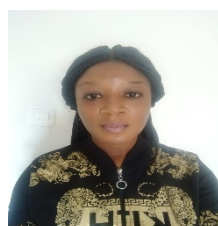


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Perception of Librarians on the Use of Chatbot for Reference Services in Libraries in Kwara State

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Abstract

The rapid digitisation of library services has introduced artificial intelligence tools like Chatbots, reshaping reference services and enhancing user engagement. This study investigates perception of librarians on the use of Chatbot for reference services in libraries in Kwara State. The objectives were to explore librarians' perceptions of Chatbots, evaluate their effectiveness in handling inquiries, examine their impact on user satisfaction, and identify integration challenges. Employing a descriptive survey design, the study sampled 70 librarians across six libraries using total enumeration techniques. Data were gathered through a structured questionnaire and analysed using descriptive statistics. Findings revealed that most librarians perceived Chatbots positively, recognising their efficiency, ease of use, and ability to manage both routine and complex inquiries. Chatbots were also associated with increased user satisfaction and engagement, although concerns were noted regarding staff training and integration difficulties. The study concluded that, while Chatbots are generally welcomed as supportive tools in reference services, successful adoption depends on addressing technical and human resource-related challenges. The study recommended that libraries should invest in comprehensive training programmes to equip staff with the necessary skills for effective Chatbot utilization.

Key words: Chatbot, Reference Services, Kwara State

Introduction

The rapid advancement of technology over recent decades has significantly transformed various sectors which include education and library services. With the advent of digital information and the increasing demand for immediate access to knowledge, libraries are evolving from traditional book repositories to dynamic information centers. The integration of artificial intelligence (AI) in library services, particularly through Chatbots provides a promising avenue for enhancing user experience and operational efficiency.

Libraries have always been at the forefront of information dissemination and knowledge management. Historically, reference services in libraries involved direct interaction between patrons and librarians, where librarians provided assistance with research queries, resource location, and general information (Sokil, 2023). As libraries embraced digital transformation, the nature of these interactions began to change. The advent of online catalogs, electronic databases, and digital libraries made information more accessible, reducing the need for face-to-face consultations but increasing the demand for remote assistance.

In the last decade, the explosion of information available online has led to an increased need for effective information retrieval and management tools (Zhu, Shastri, & Reiners, 2017). Patrons now expect instant access to accurate and relevant information, often seeking support outside of traditional library hours. This shift has created an opportunity for libraries to leverage AI technologies to meet these evolving needs. Artificial intelligence, particularly in the form of Chatbots, has seen significant growth and application across various industries. Chatbots are AI-driven programs designed to simulate human conversation, providing real-time interaction with users (Ma et al., 2023). They have been widely adopted in customer service, healthcare, education, and other fields to improve accessibility, efficiency, and user satisfaction.

In the library, Chatbots works as a virtual reference librarians to provide 24/7 assistance to patrons. These AI-powered tools handle a wide range of tasks, from answering frequently asked questions to guiding users through complex research processes (Pival, 2023). Chatbots free up human librarians to focus on more specialized and in-depth services, such as personalized research consultations, information literacy training and collection development by efficiently managing routine inquiries. Chatbots play an important role in freeing up human librarians to focus on more specialized and in-depth services within the field of Library and Information Science (LIS) (Adebowale, 2023). This enhances the overall effectiveness of library operations by automating routine queries but also improves user satisfaction by ensuring that assistance is always available.

The primary function of reference services in libraries is to provide users with accurate and relevant information efficiently. Nono et al., (2022) noted that reference services play an important role in enhancing the overall library experience by providing personalized assistance to users in

accessing valuable information for research, education, and personal development. These services are crucial for assisting patrons in navigating the vast array of available resources, ensuring they find the information they need quickly and effectively. Reference services enhance the overall library experience, making it easier for users to access valuable data for research, education, and personal development by offering personalized help (Achmad, 2022).

