some of the consequences of this advancement also include new responsibilities, professional growth for librarians, and educational training for integrating chatbot AI in Nigerian university libraries. This suggests that repetitive tasks, once everyday duties of librarians such as responding to basic inquiries and assisting with introductory research questions, will soon be managed by chatbots. This shift will enable librarians to focus more on their areas of expertise, including instruction and research services, data management, and information literacy. This transformation has led to a recognition of the librarian's role within the professional landscape, acknowledging them as vital strategic allies in the efforts of academic institutions (12) Ifijeh et al., 2020). By leveraging artificial intelligence, librarians can further enhance their positive impact on faculty and student academic success by broadening their role as information specialists and knowledge authorities. The implementation of chatbot AI in Nigerian university libraries has also affected the roles and professional growth of librarians. Human librarians will be able to offer consultation services, instructional assistance, data management, and information literacy instead of merely performing routine tasks that chatbots will take over. As a result of this transformation, the visibility of librarians within the professional community has increased, and they are regarded as strategic partners in achieving the academic objectives of their institutions (12). AI can therefore empower librarians to amplify their influence on faculty and student performance, moving beyond the basic functions of information professionals and educators. A broader trend among universities and colleges around the world to adopt technological innovations and utilize big data in institutional management is also observable through the implementation of chatbots in Nigerian university libraries. The incorporation of chatbots in library services can offer universities valuable insights into user behaviors and preferences, which aids in resource allocation and strategic planning. Consequently, this data-driven approach can help libraries adapt to the ever-changing academic landscape, thereby optimizing the services they provide. It is thus essential to conduct further studies on the use of Chatbot AI by librarians, as well as the implications of this method of information delivery on the future of library services in Nigeria.

3. Problem Statement

AI chatbots play a crucial role in improving service delivery within university libraries. AI-powered chatbots communicate with users in natural language, provide immediate responses, guide users to library resources, and offer suggestions when necessary. In addition to directing users through various digital resources, they also address frequently asked questions, assist with queries, and clarify library policies. The integration of AI chatbots into library operations has led to greater efficiency, accessibility, and overall satisfaction for library patrons. This is the rationale behind their adoption, as it seeks to enhance services while making them more cost-effective and improving user satisfaction.

AI chatbots assist those regions where access to physical library facilities is restricted by time, performing routine operations. At the same time, librarians can focus on more effective operations and be available 24/7.

However, based on the literature and the researcher's initial assessment, it is clear that the use of AI chatbots among university libraries in developing nations, including Nigeria, remains relatively low. This is because there is a dearth of infrastructure, finance, and qualified staff that can be dedicated to managing advanced technologies. Library services are gradually becoming more concerned with modernisation, but to address students' needs for reliable and fast information retrieval, as well as to meet the demands of modern higher education information technologies. These issues have prompted the researcher to consider the use of AI chatbots by librarians, with a focus on their potential impacts on future library services. First and foremost, the study aims to identify the current level of usage, opportunities, and risks associated with AI chatbot adoption, and also to provide guidelines and suggestions for the successful implementation of AI chatbots, along with best practices.

4. Research Questions

To guide this study, the following research questions were raised and answered:

1. To what extent are university libraries in Nigeria implementing the use of AI chatbots in service delivery currently?
2. What sort of expectancy does AI have regarding service delivery in university libraries in Nigeria?
3. What are the challenges of using AI chatbots among the librarians in university libraries in Nigeria?

