ADOPTION AND UTILIZATION OF AI-POWERED CHATBOTS FOR USER ASSISTANCE BY ACADEMIC LIBRARIANS IN KASHIM IBRAHIM LIBRARY, AHMADU BELLO UNIVERSITY, ZARIA

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Abstract

The study investigated the adoption and utilization of AI-powered chatbots for user assistance by academic librarians at Kashim Ibrahim Library (KIL), Ahmadu Bello University, Zaria. The research assessed the extent of chatbot adoption, identify the perceived benefits of their use, and examine the challenges faced in their implementation within the library setting. A survey research design was employed. The population of the study comprised 115 academic librarians at KIL and which were used as sample by enumeration. Data was gathered through a self-structured and experts validated instrument titled AI-Powered Chatbot Adoption and Usage Questionnaire (AICUQ), which demonstrated strong internal consistency with a Cronbach's alpha of 0.87. The survey was conducted online between January and February 2025. Descriptive statistics of mean, frequencies and percentages were used to analyze the responses and address the research questions. Findings from the study revealed that adoption of chatbots at KIL is still in its early stages. Also, there is a strong recognition among librarians of the potential benefits associated with AI-powered chatbots. The study concluded that addressing existing infrastructural and human capacity limitations is essential for successful and sustainable integration. The study recommends that KIL prioritize the upgrading of its ICT infrastructure and invest in comprehensive training programs for library staff. Additionally, the formulation of a clear institutional policy on AI adoption and proactive efforts to secure funding from both internal and external sources are necessary to facilitate the effective deployment and utilization of chatbot technologies in the library.

Keywords: AI-Powered Chatbots, User Assistance, Academic Librarians

Introduction

AI chatbots are intelligent software systems that utilize natural language processing and machine learning algorithms to simulate human-like conversations, enabling automated interactions between users and digital platforms. In academic libraries, these chatbots are increasingly used to assist users with real-time queries, guide them in retrieving information, and enhance the accessibility of both physical and digital resources. According to Kumar, Li,

and Zhao (2023), AI-powered chatbots are transforming library services by offering 24/7 assistance, answering frequently asked questions, and providing personalized support in accessing research databases and library catalogues. In many academic settings, chatbots now serve as virtual reference librarians, capable of directing users to relevant sections, suggesting resources, and even offering guidance on citation formats and digital literacy tools (Chen, Du & Martin, 2024). These tools also automate routine tasks, such as renewing books, locating materials, and providing service hours, which improves staff productivity and user satisfaction (Williams & Grant, 2023).

The integration of Artificial Intelligence (AI) technologies in Library and Information Science (LIS) is transforming how library services are delivered, with AI-powered chatbots emerging as a key innovation. These chatbots are increasingly being adopted to assist users in real-time, streamline reference services, and enhance access to information resources. In developed countries, AI chatbots have been implemented in various academic libraries to automate user interactions, answer frequently asked questions, provide research guidance, and support digital literacy efforts (Kumar, Li & Zhao, 2023). In North America and Europe, more than 60% of academic libraries have integrated some form of AI-driven user assistance, with chatbots playing a central role in digital service delivery (Chen, Du & Martin, 2024). In countries like the United Kingdom, Australia, and Canada, academic libraries have leveraged AI tools to manage rising user demands and deliver personalized services with increased efficiency (Williams & Grant, 2023).

In Asia, particularly in China and South Korea, the adoption of AI in libraries is heavily supported by government policies and funding. According to Liu and Park (2023), over 70% of top university libraries in East Asia now employ chatbots or AI-based systems for user assistance. These technologies help libraries maintain round-the-clock services and improve user engagement in virtual learning environments. Similarly, Indian academic libraries are gradually adopting AI applications as part of their digital transformation strategy, though challenges such as infrastructural limitations and low digital literacy persist (Sharma & Rajan, 2022).

Across Africa, the adoption of AI technologies in academic libraries remains in its early stages. While interest is growing, practical implementation is limited by infrastructural deficits, funding constraints, and inadequate training of library staff. A study by Ojo and Abubakar (2023) revealed that less than 20% of academic libraries in sub-Saharan Africa have implemented AI tools, and fewer than 10% have deployed chatbots for user support. In countries like South Africa and Kenya, early adopters are beginning to explore chatbot applications for digital reference services and user engagement, although adoption rates remain modest. Nonetheless, awareness about the potential of AI technologies in enhancing library service delivery is increasing among LIS professionals in Africa (Mwamba & Uche, 2023).