According to Zhu (2023), Chatbots provide a viable solution to several challenges by providing scalable, accessible, and efficient reference services. They operate continuously, handle multiple inquiries simultaneously, and provide instant responses, which enhances user satisfaction and optimizes library resources. Chatbots are equipped with natural language processing (NLP) capabilities, enabling them to understand and respond to user queries in a conversational manner, making interactions more intuitive and user-friendly (Ashfaq, 2020). This has been particularly beneficial in academic libraries, where students often require quick and accurate assistance with their research projects.

However, the implementation of Chatbots in libraries comes with challenges. Issues such as the quality of AI responses, the complexity of integrating Chatbots with library management systems, and user acceptance are critical factors that need to be addressed (Sanji, Behzadi, & Gomroki, 2022). The development of more advanced AI technologies, including machine learning and deep learning, has significantly enhanced the capabilities of Chatbots (Aslam, 2023). Modern Chatbots are now equipped with sophisticated algorithms that allow them to learn from interactions, improve their responses over time, and handle more complex queries. This has opened new possibilities for their application in library reference services.

Innovations such as voice-activated assistants and multilingual support further extend the reach and accessibility of library Chatbots (Faiz, Srivastava & Khoje, 2022). For instance, voice-activated Chatbots provide hands-free assistance, which is particularly beneficial for users with disabilities or those engaged in other tasks, allowing them to access information seamlessly without needing to type. Similarly, multilingual Chatbots cater to a different user base by offering support in multiple languages, thus breaking down language barriers and promoting inclusivity within the library environment. These advancements enhance the user experience and ensure that

libraries serve a broader audience more effectively, this makes information and resources accessible to everyone regardless of their language or physical abilities.

The integration of Chatbots in library reference services is poised to become more widespread. As AI technology evolves, Chatbots are expected to handle a broader range of inquiries, offering personalized assistance and integrating seamlessly with digital library resources (Panda & Chakravarty, 2022). Moreover, the ongoing development of AI ethics and data privacy standards will play a crucial role in ensuring secure, transparent, and respectful interactions. These advancements not only enhance user experience but also underscore the importance of maintaining trust and confidentiality in user interactions, ensuring that patrons feel confident and comfortable utilizing Chatbot services for their information needs.

Chatbots significantly reduce the operational burden on library staff by automating routine tasks and this frees up valuable time for them to focus on strategic initiatives and providing advanced research support. The potential benefits of Chatbot-driven reference services extend beyond immediate user satisfaction (Ashfaq, 2020). This leads to the development of more innovative and user-centric library services, fostering a culture of continuous improvement and adaptation to emerging technologies. Libraries can better meet the evolving needs of their patrons while staying at the forefront of technological advancements in the information spheres by leveraging Chatbots to streamline processes and enhance efficiency.

The use of a Chatbot for reference service in libraries marks a significant stride toward modernizing library operations and enriching user experience. Through AI technology, libraries offer more accessible, efficient and scalable reference services, to address the different needs of patrons in today's digital era. This study seeks to examine the creation of a Chatbot tailored for providing reference services in libraries.

Statement of the problem

In today's fast-paced digital world, libraries are under increasing pressure to provide quick, efficient, and accessible services that meet the evolving needs of users. One innovation that is gaining traction globally is the use of Chatbots. The AI-powered tools that can respond to user

queries at any time, improve access to information, and ease the burden on library staff. These tools are being successfully adopted in many parts of the world to enhance reference services. However, in Nigeria, the use of Chatbots in libraries is still quite new, and not much is known about how librarians feel about this technology. Are they open to it? Do they find it effective? What challenges are they facing when trying to use it, and how are users responding? These are important questions because librarians play a key role in the success or failure of such innovations. Their acceptance, confidence, and understanding of Chatbot technology can determine whether or not it actually improves library services. At the same time, even though Chatbots have the potential to transform how reference services are delivered, we still don't fully understand how well they're being integrated into existing library systems or whether users are satisfied with the help they get from them. Without this knowledge, it becomes difficult for libraries to make informed decisions about adopting and investing in this kind of technology. Against the background, this study, therefore, aims to explore the perception of librarians on the use of Chatbot for reference services in libraries in Kwara State.