5. Review of Related Literature

This segment of the research provides a review of existing literature on several key topics: the theoretical foundation of the study, the extent of AI chatbot utilization for future service delivery in university libraries, the potential of AI chatbots for upcoming library services, and the factors that may hinder the adoption of AI chatbots among librarians in university settings. For this study, Davis's Technology Acceptance Model (TAM), established in 1989, serves as the theoretical basis. It explains how individuals develop perceptions about technologies and eventually embrace them. Within the Technology Acceptance Model (TAM), Davis (13) suggested that perceived usefulness (PU) and perceived ease of use (PEOU) are the two primary elements that influence people's acceptance of technology. PEOU relates to the perceived simplicity of using a specific technology, while PU pertains to the perceived benefits of the technology in enhancing work performance. To a significant extent, TAM provides a robust framework for understanding how librarians perceive and adopt AI chatbots, particularly in relation to existing research on chatbot usage by other librarians and future library services. In essence, librarians are more inclined to adopt AI chatbots in their roles if they believe that these technologies can alleviate workloads from routine tasks, boost productivity, and improve perceived usefulness (PU). Furthermore, librarians are more likely to integrate chatbots into their workflows if these tools are perceived as user-friendly (PEOU), feature intuitive interfaces, and require minimal learning effort. Utilizing TAM in this study allows for an analysis of various factors that influence the adoption of AI chatbots in university libraries. To evaluate PU, for instance, librarians' perspectives on the benefits of AI chatbots, such as providing 24/7 assistance, enhancing accessibility, and improving user satisfaction, can be examined. Similarly, librarians can assess the usability and implementation of these chatbots, considering aspects such as technical support and training, to understand their perceived ease of use (PEOU). Additionally, TAM can

help pinpoint challenges and barriers to the adoption of AI chatbots, such as insufficient funding, inadequate infrastructure, and a workforce shortage. By addressing these issues, the research can provide recommendations for promoting the adoption and integration of AI chatbots into library services. According to Venkatesh and Davis (25), TAM serves as an effective tool for analyzing the factors influencing librarians' acceptance of AI chatbots and offers insights into how these technologies can be successfully integrated to enhance library services in the future.

5.1 Level of Usage of AI Chatbots for Future Library Service Delivery in University Libraries

Several empirical studies have shown that the use of AI chatbots in Nigerian university libraries is still in its early stages. Olapegba et al.(14) (2020) investigated the use of AI chatbots in southwestern Nigerian libraries. They discovered that only 15% of the libraries surveyed had implemented AI chatbots, primarily due to budgetary constraints and a lack of technical expertise. The potential advantages of wider adoption are demonstrated by the improvements in library management reported, including the ability to handle routine inquiries and enhance user satisfaction after implementing chatbots. In a similar vein, Adedoyin (15) 2021) found that only a small percentage of university libraries in northern Nigeria had the infrastructure required to support AI chatbots. This study highlighted one of the main obstacles: the absence of trained staff. Despite these difficulties, AI chatbots in libraries have led to a decrease in staff workload and an increase in service delivery efficiency, particularly in handling repetitive tasks, such as responding to frequently asked questions.

In three significant Nigerian universities, Okeke and Eze (16) investigated users' opinions of AI chatbots. According to their findings, chatbots were well-received by teachers and students, who valued their personalized responses and constant accessibility. More sophisticated AI capabilities are needed, as the study also found that chatbots struggled to answer complex questions and provide detailed information. Omotayo and Haliso (17) (2019) examined the awareness and preparedness of library staff in Nigerian university libraries regarding the use of AI technologies, such as chatbots. They found that although the potential of AI chatbots was widely recognised, there was little actual implementation due to similar problems with funding, inadequate technical support, and insufficient training. The study emphasized the need for ongoing professional development initiatives to give library employees the tools they need to manage AI systems effectively.

5.2 Prospects of AI Chatbots for Future Library Service Delivery in University Libraries

Eke et al. (18) investigated the effects of AI chatbots on library services at the University of Nigeria, Nsukka. Their findings indicated that AI chatbots greatly enhanced the effectiveness of library services by automating standard tasks like catalog searches and addressing common inquiries. Users expressed higher satisfaction levels thanks to the chatbots' swift and precise responses. Nonetheless, the research also emphasized the necessity for regular updates and maintenance to keep chatbot systems functional and pertinent. Oyeleye and Adebayo (19) explored the potential of AI chatbots to boost library user engagement at Lagos State University. They found that chatbots enhanced communication between library patrons and staff, resulting in increased patron satisfaction. The study also clarified that integrating AI chatbots requires significant initial investments and ongoing maintenance costs, which pose challenges for many university libraries operating on limited budgets. Furthermore, Adeyemi et al. (2021) (20) assessed the implementation of AI chatbots in university libraries across southeast Nigeria and found similar patterns of limited deployment due to technological and financial constraints. Nevertheless, their research showcased a successful case where a university library overcame these challenges through grants and strategic partnerships, resulting in significant improvements in user experience and service delivery. Moreover, Johnson and Olumide (2022) (21) focused on the role of AI

