

AVAILABILITY AND UTILIZATION OF AI-POWERED CHATBOTS FOR ENHANCED USER SERVICES IN ACADEMIC LIBRARIES IN ANAMBRA STATE

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Abstract

The research examined availability and utilization of AI-powered chatbots for enhanced user services in academic libraries in Anambra state. This study adopts the survey research design. The population of the study comprised of 129 librarians in university libraries in Anambra state. The researcher used a sample of 50 librarians. The observation checklist and questionnaire were the research instruments used for data collection. The Cronbach Alpha reliability method was used to test the internal consistency of the instrument. A reliability coefficient of 0.77 was gotten. Data collected was analyzed using descriptive statistics of mean scores and standard deviation. The study found that none of the AI-powered chatbot features such as rule-based chatbots, FAQ chatbot etc listed are currently available in the university libraries surveyed. However, the respondents believed that AI-powered chatbots if utilized can be very effective in improving user services in university libraries. The challenges of high cost of implementation, and limited technical expertise etc, affects university libraries in adopting AI-powered chatbots. The study recommended that Government should provide adequate funding to procure the tools and systems that will enable the availability of AI-powered chatbots in the university libraries.

Keywords: AI-powered chatbots, Academic libraries, User services, Availability, Utilization
Library automation, Artificial intelligence in libraries

Introduction

AI-powered chatbots are increasingly utilized in various sectors, including academic libraries, to enhance user experiences and streamline service delivery. Chatbots, which use artificial intelligence to interact with users, are especially beneficial in providing 24/7 library services, answering frequently asked questions, and assisting with resource searches (Kumar & Malhotra, 2021). These advancements are reshaping traditional library services, making them more accessible and efficient for students and researchers.

In the context of academic libraries, availability refers to the state of being available (Ezejiolor, Agim&Ndanwu, 2022). It also refers to the extent to which chatbots are deployed to meet the needs of users, while utilization focuses on how effectively users leverage these tools for accessing information resources (Adebayo & Ayodele, 2019). Despite their potential, the adoption rate of AI-powered chatbots in Nigerian academic libraries remains relatively low, attributed to challenges such as inadequate funding, limited ICT infrastructure, and resistance to change among staff (Okoro&Udo, 2020). These barriers limit the ability of libraries to fully leverage the benefits of AI technologies.

Studies have highlighted that chatbots in academic libraries can provide personalized learning experiences, support research activities, and improve user satisfaction by reducing response times (Chen et al., 2018). However, research in Anambra State is scant regarding the extent to which these technologies have been integrated into library services (Agim&Azolo, 2022). Additionally, there is limited data on how students and academic staff perceive and utilize these tools, indicating a significant research gap.

The availability and utilization of AI-powered chatbots is essential for addressing service delivery challenges in academic libraries. When effectively implemented, chatbots can mitigate resource constraints, enhance service efficiency, and promote equitable access to library resources (Eke & Nwankwo, 2021). This study seeks to bridge the existing gap by exploring the current state of chatbot adoption in academic libraries in Anambra State and its implications for user services.

Statement of the Problem

The integration of artificial intelligence (AI) in library services has revolutionized how users access information globally. AI-powered chatbots are now widely adopted to provide

efficient, personalized, and round-the-clock services to library users. These systems have proven to reduce the workload of library staff, improve user satisfaction, and enhance the overall effectiveness of academic library operations (Kumar & Malhotra, 2021). Despite the global advancements, academic libraries in Nigeria, particularly in Anambra State, appear to lag behind in the availability and effective utilization of AI-powered chatbots.

In Anambra State, the limited deployment of AI-powered chatbots in academic libraries poses a challenge for students and researchers who depend on library services for timely information. Preliminary observations suggest that many libraries in the state still operate under traditional systems that are unable to meet the growing demand for rapid, 24/7 services. This has led to inefficiencies such as long response times, limited access to information resources, and reduced user engagement. These inefficiencies may compromise the academic productivity of students and researchers who require seamless library services.

Additionally, while some academic libraries may have introduced AI-powered chatbots, the extent of their utilization remains unclear. Factors such as insufficient technological infrastructure, inadequate training of library staff, and low awareness among users may hinder the effective use of these tools. Previous studies on the application of AI technologies in Nigerian libraries have often focused broadly on ICT adoption, without specifically addressing how AI-powered chatbots are utilized to enhance library services (Okoro&Udo, 2020; Eke &Nwankwo, 2021). This creates a significant knowledge gap regarding the effectiveness and challenges of implementing such technologies in Anambra State's academic libraries.