Objectives of the Study

The main objective of the study is to investigate the perception of librarians on the use of Chatbot for reference services in libraries in Kwara State. The specific objectives of the study are to:

1. ascertain the perception of librarians on the use of Chatbots to provide reference services in libraries in Kwara State.
2. evaluate the effectiveness of Chatbots in addressing both routine and complex user inquiries in libraries in Kwara State.
3. determine the impact of Chatbots on user satisfaction and engagement with library services in libraries in Kwara State.
4. identify the integration challenges and user acceptance of Chatbots technology in libraries in Kwara State.

Literature Review

Chatbots have become integral to modern digital interactions, fundamentally changing how humans engage with technology. These intelligent programs simulate human conversation,

offering users intuitive access to various services and applications. Over time, chatbots have advanced significantly, now utilizing natural language processing (NLP) and artificial intelligence (AI) to provide more human-like interactions (Zhu, 2023).

Chatbots are categorized based on their complexity and underlying technology:

1. **Rule-Based Chatbots:** Operate on predefined rules and responses, effectively handling straightforward queries but struggling with complex conversations.
2. **AI-Powered Chatbots:** Employ machine learning and NLP to understand context and deliver more accurate, human-like responses. These bots learn from interactions, improving their performance over time. However, their ability to collect personal information raises security concerns (Hasal et al., 2021).
3. **Hybrid Chatbots:** Combine rule-based efficiency with AI's adaptability, managing predictable interactions through predefined rules and addressing complex queries using AI. This integration offers a more flexible conversational experience (Zohuri & Rahmani, 2023).

The concept of chatbots dates back to Alan Turing's 1950 paper "Computing Machinery and Intelligence," which introduced the Turing Test as a measure of machine intelligence (Ma et al., 2023). In the mid-1960s, Joseph Weizenbaum developed ELIZA, simulating a Rogerian psychotherapist using pattern matching to engage in conversation. Despite its simplicity, ELIZA demonstrated the potential for machines to mimic human dialogue, sparking further interest in chatbot development. Subsequent advancements included PARRY in 1972, simulating a patient with paranoid schizophrenia (Gangl et al., 2020), and later, A.L.I.C.E. in 1995, which utilized heuristic pattern matching and an extensive knowledge base coded in AIML (Manju & Aman, 2023). The early 2000s saw chatbots integrated into internet platforms, exemplified by SmarterChild on AOL Instant Messenger, showcasing their practical utility in daily digital interactions. The 2010s marked exponential growth in AI and machine learning, significantly enhancing chatbot performance. Developments like Google's BERT and OpenAI's GPT series revolutionized NLP, enabling chatbots to understand context and generate coherent responses (Esfandiari, Kiani, & Rastgoo, 2023).

Chatbots have found applications across multiple sectors:

1. Customer Service: Manage inquiries, provide support, and execute transactions efficiently, especially for repetitive tasks (William et al., 2023).
2. Healthcare: Assist with patient triage, appointment management, and dissemination of medical information (Martínez-Ezquerro, 2023).
3. Education: Serve as interactive tools offering instructional support, tutoring, and information dissemination, enhancing the learning experience (Oluchukwu, 2023).

In library science, reference services have evolved due to technological advancements and changing user needs. Traditionally, these services involved librarians assisting patrons in locating and utilizing information effectively. The digital age has expanded this role to include virtual reference services and specialized research assistance (Luneva, 2023). Integrating chatbots into libraries has enhanced service delivery and user engagement. Chatbots provide immediate assistance, reducing wait times and improving user satisfaction. For instance, the National Library of Singapore's "Ask Miss A" chatbot effectively handles common inquiries, allowing staff to focus on complex tasks (Panda & Kaur, 2023). Chatbots also manage administrative tasks like scheduling appointments and sending reminders, contributing to operational efficiency. At the University of Pretoria Library, a chatbot successfully manages student appointments and overdue book reminders (Corrado, 2023).