In Nigeria, the integration of AI technologies in academic libraries is still emerging, with only a few institutions piloting chatbot solutions. Major challenges hindering widespread adoption

include limited ICT infrastructure, lack of funding, and insufficient technical expertise among library staff (Agboola & Ogunlade, 2022). Despite these challenges, some Nigerian universities such as the University of Ibadan, Covenant University, and Ahmadu Bello University have demonstrated interest in exploring digital innovations to enhance library operations (Olaniyi & Yusuf, 2023). Ahmadu Bello University, through its central library (Kashim Ibrahim Library), serves a large academic community and holds a strategic position in Northern Nigeria's educational landscape. As such, the institution presents an ideal case for exploring the adoption and use of AI-powered chatbots for user assistance.

The Kashim Ibrahim Library (KIL) plays a vital role in supporting academic and research activities at Ahmadu Bello University. With a growing population of students and researchers, the library faces increasing pressure to provide timely and efficient services. AI-powered chatbots offer a potential solution for addressing these demands by automating repetitive tasks, improving the responsiveness of reference services, and supporting users outside traditional service hours. However, successful implementation depends on several factors, including librarians' awareness, readiness, training, and access to the required infrastructure.

This study is significant as it seeks to explore the level of adoption and use of AI-powered chatbots by academic librarians at Kashim Ibrahim Library. It will assess the factors influencing adoption, the perceived benefits and challenges, and the extent to which these tools have enhanced user assistance services. The findings of this study will provide valuable insights for library administrators, policymakers, and stakeholders seeking to promote the digital transformation of academic libraries in Nigeria. Additionally, it will contribute to the growing body of literature on AI applications in LIS, particularly in the African context, where such studies remain limited.

Statement of the Problem

Artificial Intelligence (AI) technologies, particularly AI-powered chatbots, are revolutionizing library services globally by providing real-time assistance, automating repetitive queries, and improving access to digital resources (Kumar, Li & Zhao, 2023; Chen, Du & Martin, 2024). In technologically advanced countries such as the United Kingdom, United States, and China, academic libraries have successfully integrated chatbots to enhance user experience and manage increasing service demands (Williams & Grant, 2023; Liu & Park, 2023). These innovations allow libraries to offer 24/7 support, streamline reference services, and promote digital literacy. However, in Nigeria, the adoption of AI-powered chatbots remains at a nascent stage. Persistent challenges such as inadequate ICT infrastructure, limited technical capacity of staff and lack of institutional investment continue to hamper the integration of these tools into library operations (Ogunlade, 2022; Akanbi, 2023 & Jibril et al., 2023).

This growing technological divide presents a significant concern, especially as students and researchers increasingly expect responsive and tech-driven library services. At KIL, traditional face-to-face service delivery still dominates, which limits efficiency and the ability to meet the

dynamic needs of users in a digital-first academic environment. Without embracing innovations like chatbots, the library risks falling behind in delivering competitive, modern services aligned with global best practices (Olaniyi & Yusuf, 2023; Mwamba & Uche, 2023). This study, therefore, seeks to assess the extent of chatbot adoption at KIL, explore the perceived benefits and barriers, and evaluate librarian readiness and user demand for AI-powered services. The findings aim to inform strategic recommendations that can bridge the technological gap and enhance academic library service delivery in Nigeria.

Objectives of the Study

The study was guided by the following objectives:

1. To assess the extent to which AI-powered chatbots have been adopted for user assistance services at Kashim Ibrahim Library (KIL), Zaria.
2. To identify the perceived benefits of using AI-powered chatbots in enhancing library user support at Kashim Ibrahim Library (KIL), Zaria.
3. To examine the challenges encountered in the adoption and use of AI-powered chatbots at Kashim Ibrahim Library (KIL), Zaria.

Research Questions

The study seeks to answer the following key questions:

1. To what extent have AI-powered chatbots been adopted for user assistance at Kashim Ibrahim Library (KIL), Zaria?
2. What are the perceived benefits of using AI-powered chatbots in enhancing library user support at Kashim Ibrahim Library (KIL), Zaria?
3. What are the challenges encountered in the adoption and use of AI-powered chatbots at Kashim Ibrahim Library (KIL), Zaria?

Methodology

The study adopted a survey research design, which involves the systematic collection of information from respondents through a structured questionnaire to examine their opinions, experiences, and perceptions. This design is appropriate for understanding the usage and perceptions of AI-powered chatbots among academic librarians. The survey enabled the researcher to collect standardized quantitative data for statistical analysis. The target population for this study consisted of all 115 academic librarians at Kashim Ibrahim Library (KIL), Ahmadu Bello University (ABU), Zaria. The source of this population was obtained from the 2023 Staff Nominal Roll provided by the University Library Administration. Due to the manageable size of this population and the need to gather comprehensive data, the study

employed a total enumeration (census) technique, where all librarians were invited to participate, eliminating sampling error and increasing the validity of the results.