The lack of comprehensive studies on the availability and utilization of AI-powered chatbots in this context motivates the need for this research. The need to understand the barriers to adoption and utilization, as well as identifying strategies to improve these services, is critical for enhancing the delivery of user-focused library services. Therefore, this study aims to address these gaps by investigating the extent to which AI-powered chatbots are available and utilized in academic libraries in Anambra State, thereby contributing to the development of innovative and efficient library services

Purpose of the Study

The purpose of this study is to examine the availability and utilization of AI-powered chatbots for enhanced user services in academic libraries in Anambra state. The specific objectives are to:

1. Examine the extent of availability of AI-powered chatbots in university libraries in Anambra State.
2. Assess the effectiveness of AI-powered chatbots in enhancing user services in university libraries.
3. Identify the challenges faced by university libraries in implementing AI-powered chatbots for user services.
4. Suggest strategies for improving the availability and effectiveness of AI-powered chatbots in university libraries.

Review of Related Literature

AI-powered chatbots have emerged as a transformative technology in academic libraries, enabling enhanced user services and operational efficiency. These intelligent systems utilize natural language processing and machine learning to assist users in real-time, providing information retrieval, answering queries, and guiding library users through resources (Kumar & Malhotra, 2021). Globally, the adoption of chatbots in academic libraries has grown rapidly, particularly in developed countries where technological infrastructure supports such advancements. This adoption has redefined how libraries interact with users, bridging the gap between traditional library services and the demands of digital-age users.

The availability of AI-powered chatbots in academic libraries varies significantly across regions. In many developed countries, chatbots are an integral part of library systems, offering uninterrupted services to users (Chen et al., 2018). However, in Nigerian academic libraries, the adoption of such technologies remains limited. Studies by Eke and Nwankwo (2021) indicate that inadequate funding, insufficient ICT infrastructure, and low technological literacy among library staff hinder the implementation of AI-powered solutions in libraries across Nigeria, including Anambra State. This limited availability underscores a significant disparity in access to innovative library services between Nigerian academic institutions and their counterparts globally.

Utilization of chatbots is another critical area of concern. Even in cases where chatbots are available, their effective utilization depends on factors such as user awareness, technical

training of library staff, and ease of use. Adebayo and Ayodele (2019) observed that while some Nigerian universities have introduced AI tools in library systems, utilization rates remain low due to a lack of adequate promotion and user education. Furthermore, students and researchers often revert to traditional methods of accessing library services, either due to unfamiliarity with chatbot interfaces or lack of trust in AI systems' ability to deliver accurate information.

The increasing integration of Artificial Intelligence (AI) in academic libraries has significantly improved user services, particularly through AI-powered chatbots. These chatbots function as virtual assistants, automating responses to frequently asked questions, providing research guidance, and assisting with catalog searches. According to Okoro and Udo (2020), AI-driven tools have revolutionized library operations by offering real-time, personalized assistance to users, thereby reducing librarians' workload and improving efficiency. The availability of AI chatbots ensures that students and researchers receive immediate responses to their inquiries, enhancing the overall user experience in academic libraries.

The utilization of AI-powered chatbots in academic libraries enhances accessibility and engagement among users. Traditional library services often require human intervention, leading to delays, especially during peak hours. However, with chatbots, students can access library resources 24/7 without the constraints of time or physical presence. These tools utilize Natural Language Processing (NLP) to understand and respond to user queries effectively, making information retrieval more efficient. Furthermore, studies by Al-Farsi et al., (2022) indicate that AI chatbots can support multilingual interactions, which is particularly beneficial in academic settings with diverse student populations.

The impact of AI chatbots on academic library services also extends to research support. Researchers often require assistance with literature searches, citation management, and academic writing. AI-powered chatbots integrated with digital libraries and research databases can provide recommendations on relevant resources, helping students and faculty conduct efficient and comprehensive research (Alimi et al. (2021). As AI technology evolves, its role in facilitating advanced research analytics and personalized recommendations is expected to grow, making library services more dynamic and user-centered.

Several studies highlight the potential of chatbots in enhancing library services. AI-powered chatbots can personalize user experiences, reduce response times, and improve accessibility to library resources (Al-Farsi et al., 2022). These systems also alleviate the workload of library staff by automating repetitive tasks, enabling them to focus on complex queries and user engagement. However, the extent to which these benefits are realized in Nigerian academic libraries remains underexplored. Okoro and Udo (2020) emphasize that the absence of a cohesive policy framework for AI integration in Nigerian libraries contributes to inconsistent adoption and utilization of such technologies.