Despite their benefits, challenges exist. Chatbots may misinterpret complex language nuances, leading to user frustration (Wang, 2023). Continuous updates are necessary to maintain accuracy, which can be resource-intensive (Panda, 2023). Privacy and data security are also critical concerns, requiring robust measures to protect user information (Adebowale, 2023). The future of chatbots in libraries is promising, with advancements in AI and machine learning poised to enhance their capabilities further. Emerging trends include voice-activated chatbots and multilingual support, improving accessibility and user interaction. Integrating chatbots with other library systems, such as integrated library systems and digital repositories, can provide more comprehensive and accurate information to users (Frederick, 2023).

The implementation of Chatbots in libraries has gained significant attention in academic settings due to their potential to enhance virtual reference services. For example, the San Jose State University library deployed an AI Chatbot to meet the growing demand for virtual reference assistance (Rodriguez & Mune, 2022). Chatbots, such as those powered by technologies like Dialogflow, can be customized to address the specific needs of libraries, providing efficient virtual reference services (Garg & K., 2023). Additionally, open-source conversational AI has gained traction among institutions seeking to improve services like website navigation and digital reference interviews (Bagchi, 2020). These technologies allow libraries to deliver a more interactive and user-friendly experience. Chatbots support operations by addressing user inquiries promptly, thereby enhancing service delivery. In Brazil, for instance, Chatbots were integral in providing reliable information and promoting healthy behaviors during the COVID-19 pandemic (Chagas et al., 2023). By expanding service provision and ensuring accessibility, Chatbots can cater to a diverse range of users.

The integration of Chatbots also leads to improvements in user satisfaction by delivering personalized information and merging digital tools with traditional library services (Sugiono, 2022). This allows libraries to ensure that users receive timely and accurate information. Chatbots' adaptability to user preferences further enhances their effectiveness, providing tailored responses to individual inquiries. However, the integration of AI into library workflows raises concerns about potential biases and confidentiality issues, which must be addressed to maintain ethical standards (Pival, 2023). Chatbots offer substantial benefits. They can assist with routine inquiries, which frees up librarians to focus on more complex tasks. A study by the American Library Association (ALA) (2021) reported a 30% increase in patron satisfaction due to the implementation of Chatbots, which provided 24/7 assistance. Furthermore, Chatbots have the capacity to handle multiple queries simultaneously, significantly reducing wait times (Lateef & Mairaj, 2024). This not only improves operational efficiency but also enhances the overall user experience by allowing librarians to focus on more specialized patron needs (Pegolo, 2023).

In academic libraries, Chatbots have been increasingly used to complement traditional reference services. The integration of AI Chatbots, such as ChatGPT, has proven effective in providing

reliable virtual assistance, thereby enhancing the reference services available to users (Adetayo, 2023; Panda & Chakravarty, 2022). Additionally, the use of AI in libraries has helped promote awareness of available services, allowing users to navigate resources more easily (Sanji et al., 2022). While Chatbots offer many benefits, they do have limitations. They cannot replicate the depth of human interaction, especially in terms of emotional understanding and complex problem-solving (Vincze, 2017). However, Chatbots excel in handling routine queries, thus enabling librarians to focus on providing personalized assistance for more intricate inquiries. The practical application of AI, such as in San Jose State University's Kingbot, highlights how Chatbots can be effectively used to meet user needs (Garg & K., 2023). Moreover, Chatbots' continuous learning capabilities allow them to enhance their responses and accuracy over time, further improving service delivery (Kane, 2019).

Despite their growing role, the integration of Chatbots requires careful consideration of data privacy and security issues. Libraries must ensure that Chatbot interactions comply with data protection regulations and safeguard sensitive user information (Alshurafat, 2023). While Chatbots offer increased efficiency and accessibility, they should complement human librarians rather than replace them entirely. The use of Chatbots in libraries is reshaping service delivery, offering 24/7 assistance, managing high volumes of queries, and improving patron satisfaction (Chen, Cheng & Heh, 2021). These benefits highlight the potential of Chatbots to enhance library services while streamlining operations and reducing the workload of human staff (Muangkammuen, Intiruk, & Saikaew, 2018). As libraries continue to evolve, the role of Chatbots in reference services will expand, offering more innovative solutions to meet the changing needs of library patrons.