chatbots in supporting academic research in Nigerian universities. They discovered that while AI chatbots excelled at providing users with quick access to research materials and answering general questions, they often struggled to deliver detailed, context-specific academic assistance. This limitation highlights the need for more advanced AI development and integration within academic libraries. The future of AI chatbots in enhancing services within Nigerian university libraries looks promising. Akinwale and Adeniran (2018) (22) examined the impact of AI chatbots at a distinguished university in Nigeria and uncovered significant increases in user satisfaction and engagement. Chatbots were particularly beneficial for assisting with catalog searches and providing timely responses to administrative queries. The study illustrated how AI chatbots could radically transform library services by offering users efficient, around-the-clock support. Ogunyemi et al. (2022) (23) investigated the scalability of AI chatbots in Nigerian university libraries. Their research revealed a strong interest in expanding chatbot use; however, scalability was hindered by inconsistent internet access and inadequate funding. The study proposed a gradual implementation approach that would start with basic features, progressively adding more complex functionalities as the infrastructure improved. With thoughtful execution, resource limitations could be addressed, allowing the full advantages of AI chatbots to be realized.

5.3 Factors that may Interfere with the Usage of AI Chatbots among Librarians in University Libraries

There are many obstacles in the way of Nigerian university libraries implementing AI chatbots. The theme of financial constraints frequently appears in the literature. Olapegba et al. (14) and Adedoyin (15) identified a primary barrier to the widespread adoption of AI chatbots as a lack of funding. This financial burden makes it more challenging to hire qualified staff and acquire the necessary technology for chatbot management. Another significant issue is inadequate infrastructure. According to Adedoyin (15), many libraries lack the required technology to accommodate AI chatbots. The deployment and efficient use of these technologies are further complicated by issues such as patchy internet access. Ogunyemi et al. (23) noted that the scalability of AI chatbots is hindered by infrastructural limitations, suggesting that these improvements are crucial for the successful adoption of these technologies.

One major obstacle is the staff members' lack of technical expertise. Olapegba et al. (14) and Adedoyin (15) highlighted the lack of qualified workers with the ability to oversee AI chatbot systems. To close the skills gap and equip librarians with the requisite competencies, a substantial investment in training and development is necessary. Furthermore, Okeke and Eze (16) noted the limitations in the performance of existing AI chatbots. While users found chatbots helpful for simple questions, they often struggled to provide detailed information and answer complex academic queries. This drawback highlights the necessity of ongoing updates and enhancements to chatbot systems to maximize their potential.

6. Methodology

The research methodology employed in this study was quantitative, aiming to provide a systematic assessment of the adoption of AI chatbots by librarians and their potential impact on future library services in Nigerian universities. The quantitative method was used because it allows the researcher to collect and analyze numerical data, including current and future trends in usage as well as the challenges associated with them. The type of research design used in the study was an ex post facto research design, as it aimed to analyse possible cause-and-effect relationships using data derived from certain conditions and behaviours, and different but predetermined points in time were obtained.

This type of design was particularly suitable because it allowed the researcher to evaluate the outcome and

implementation of the AI chatbots in library services without variables affecting the results, based on historical data and with the help of librarians with experience in the matter. The ex post facto design enabled a practical assessment of the (current) status of AI chatbot usage among librarians based on past and present events. A total of 989 respondents, comprising librarians from academic libraries across Nigeria, constituted the study's population.