Despite their numerous advantages, the challenges surrounding the availability and utilization of chatbots in Nigerian academic libraries are multifaceted. Key barriers to implement enhanced technology include the digital divide, insufficient investments in library technologies, and resistance to change among stakeholders (Agim, Irieguna & Chivuzo, (2023). Addressing these issues requires concerted efforts from library administrators, government bodies, and academic institutions to develop strategies that promote the adoption and utilization of AI-powered tools in libraries. Such measures could include targeted funding, capacity-building programs for library staff, and awareness campaigns to encourage user engagement.

Efforts to enhance chatbot utilization must also consider the needs of library users. Research by Alimi et al. (2021) suggests that tailoring chatbot functionalities to address specific user demands, such as academic research assistance and resource recommendations, can significantly improve user satisfaction. For Nigerian academic libraries, incorporating local languages and culturally relevant content into chatbot systems could also enhance their accessibility and usability among diverse user groups.

In conclusion, the availability and utilization of AI-powered chatbots significantly enhance user services in academic libraries by improving accessibility, efficiency, and engagement. While AI-powered chatbots hold immense potential to revolutionize library services, their availability and utilization in Nigerian academic libraries, particularly in Anambra State, face significant challenges. Bridging these gaps requires investments in technology, policy development, and capacity building. However, challenges such as digital literacy gaps and data privacy concerns must be addressed to optimize their effectiveness. Future research should focus on refining chatbot capabilities, ensuring inclusivity, and integrating them with emerging AI technologies to further improve library services. With the right strategies, AI-

powered chatbots can transform academic libraries into more responsive and adaptive knowledge hubs, meeting the evolving needs of students and researchers.

Methodology

This study adopts the survey research design. The population of the study comprised of 129 librarians in the university libraries in Anambra state and a sample of 50 librarians were used. The observation checklist and questionnaire were the research instruments used for data collection. The instrument was validated by 3 experts. The Crombach Alpha a reliability method was used to test the internal consistency of the instrument. A reliability coefficient of 0.77 was gotten. Data collected was analyzed using descriptive statistics of mean scores and standard deviation

Results

Research Question 1: What is the extent of availability of AI-powered chatbots in university libraries in Anambra State?

Table 1: Observation checklist on availability of AI-powered chatbots in university libraries

S/N	Items	Available	Not Available
1	The library uses rule-based chatbots that respond to specific keywords and commands.		x
2	The library provides access to conversational AI chatbots capable of handling complex queries in natural language.		x
3	The library utilizes FAQ chatbots designed to answer frequently asked questions by users.		x
4	The library offers hybrid chatbots that combine rule-based responses with advanced AI-driven conversations.		x
5	The library's chatbot includes multilingual capabilities to assist users in various languages.		x
6	The library has personalized chatbots that can adapt responses based on individual user preferences and history.		x
7	The library uses task-oriented chatbots designed to help users complete specific actions, such as finding resources or checking availability		x

The results presented in Table 1 indicate that none of the AI-powered chatbot features listed are currently available in the university libraries surveyed. Specifically, the libraries do not use rule-based chatbots that respond to specific keywords and commands, conversational AI chatbots capable of handling complex queries in natural language, or FAQ chatbots designed to answer frequently asked questions. Additionally, hybrid chatbots, which combine rule-based responses with advanced AI-driven conversations, are absent. The libraries also lack

multilingual chatbots, personalized chatbots that adapt to user preferences, and task-oriented chatbots designed to assist users with specific actions like resource searches or availability checks. The unanimous "Not Available" decision across all items underscores a significant lack of AI-powered chatbot integration in these libraries.

The findings align with previous studies that highlight the low adoption of AI-powered technologies in academic libraries, particularly in developing countries like Nigeria. According to Eke and Nwankwo (2021), Nigerian university libraries face challenges in implementing AI technologies due to insufficient funding, lack of infrastructure, and limited technical expertise. They argue that such deficiencies hinder the integration of tools like chatbots, which have proven beneficial in streamlining user services in libraries worldwide. This observation supports the current study's findings that no AI-powered chatbots are available in the surveyed libraries. Similarly, Adebayo and Ayodele (2019) emphasize that even where some forms of AI have been introduced in Nigerian libraries, their application remains rudimentary, often limited to basic digital cataloging systems rather than advanced features like conversational or multilingual chatbots. This resonates with the observed unavailability of advanced chatbot functionalities in the libraries under investigation. The study further advocates for increased investments and capacity-building initiatives to bridge this technological gap

Research question 2: How effective can AI-powered chatbots be in enhancing user services in university libraries in Anambra State?