The integration of Chatbots in library reference services offers significant advantages, enhancing user experience and streamlining information retrieval. By providing instant support, Chatbots help users quickly find resources, boosting satisfaction and engagement (Hussain et al., 2023). These systems can handle multiple inquiries simultaneously, a capability essential during peak periods like exam seasons, freeing librarians to focus on more complex tasks (Rodriguez & Mune, 2022). Chatbots are also effective in promoting library resources, guiding users through available services (Sanji et al., 2022), and offering virtual assistance to enhance traditional library services

(Vincze, 2017). With their ability to offer round-the-clock support, Chatbots improve operational efficiency and user access to information (Avisyah, Putra, & Hidayat, 2023).

In addition to simplifying basic queries, Chatbots help alleviate library anxiety for new users, especially undergraduates, by guiding them through database and service navigation (Mckie & Narayan, 2019). This promotes information literacy and empowers users to maximize available resources. By improving library visibility, Chatbots also attract more users, fostering greater engagement (Rubin et al., 2020). Furthermore, Chatbots can support multiple languages, enhancing accessibility for diverse users (Ayers et al., 2023). Despite their benefits, the integration of Chatbots faces challenges, particularly with Natural Language Processing (NLP) limitations, which may lead to misunderstandings or inaccurate responses (Yan, Zhao, & Mazumdar, 2023). Additionally, integrating Chatbots with existing library systems requires complex APIs, and ensuring data security adds further complexity (Salmans & Barba, 2023). Regular updates and staff training are necessary to maintain their effectiveness (Barus & Surijati, 2022; Swogger, 2022). Ethical concerns regarding data privacy and bias in responses also need addressing to ensure compliance with regulations like the GDPR and to maintain user trust (Bridgeman, 2022; Thalaya & Puritat, 2022).

Collaborations between libraries and technology developers are crucial for overcoming these challenges and ensuring continuous improvement (Calvaresi et al., 2023). While Chatbots provide substantial benefits in enhancing user support, balancing automated assistance with human interaction remains essential for comprehensive service delivery (Vincze, 2017). AI-powered Chatbots, such as Kingbot, exemplify how these systems can enhance user engagement and improve service delivery in academic libraries (Garg & K., 2023). However, challenges related to data accuracy, technical issues, and security persist (Alshurafat, 2023).

In conclusion, while Chatbots offer transformative potential for library reference services, addressing their limitations and integrating them effectively into existing systems is vital for optimizing their benefits (Zhu, 2023; Esfandiari, Kiani, & Rastgoo, 2023).

Methodology

This study adopted a descriptive research design, which, according to Salaria (2012), focuses on gathering information about prevailing conditions or situations for descriptive analysis and interpretation. It goes beyond mere data collection to include proper analysis, comparison, identification of trends, and relationship interpretation without external manipulation. A survey method was used to collect large amounts of information on the perceptions, activities, and opinions of respondents in the area of study. The population for this study includes all 70 librarians from six libraries in Kwara State, namely: Al-Hikmah University Library, Ghalib Law Library (4), High Court Library (5), Kwara State Library (20), Mustapha Akanbi Library (5), and University of Ilorin Library (32). The total enumeration technique was employed as sample for the study; therefore, the sample size for this study is 70.