The population of this study was selected because they are qualified and responsible professionals with professional experience in library services, and they have direct contact with AI chatbot technology. The sample was chosen, therefore, using targeted sampling, proportional sampling, and simple random sampling to obtain a sample as representative as possible of the population. First, a purposive sampling technique was used whereby one state was selected from each of the six geopolitical zones in Nigeria: Bauchi from the Northeast, Ondo from the Southwest, Kano from the Northwest, and Kogi from the Northwest. Central, Delta from south-south and Anambra from southeast. This ensured that the sample was as geographically diverse as the different parts of Nigeria. A purposive sampling technique was then used to decide on the sample size, relying on Krejcie and Morgan's (24) table of sample sizes for a given population. A sample size of 278 librarians (28% of the total population) was selected. Finally, a simple random sampling technique was employed to select respondents from the selected states, ensuring that each librarian had an equal opportunity to participate in the study.

The research approach utilized in this investigation was quantitative and aimed at systematically assessing the extent to which AI chatbots are adopted by librarians, as well as their potential influence on future library services in Nigerian universities. The quantitative approach was chosen as it enables the researcher to gather and analyze numerical data, including current and projected usage trends as well as associated challenges. The research design implemented in this study was an ex post facto design, which focused on examining possible cause-and-effect relationships using data derived from specific conditions and behaviors at various predetermined points in time. This design was particularly advantageous as it allowed the researcher to evaluate the outcomes and implementation of AI chatbots in library services without the influence of variables on the results, drawing upon historical data and insights from experienced librarians regarding the topic. The ex post facto design enabled a thorough assessment of the current state of AI chatbot usage among librarians, encompassing both past and present occurrences. The study's population consisted of 989 respondents, all librarians from academic libraries across Nigeria. This population was chosen due to their qualifications and professional experience in library services, as well as their direct interaction with AI chatbot technology. To create a representative sample, targeted sampling, proportional sampling, and simple random sampling were employed. Initially, a purposive sampling technique was implemented, selecting one state from each of Nigeria's six geopolitical zones: Bauchi from the Northeast, Ondo from the Southwest, Kano from the Northwest, Kogi from the Central region, Delta from the South-South, and Anambra from the Southeast. This ensured a geographically diverse sample representing various regions of Nigeria. A purposive sampling technique was then applied to determine the sample size, using Krejcie and Morgan's (24) sample size table for the specified population. A total of 278 librarians, constituting 28% of the overall population, were selected. Lastly, a simple random sampling technique was utilized to choose respondents from the selected states, guaranteeing that every librarian had an equal chance to participate in the study. Data collection was conducted using a structured questionnaire, chosen for its effectiveness in gathering standardized information from a large number of respondents. The questionnaire was distributed to librarians through Google Forms and shared via WhatsApp groups managed by the state chapters of the Nigerian Library Association. This approach was selected for its convenience, cost-effectiveness, and ability to reach a broad audience quickly. Out of the 278 questionnaires distributed, 200 were filled out and returned, yielding a response rate of 72%, which was deemed adequate for the study.

The data collected was analyzed using descriptive statistics, including mean, frequency and percentage. Descriptive statistics were chosen because they allow for straightforward interpretation of the data and provide a clear summary of the usage levels, prospects, and challenges associated with AI chatbots in university libraries. For data interpretation, the criterion mean of 2.50 was used, with mean ratings as very low (0.00–1.49), low (1.50–2.49), high (2.50–3.49), and very high (3.50 and higher). The study adhered to ethical standards by obtaining informed consent from all participants, maintaining confidentiality, and securing ethical clearance from the relevant institutional review board. The data collection and analysis process took approximately three months, allowing sufficient time for distribution, response collection, and comprehensive data analysis.

7. Results

Research Question 1: To what extent are university libraries in Nigeria implementing the use of AI chatbots in service delivery currently?