Table 2: Mean Responses on How effective can AI-powered chatbots be in enhancing user services in university libraries

S/N	Items	Mean	SD	Remarks
1	The AI-powered chatbot provides accurate answers to most library-related questions.	3.12	0.75	Very effective
2	Using the AI chatbot saves time for users by providing quick responses to inquiries.	3.48	0.60	Very effective
3	The AI chatbot in the library effectively assists users in locating digital resources, such as e-books and journals.	3.25	0.82	Very effective
4	The AI-powered chatbot is helpful in guiding users through the library catalog and databases.	3.34	0.78	Very effective
5	The chatbot successfully handles frequently asked questions, reducing the need for direct librarian assistance.	3.10	0.65	Very effective
6	Users find the AI-powered chatbot's responses to be clear and	3.15	0.79	Very effective

S/N	Items	Mean	SD	Remarks
	easy to understand.			
7	The chatbot provides effective support during peak hours when librarians may be unavailable	3.28	0.81	Very effective
	Grand Mean	3.25		Very effective

The table reveals that AI-powered chatbots can be highly effective in enhancing user services in university libraries. All items achieved mean scores above the 2.50 benchmark, indicating "very effective" performance across all evaluated aspects. Specifically, the chatbots provide accurate answers, save users' time, assist in locating digital resources, guide users through library systems, handle FAQs, deliver clear responses, and offer essential support during peak hours. The grand mean of 3.25 confirms that overall, AI-powered chatbots can be very effective in improving user services in university libraries. Their effectiveness in addressing inquiries and providing timely, reliable assistance highlights their potential to enhance library operations and user satisfaction.

The findings of this study align with Adebayo et al. (2019), who observed that AI-powered systems can significantly improve user satisfaction by reducing response times and providing accurate information in Nigerian university libraries. Similarly, Luo and Cheng (2021) emphasized that chatbots in academic libraries enhance resource accessibility and enable users to efficiently navigate catalogs and databases, reflecting the "very effective" rating across the items in this study. Moreover, Boulianne et al. (2022) reported that the integration of AI-driven tools in libraries positively influences user experience, particularly during peak hours when human assistance may be limited. This corroborates the high mean scores for chatbot support during such times in this study. Overall, these findings underscore the transformative impact of AI-powered chatbots in academic environments.

Research Question 3: What are the challenges faced by university libraries in Anambra State in adopting AI-powered chatbots for user services?

Table 3: Mean Responses on challenges faced by university libraries in adopting AI-powered chatbots for user services

S/N	Items	Mean	SD	Remarks
1	The high cost of implementing AI-powered chatbots is a major barrier to adoption in university libraries.	3.18	0.56	Agree
2	Limited technical expertise among library staff poses a challenge in	3.05	0.61	Agree

S/N	Items	Mean	SD	Remarks
	managing and maintaining AI-powered chatbots.			
3	Privacy concerns about user data hinder the adoption of AI-powered chatbots in the library.	3.47	0.49	Agree
4	Integrating AI chatbots with existing library systems and databases is a complex process.	3.32	0.52	Agree
5	Insufficient funding and budget allocations make it difficult to adopt AI-powered chatbots in university libraries.	3.19	0.58	Agree
6	Users may have a lack of trust in AI chatbots, preferring direct interaction with librarians for their inquiries.	3.26	0.55	Agree
7	The constant need for updates and improvements in AI technology is a challenge for sustained adoption in the library	3.30	0.54	Agree
Grand Mean		3.25		Agree

The table reveals that all respondents agree that several challenges impede the adoption of AI-powered chatbots in university libraries, as evidenced by mean scores above the 2.50 benchmark for all items. The challenges include the high cost of implementation, limited technical expertise, privacy concerns, complexity in integration with existing systems, insufficient funding, user mistrust, and the constant need for technological updates. The grand mean of 3.25 further underscores a strong agreement on these challenges across respondents which highlights that university libraries face significant challenges in adopting AI-powered chatbots

The findings of this study align with Chakraborty and Saha (2020), who emphasized that the high cost of AI implementation and insufficient funding are primary barriers to AI adoption in developing countries' academic libraries. Similarly, Tait (2021) reported that privacy concerns and the complexity of integrating AI tools with existing library management systems often delay their adoption, consistent with the high mean scores for these challenges in this study. Additionally, Park et al. (2019) highlighted that user trust issues and limited technical expertise among library staff hinder the effective deployment of AI technologies, corroborating the findings of this study. These studies underscore the multifaceted nature of the challenges that must be addressed to maximize the benefits of AI-powered chatbots in university libraries.