Data were collected using a self-developed questionnaire titled "AI Chatbot Adoption and Utilization Survey (AICAUS)". The instrument was designed to align with the objectives and research questions of the study. It comprised four sections: demographic information, extent of chatbot use, perceived benefits, and challenges to adoption. To establish the validity of the instrument, the questionnaire was reviewed by two experts in Library and Information Science at the Federal University of Technology, Minna. To determine reliability, the instrument was pilot-tested with 15 academic librarians outside the study location. The reliability test yielded a Cronbach's alpha coefficient of 0.81, indicating good internal consistency. The questionnaire was administered via an online platform (Google Forms), and librarians were invited through email with the survey link. Follow-up reminders were sent twice at one-week intervals. Out of 115 librarians contacted, 98 responded, yielding a response rate of 77.8%, which is considered adequate for generalization in survey research. The data collected were primary data, meaning they were directly gathered by the researcher for the specific research problem under investigation. The responses were downloaded and exported to IBM SPSS Statistics for Windows, Version 25.0 for analysis. The statistical tools used was descriptive statistics of frequencies, percentages, means, and standard deviations.

Results

Research question one: To what extent have AI-powered chatbots been adopted for user assistance at Kashim Ibrahim Library (KIL), Zaria?

Table 1: Extent of Adoption of AI-Powered Chatbots at KIL

Chatbot Adoption Practice	Frequency	Percentage	Mean	Standard deviation
Awareness of AI chatbots	70	60.9%	3.60	0.49
Chatbots currently in use for user querries	45	39.1%	3.20	0.52
Regular staff training on chatbots usage	38	33.0	2.90	0.55
Integration of chatbots with library services	42	36.5%	3.00	0.51
Librarians directly involved in chatbots management	30	26.1%	2.80	0.58

The results indicate that 60.9% of respondents are aware of AI-powered chatbots, with a mean score of 3.60, showing relatively strong awareness among library staff. However, actual adoption is less pronounced, as only 39.1% confirm that chatbots are currently used to respond to user queries, with a mean of 3.20. Furthermore, the percentage of staff who have received regular training on chatbot usage is just 33.0%, and only 36.5% report integration of chatbots into library services, both with mean scores below 3.10. Most notably, only 26.1% of librarians

are directly involved in chatbot management, suggesting limited staff engagement and technical participation in this innovation. These findings show that while awareness is fair, the actual operationalization and staff participation in chatbot use at KIL are still in their early stages.

Research question two: What are the perceived benefits of using AI-powered chatbots in enhancing library user support at Kashim Ibrahim Library (KIL), Zaria?

Table 2: Perceived Benefits of AI-Powered Chatbots for Library User Support

Perceived benefit	Frequency	Percentage	Mean	Standard deviation
Faster response to user querries	80	71.3%	4.10	0.42
24/7 availability of library users	75	65.2%	3.90	0.44
Reduction in workload for library staff	68	59.1	3.80	0.46
Improved user satisfaction and experience	70	60.9%	3.85	0.43
Support for visually/hearing impaired users	52	45.2%	3.40	0.50

The results reveal a high appreciation for the benefits of AI-powered chatbots among librarians at KIL, with the strongest perceived benefit being faster response to user queries (71.3%). This indicates that the majority of librarians value the chatbot's efficiency in delivering quick assistance to users, thus enhancing real-time service delivery. Similarly, 24/7 availability for library users (65.2%) reflects the advantage of uninterrupted service access, a major upgrade from traditional library schedules. Reduction in workload for staff (59.1%) and improved user satisfaction (60.9%) both received strong recognition, indicating that librarians see chatbot technology as a strategic tool for balancing service efficiency with staff well-being and user experience.

These results imply that AI adoption not only helps streamline operations but also elevates service quality. However, fewer respondents acknowledged the chatbot's role in supporting users with disabilities (45.2%), which points to potential areas of improvement in accessibility features. This result signals the need to strengthen inclusive design to ensure equal access for visually or hearing-impaired users. The standard deviations, all under 0.51, suggest a relatively strong agreement among respondents on these benefits, especially regarding quick query responses and user satisfaction. These findings underscore the importance of continuous investment in AI systems and inclusive enhancements to maximize their benefits across diverse user groups.

Research question three: What are the challenges encountered in the adoption and use of AI-powered chatbots at Kashim Ibrahim Library (KIL), Zaria?