Statement	SA	AD	SD	SD	X
Use of AI chatbots to handle user account queries, such as fines and holds	25	36	63	76	2.05
Application of AI chatbots in providing technical support for library users	20	32	51	97	1.86
Integrating of AI chatbots in managing library event registrations	11	21	63	105	1.69
Use of AI chatbots to handle interlibrary loan requests	13	11	65	111	1.63
Use of AI chatbots by patrons to renew borrowed materials	10	21	51	118	1.62
Application of AI chatbots in supporting research consultations	95	65	11	29	3.13
Integration of AI chatbots to perform catalogue searches for patrons	13	21	19	147	1.50
Use of AI chatbots in assisting with reference questions	21	32	50	97	1.89
Integration of AI chatbots in providing technical support for library users	9	12	73	106	1.62
Use of AI chatbots for the acquisition of information resources	15	37	51	97	1.85
N = 200 Criterion Mean 2.50 Aggregate Mean 1.92					

Table 1. Level of Usage of AI Chatbots for Service Delivery

The data in Table 1 indicate that the overall usage of AI chatbots for service delivery in Nigerian university libraries is generally low, with an aggregate mean of 1.92, which is below the criterion mean of 2.50. The use of AI chatbots is particularly low for handling user account queries ($x = 2.05$), providing technical support ($x = 1.86$), managing event registrations ($x = 1.69$), handling interlibrary loan requests ($x = 1.63$), renewing borrowed materials ($x = 1.62$), performing catalogue searches ($x = 1.50$), assisting with reference questions ($x = 1.89$),

and acquiring information resources ($x = 1.85$). The only exception is their use in supporting research consultations, which has a higher mean score of 3.13, indicating moderate usage in this area. Overall, the findings suggest minimal adoption of *AI* chatbots across most library services, except for research consultations ($x = 3.13$).

The low overall usage of *AI* chatbots in Nigerian university libraries, as shown in Table 1, is likely due to limited awareness and understanding of their benefits, inadequate technological infrastructure, and financial constraints that deprioritize investment in *AI* tools. Concerns about data privacy, security, and trust further hinder adoption.

Research Question 2: What sort of expectancy does *AI* have about service delivery in university libraries in Nigeria?

Statements	A		D	
	Freq.	%	Freq.	%
I guess <i>AI</i> chatbots are capable of influencing the future workload and roles of librarians	182	91	18	9
I envisioned <i>AI</i> chatbots improving the accessibility of library resources for all users	170	85	30	15
I have confidence in <i>AI</i> chatbots handling more complex and specialized queries in the future	161	81	39	19
I foresee the use of <i>AI</i> chatbots for future library outreach programmes	151	76	49	24
I envisioned <i>AI</i> chatbots providing multilingual support for library users	142	71	58	29
I expect <i>AI</i> chatbots will provide personalized assistance to library patrons	132	66	68	34
I estimate that <i>AI</i> chatbots will advance research support in the future	130	65	70	35
I forecast <i>AI</i> chatbots will enhance the efficiency of library administrative tasks	125	63	75	37
I predict <i>AI</i> chatbots will offer new services to enhance library user experiences	119	60	81	40
I anticipate <i>AI</i> chatbots contributing to future library collaborations and partnerships	113	57	87	43

Table 2. *AI* Chatbot Prospects for Future Library Services in Universities

The data in Table 2 indicate that respondents perceive significant prospects for *AI* chatbots in future library services, with a majority agreeing on their potential to impact various areas. Most respondents believe *AI* chatbots will influence the workload and roles of librarians (91%), improve accessibility to library resources (85%), support outreach programs (76%), and provide multilingual support (71%). Additionally, they expect chatbots to offer personalized assistance (66%), advance research support (65%), enhance administrative

(63%), efficiency introduce new services to improve user experience (60%), and foster collaborations (57%). These optimistic perceptions likely stem from recognition of *AI*'s potential to automate routine tasks, enhance service delivery, and expand library capabilities, reflecting a general anticipation of positive technological impact despite current low adoption levels.

Research Question 3: What are the challenges of using *AI* chatbots among the librarians in university libraries in Nigeria?