Research Question 4: What strategies can be implemented to improve the availability and utilization of AI-powered chatbots in university libraries in Anambra State?

Table 4: Mean responses on strategies to improve the availability and utilization of AI-powered chatbots in university libraries

SN	Items	Mean	SD	Remarks
1	Allocating dedicated funding and resources for AI chatbot implementation can improve their availability and effectiveness in university libraries.	2.87	0.78	Agreed
2	Offering continuous training programs for library staff can enhance their ability to manage and update AI-powered chatbots effectively.	3.13	0.72	Agreed
3	Ensuring user data privacy and security through robust encryption can build user trust in AI chatbots.	2.97	0.83	Agreed
4	Collaborating with technology vendors and experts can simplify the integration of AI chatbots with existing library systems.	3.09	0.76	Agreed
5	Conducting regular user feedback surveys can help in improving the functionality and user-friendliness of AI-powered chatbots.	3.10	0.68	Agreed
6	Creating awareness programs to educate users on the benefits of AI-powered chatbots can increase their acceptance and use.	2.92	0.81	Agreed
7	Establishing clear protocols for chatbot updates and maintenance can improve the long-term effectiveness of AI-powered chatbots in libraries	3.12	0.74	Agreed
Grand Mean		3.04		Agreed

The table shows that all respondents agree on the proposed strategies to enhance the availability and utilization of AI-powered chatbots in university libraries, as evidenced by mean scores above the 2.50 benchmark. Key strategies include allocating funding, continuous training for library staff, ensuring data privacy, collaborating with technology vendors, conducting user feedback surveys, awareness creation, and establishing protocols for updates and maintenance. The grand mean of 3.04 indicates a strong consensus on these strategies which gave a unanimous agreement on the necessity of implementing structured strategies to improve the adoption and effectiveness of AI-powered chatbots.

The findings of this study are consistent with the results of Chen and Liu (2021), who emphasized that adequate funding and continuous staff training are crucial for the successful implementation of AI technologies in libraries. They found that libraries that allocated a

dedicated budget for AI innovations observed increased user satisfaction and chatbot efficiency. Similarly, Patel et al. (2019) reported that addressing user concerns regarding data privacy and security builds trust and improves the utilization of AI systems. Their research found that libraries implementing robust encryption protocols experienced higher user engagement with AI-powered services.

Conclusion

The findings from the study demonstrate a comprehensive evaluation of AI-powered chatbots in university libraries, focusing on their effectiveness, challenges, and strategies for improvement. The results indicate that although AI-powered chatbots are not available, they can play a significant role in enhancing user services by providing accurate, timely responses and supporting resource accessibility, particularly during peak library hours. However, their adoption and utilization face challenges such as high implementation costs, limited technical expertise, user privacy concerns, and the complexities of system integration. Despite these challenges, the study highlights actionable strategies to address these barriers, including dedicated funding, staff training, robust data privacy measures, collaborative partnerships, and user engagement initiatives. These measures are strongly agreed upon by respondents as necessary for improving the availability and effectiveness of AI-powered chatbots in university libraries. Overall, the study underscores the potential of AI-powered chatbots to transform service delivery in university libraries, provided that institutions adopt proactive measures to address implementation challenges and foster user trust. The integration of these strategies could lead to more efficient library operations, enhanced user satisfaction, and broader acceptance of AI technologies in academic settings.

Recommendations

Based on the findings of the study, several recommendations were made to address the identified problems:

1. Government should provided adequate funding to procure the tools and systems that will enable the availability of AI-powered chatbots in the university libraries
2. University libraries should enhance the capabilities of AI-powered chatbots to provide more accurate and contextual responses by investing in advanced natural language processing (NLP) technologies.

3. Libraries should organize workshops and orientation programs to familiarize users with the features and benefits of AI-powered chatbots, increasing user engagement and satisfaction
4. Universities should prioritize budget allocations for AI chatbot implementation, ensuring resources are available for acquisition, maintenance, and periodic upgrades.
5. Institutions should provide continuous training for library staff to equip them with the technical expertise required to manage and maintain AI-powered chatbots effectively.
6. Libraries should partner with technology vendors and AI experts to simplify chatbot integration and ensure seamless operation within existing library systems.
7. Conduct regular user feedback surveys to identify areas for improvement and refine chatbot functionality based on user preferences and needs.

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