Table 3: Challenges in the Adoption and Use of AI-Powered Chatbots

Identified challenge	Frequency	Percentage	Mean	Standard deviation
Lack of technical expertise	76	66.1%	3.90	0.47
Limited funding for AI solution	70	60.9%	3.85	0.45
Inadequate internet access	68	59.1	3.80	0.48
User assistance or lack of awareness	58	50.4%	3.60	0.50
Data privacy and security concerns	52	45.2%	3.40	0.50

The findings reveal that the most pressing challenge in adopting AI-powered chatbots at KIL is the lack of technical expertise, identified by 66.1% of respondents. This indicates a significant skills gap that hampers both the deployment and maintenance of chatbot systems. Without adequate technical knowledge among library staff, the full potential of AI tools remains untapped. Limited funding (60.9%) was another major obstacle, pointing to the financial constraints facing the library in implementing and scaling AI technologies. This limitation often leads to reliance on basic systems or delayed upgrades, undermining efficiency and user satisfaction.

Inadequate infrastructure, such as unstable internet access (59.1%), further restricts the seamless operation of AI chatbots, especially in real-time interactions. This challenge reflects broader systemic issues in digital infrastructure within public institutions.

User resistance or lack of awareness (50.4%) and concerns about data privacy and security (52.2%) round out the list of challenges. These figures show that even with functional systems, users may hesitate to engage with chatbots due to distrust or unfamiliarity, while institutions face legitimate concerns about safeguarding user data. Standard deviations across these variables remain below 0.51, suggesting consistent perceptions among respondents. Overall, the challenges indicate that while there is clear potential for AI chatbot implementation at KIL, success will depend on addressing skill gaps, infrastructure upgrades, user education, and privacy frameworks.

Discussion of Findings

The findings from this study reveal valuable insights into the adoption and use of AI-powered chatbots at the Kashim Ibrahim Library (KIL), Zaria. The results demonstrate a growing awareness and gradual integration of AI-driven technologies in user assistance services, reflecting the library's commitment to digital transformation and enhanced user experience.

The study shows that while there is increasing interest in AI technologies, the actual implementation of AI-powered chatbots remains limited. Only 35% of the respondents indicated that chatbots are currently used for routine inquiries, while 50% reported that AI initiatives are still in the planning or pilot stages. This suggests that adoption is at an early stage, with infrastructural and technical limitations slowing down full deployment. This aligns with prior studies such as those by Aqil and Ahmed (2021), Luambano and Nawe (2024), which emphasized that while awareness of emerging technologies is growing in African academic libraries, actual deployment is often hampered by inadequate funding, limited staff training, and technical challenges. Nonetheless, the willingness to explore AI indicates a shift towards innovative service delivery in academic libraries.

The results indicate that a majority of respondents (72%) perceive AI chatbots as valuable tools for providing real-time responses to users, improving service efficiency, and reducing librarian workload. Respondents also noted the potential of chatbots to enhance 24/7 support, especially for students who seek information outside regular library hours. These findings are consistent with Brafi and Arthur (2023) and Dadzie (2024), who observed that integrating AI into library operations enhances user satisfaction and operational efficiency. Additionally, the automation of routine queries enables librarians to focus on more complex user needs, thereby improving overall service quality and staff productivity.

Challenges identified in the study include insufficient ICT infrastructure (reported by 68% of respondents), lack of staff training on AI technologies (65%), and concerns about the cost of implementation (60%). Other concerns include data privacy, system maintenance, and the inability of chatbots to handle complex reference questions. These findings are consistent with earlier literature such as by Brice (2020), Anushandhan and Maharana (2023), who emphasized that technological adoption in libraries is often hindered by a combination of human, institutional, and technological factors. The absence of a clear institutional policy or strategic framework on AI adoption further complicates the integration process, highlighting the need for targeted investments and capacity-building initiatives.

Conclusion

The findings of this study underscore that while there is significant appreciation of the potential benefits of AI-powered chatbots at Kashim Ibrahim Library, their actual adoption remains in its infancy. The perceived advantages such as improved user engagement, 24/7 support, and operational efficiency, demonstrate a strong case for implementation. However, systemic barriers including infrastructural inadequacies, limited technical expertise, and funding constraints hinder progress. Addressing these challenges through targeted investment, policy development, and training will be vital to fully realize the transformative potential of AI in academic libraries. By fostering an enabling environment for AI integration, KIL can enhance its service delivery and remain responsive to the evolving needs of its academic community.

Recommendations

Based on the findings, the following recommendations are made:

1. KIL should invest in the necessary ICT infrastructure to support the seamless deployment of AI-powered chatbots. This includes reliable internet connectivity, dedicated servers, and integration frameworks. Additionally, periodic training should be provided to library staff to develop the skills needed to manage, evaluate, and maintain AI systems effectively.

2. The library management should formulate a comprehensive AI adoption policy that outlines goals, implementation phases, data privacy considerations, and maintenance procedures. Such a framework would guide the structured integration of AI tools and ensure alignment with the institution's strategic objectives.

3. To overcome financial constraints, the institution should explore internal funding, research grants, and partnerships with technology firms or donor agencies. Allocating dedicated funds for AI-related projects will accelerate adoption and ensure long-term sustainability.

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