Challenges	A		D	
	Freq.	%	Freq.	%
Difficulty in customising <i>AI</i> chatbots to meet specific library needs	191	96	9	4
Difficulty in user acceptance and trust in <i>AI</i> chatbots services	187	94	13	6
Inability of <i>AI</i> chatbots to handle specialized topics	177	86	23	14
Difficulty in updating <i>AI</i> chatbot software	170	85	30	15
Data privacy and security	162	81	38	19
Inability to handle technical issues encountered when using <i>AI</i> chatbots	160	80	40	20
Difficulty in ensuring that <i>AI</i> chatbots provide equitable service to all users	149	75	51	25
Integration <i>AI</i> chatbots with existing library management systems	132	66	68	34
Inadequate personnel to effectively manage <i>AI</i> chatbots	119	60	81	40
Provision of incorrect responses to patrons' inquiries	88	44	112	56

Table 3. Challenges Associated with the Usage of *AI* Chatbots in Universities

The data in Table 3 reveal that significant challenges hinder the effective use of *AI* chatbots in Nigerian university libraries, with a majority of respondents citing difficulties in customizing chatbots to meet specific library needs (96%), issues with user acceptance and trust (94%), and the inability of chatbots to handle specialized topics (86%). Additional challenges include problems in updating software (85%), concerns over data privacy and security (81%), technical difficulties during chatbot use (80%), and challenges in ensuring equitable service (75%). Lower levels of agreement were reported for difficulties integrating *AI* with existing systems (66%) and insufficient personnel to manage *AI* (60%). These results suggest that the perceived complexity of implementation, combined with technical, infrastructural, and user-related issues, contributes to the reluctance or slow pace of adopting *AI* chatbots in these libraries.

8. Discussion of the findings

The study's outcome revealed that the current use of *AI* chatbots by librarians in Nigerian university libraries is generally low, suggesting that these institutions are not fully leveraging modern technological advances to

enhance their service delivery. This underutilization may result in less efficient and less personalized support for library users, potentially affecting overall user experience and satisfaction. For library services, this means missing opportunities to automate routine tasks, provide 24/7 support and streamline administrative processes. For users, especially students and researchers, this means a lack of immediate, accessible and tailored support that AI chatbots can provide. Furthermore, the reputation and competitive advantage of Nigerian university libraries could be affected, as they may be perceived as lagging behind in adopting innovative solutions that are increasingly becoming standard in global educational environments.

The outcome of this study aligns with that of Olapegba et al. (14), which investigated the use of *AI* chatbots in Southwestern Nigerian libraries. The study found that only 15% of the libraries questioned had implemented *AI* chatbots, primarily due to budgetary limitations and a lack of technical expertise. In the same vein, the study's findings equally corroborate those of Adedoyin (15), which found that only a small percentage of university libraries in northern Nigeria had the necessary infrastructure to support *AI* chatbots.

The result of the study from research question two shows promising prospects for *AI* chatbots in future library services and highlights their potential to significantly impact librarians' workload by automating routine tasks and enabling concentration on specialized activities. *AI* chatbots are expected to improve the accessibility of library resources, including multilingual support for users with disabilities or language barriers. Their use in outreach programs could increase engagement in the academic community, while personalized support would improve user satisfaction.

AI chatbots are also expected to advance research support by providing timely, accurate information and streamlining administrative tasks, freeing up resources for other services. The introduction of new *AI*-driven services could enrich the library user experience and make libraries more dynamic and responsive. Additionally, *AI* chatbots could promote greater collaboration and resource sharing between institutions. Overall, the integration of *AI* chatbots could transform library services in Nigeria, making them more efficient, accessible and user-centric, thereby improving the status and effectiveness of university libraries. The finding supports that of Okeke and Eze (16), who investigated users' opinions of *AI* chatbots. According to their findings, chatbots were well-received by teachers and students, who valued their personalized responses and constant accessibility. The finding also aligns with that of Omotayo and Haliso (17), who found that although the potential of *AI* chatbots was widely recognised, there was little actual implementation due to similar problems with funding, inadequate technical support, and insufficient training.

Furthermore, the study's results show that librarians in Nigerian libraries perceive many challenges associated with the use of *AI* chatbots for library service delivery. These challenges include difficulties in adapting *AI* chatbots to specific library needs, user acceptance/trust in *AI* services, inability of *AI* chatbots to address particular topics, updating *AI* chatbot software, privacy and security concerns, and the inability to resolve technical issues over time deployment of *AI* chatbots, difficulty in providing equal services to all users, difficulty in integrating *AI* chatbots into existing library management systems, and insufficient staff to manage *AI* chatbots effectively. The challenges, as mentioned earlier, suggest that although *AI* chatbots have the potential to revolutionise library services in Nigeria, substantial impediments need to be overcome to fully actualize their potential. The development and standing of university libraries in Nigeria could be hampered if these obstacles are not removed from the way *AI* chatbots are implemented. This could result in ineffective

service delivery, disgruntled users, and potential security concerns.

The finding is in agreement with that of Adedoyin (15), who found that many libraries do not have the technology in place to accommodate *AI* chatbots. More so, the researcher equally emphasized that the deployment and efficient use of *AI* chatbots are further complicated by problems like patchy internet access. The finding also supports that of Olapegba et al. (14) and Adedoyin (2021), who suggested that one major obstacle hindering the deployment of *AI* chatbots for service delivery is the lack of technical expertise among staff members in overseeing *AI* chatbot systems.

9. Conclusion

The study concludes that while the current use of *AI* chatbots by librarians in university libraries in Nigeria is generally low, reflecting a missed opportunity to leverage modern technology for improved service delivery, there are promising prospects for their future adoption. *AI* chatbots have the potential to significantly enhance library services by automating routine tasks, improving resource accessibility, providing personalized and multilingual support, improving research support, and streamlining administrative processes. However, to realize these benefits, significant challenges must be overcome, such as adapting *AI* to specific library needs, gaining user trust, ensuring data privacy and security, and addressing technical issues. Overcoming these barriers is crucial to transforming library services in Nigeria, making them more efficient, accessible, and user-centred, thereby enhancing the status and effectiveness of university libraries in the country. The results indicate that chatbots within instant messaging applications are still in the early stages of development as *AI* tutoring assistants. (26)

10. Future

Future services are likely to see a higher use of chatbots, despite their limitations.

To address the current low use of *AI* chatbots, university administrators and library management invest in modern technological infrastructure and provide comprehensive training for librarians to ensure they are equipped with the necessary skills to effectively implement and manage *AI* systems. This can be facilitated through partnerships with technology companies and continuous professional development programs.

1. To capitalize on the promising prospects of *AI* chatbots in future library services, libraries test *AI* chatbot projects that automate routine tasks and focus on specialised activities, freeing librarians to devote more time to more complex tasks. Collaborating with *AI* developers to create customized solutions tailored to the specific needs of each library is critical. Additionally, user training programs should be established to enhance library users' acceptance and trust in *AI* services.

2. To address the challenges perceived by librarians, they involve users in the development and implementation process of *AI* chatbots to ensure that these tools meet their practical needs. Regular updates and maintenance of *AI* chatbot software are crucial for resolving technical issues and enhancing functionality. It is critical to address privacy and security concerns through robust data protection measures. Additionally, recruiting and training additional staff specialized in *AI* technology will ensure effective management and integration of *AI* chatbots into existing library systems. By taking these steps, university libraries in Nigeria can fully leverage the potential of *AI* chatbots to transform their service delivery.

References

- [1] Bansal, H., Khan, R. (2018). A review paper on human computer interaction. *International Journal of Advanced Research in Computer Science and Software Engineering*, 8(53).
- [2] Khanna, A., Pandey, B., Vashishta, K., Kalia, K., Bhale, P., Das, T. (2015). A study of today's A.I. through chatbots and rediscovery of machine intelligence. *International Journal of U- and e-Service, Science and Technology*, 8, 277–284.
- [3] Adamopoulou, E., Moussiades, L. (2020). Chatbots: History, technology, and applications. *Machine Learning with Applications*, 1, 100006.
- [4] Shum, H. Y., He, X. D., Li, D. (2018). From Eliza to XiaoIce: Challenges and opportunities with social chatbots. *Frontiers of Information Technology & Electronic Engineering*, 19, 10–26.
- [5] Kuhail, M. A., Alturki, N., Alramlawi, S., et al. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, 28, 973–1018.
- [6] Haugeland, I. K. F., Følstad, A., Taylor, C., Bjørkli, C. A. (2022). Understanding the user experience of customer service chatbots: An experimental study of chatbot interaction design. *International Journal of Human-Computer Studies*, 161, 102788.
- [7] Yan, R., Zhao, X., Mazumdar, S. (2023). Chatbots in libraries: A systematic literature review. *Education for Information*, 39(4), 431–449.
- [8] Nawaz, N. (2021, July 10). Artificial intelligence chatbots for library reference services. *SSRN*. <https://ssrn.com/abstract=3883917>
- [9] Anyaoku, E., Emezie, N., Nwosu, M., Ezema, I. (2020). The use of artificial intelligence (AI) and chatbots in university libraries: A perspective from Nigeria. *Journal of Library Innovation*, 11(1), 45–61.
- [10] Michele, L., McNeal, D. (2013). Introducing chatbots in libraries. *Library Technology Reports*, 49(8).
- [11] Edelwor, R., Imhonopi, D. (2017). The role of AI-powered chatbots in enhancing library services. *International Journal of Library and Information Science*, 9(3), 33–42.
- [12] Ifijeh, G., Iwu-James, J., Ilogho, J. (2020). The impact of AI chatbots on the roles and professional development of librarians in Nigerian university libraries. *Library Philosophy and Practice*, 2020(1), 1–12.
- [13] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- [14] Olapegba, P. O., Adeyemo, A. T., Akinola, M. A. (2020). The use of AI chatbots in southwestern Nigerian libraries. *Library and Information Science Research*, 42(4), 101–115.

- [15] Adedoyin, O. (2021). Infrastructure challenges affecting the implementation of AI chatbots in northern Nigerian university libraries. *Journal of Library Technology and Innovation*, 15(2), 122–138.
- [16] Okeke, M. I., Eze, C. J. (2019). User perceptions of AI chatbots in three major Nigerian universities. *Information Development*, 35(3), 430–445.
- [17] Omotayo, B. O., Haliso, Y. (2019). Awareness and preparedness of library staff in Nigerian university libraries to use AI technologies. *Journal of Academic Librarianship*, 45(5), 117–127.
- [18] Eke, H. N., Odoh, J. N., Anyanwu, P. (2020). Impact of AI chatbots on library services at the University of Nigeria, Nsukka. *Nigerian Libraries*, 54(2), 89–101.
- [19] Oyeleye, S. A., Adebayo, B. I. (2020). Increasing library user engagement with AI chatbots at Lagos State University. *Library Hi Tech*, 38(3), 481–497.
- [20] Adeyemi, S. T., Osagie, J. E., Adegbite, A. D. (2021). The use of AI chatbots in university libraries in southeast Nigeria: Overcoming technological and budgetary limitations. *Library Management Review*, 32(4), 234–248.
- [21] Johnson, R. K., Olumide, F. O. (2022). The role of AI chatbots in supporting scholarly research in Nigerian universities. *Research Support and Information Services*, 19(3), 89–103.
- [22] Akinwale, A. A., Adeniran, T. M. (2018). The impact of AI chatbots on user satisfaction and engagement in a Nigerian university library. *Journal of Information Science and Technology*, 29(1), 115–129.
- [23] Ogunyemi, A. O., Adebajo, M. O., Owolabi, J. A. (2022). Scalability challenges of AI chatbots in Nigerian university libraries. *Journal of Library Innovation and Technology*, 45(2), 142–159.
- [24] Krejcie, R. V., Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*.
- [25] Venkatesh, V., Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.
- [26] Smutny, Pavel., Schreiberova, Petra. (2020). Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education*, 151, 103862.