The data collection instrument was a questionnaire, which is divided into five sections: Section A focused on demographic characteristics (age, gender, religion and cadre), Section B on perception of librarians on the use of Chatbots to provide reference services, Section C on effectiveness of Chatbots in addressing both routine and complex user inquiries, Section D on the impact of Chatbots on user satisfaction and engagement with library services, and Section E on integration challenges and user acceptance of Chatbots technology. The questionnaire items was measured on a dichotomous scale and five-point Likert scale. The questionnaire was validated by experts in the field of library and information science for expert scrutiny, and all observations and comments were well addressed before administering the final version of the questionnaire to the respondents. The reliability of the instrument was also ensured at a high reliability rate. Data analysis was performed quantitatively using descriptive statistics, with results presented in frequencies and percentages, mean and standard deviation via IBM-SPSS 26.0 software. Ethical considerations included seeking permission and consent of the respondents before administering the questionnaire, maintaining the confidentiality of their identities, and assuring them that the information they provided would be protected and sincerely appreciated.

Result

Table 1: Demographic Information of the Respondent

Demographic	Frequency	Percent
Gender		
Male	43	61.4
Female	27	38.6
Total	70	100
Age range		
25-30	10	14.3
31-35	17	24.3
36-40	19	27.1
41 and above	24	34.3
Total	70	100
Religion		
Christianity	29	41.4
Islam	41	58.6
Traditional worshipper	0	0
Others	0	0
Total	70	100
Position		
Assistant Librarian	9	12.9
Librarian I	13	18.6
Librarian II	17	24.3
Senior Librarian	17	24.3
Principal Librarian	14	20
Total	70	100

The Table 1 showed the demographic breakdown of the study sample, consisting of 70 individuals, is as follows; In terms of gender, 43 participants, or 61.4%, are male, while 27 participants, representing 38.6%, are female. Regarding age distribution, 10 individuals, or 14.3%, are aged 25-30 years; 17 participants, making up 24.3%, fall within the 31-35 years age range; 19 participants, or 27.1%, are aged 36-40 years; and 24 participants, constituting 34.3%, are 41 years old or above. For religious affiliation, 29 participants, or 41.4%, identify as Christians, while 41 participants, or 58.6%, are Muslims. There are no participants who identify as traditional worshippers or other religions. In terms of Cadre, 9 respondents, or 12.9%, hold the title of Assistant Librarian; 13 participants, representing 18.6%, are Librarian I; 17 participants, or 24.3%,

are Librarian II; another 17 participants, also 24.3%, are Senior Librarians; and 14 individuals, or 20%, hold the position of Principal Librarian.

Analysis and interpretation of research questions

Table 2: Frequency, percentage, mean and standard deviation of the perception of librarians on the use of Chatbots to provide reference services

S/N	Perception on Chatbot for reference services in libraries	Yes	No	Mean	Std.D
1.	Chatbots can provide accurate information to library users	50 (71.4)	20 (26.6)	1.71	0.46
2.	Chatbot can assist users in finding specific books or resources within the library	45 (64.3)	25 (35.7)	1.64	0.49
3.	Chatbot can handle reference inquiries effectively outside of regular library hours	40 (57.1)	30 (42.9)	1.57	0.50
4.	Chatbot improves the overall efficiency of reference services in the library	55 (78.6)	15 (21.4)	1.79	0.41
5.	Chatbot can effectively work with human librarians to enhance reference services	48 (68.6)	22 (31.4)	1.69	0.47
6.	Library users will trust and use a Chatbot for reference services	43 (61.4)	27 (38.6)	1.61	0.49
7.	Chatbot can be programmed to understand and respond to complex reference queries accurately	38 (54.3)	32 (45.7)	1.54	0.50
8.	Integrating Chatbot into the library's reference services will be a beneficial technological advancement	52 (74.3)	18 (25.7)	1.74	0.43
9.	Personalized recommendations based on users' previous inquiries and preferences can be provided through Chatbots	47 (67.1)	23 (32.9)	1.67	0.47
10.	Chatbot reduces the workload of library staff by handling routine reference questions	50 (71.4)	20 (28.6)	1.71	0.46

The research results presented in Table 2 above shows perception of librarians on the use of Chatbots to provide reference services in libraries in Kwara State. The majority of librarians believe that chatbots can provide accurate information to library users, with 71.4% agreeing with this statement. The mean score for this perception is 1.71, with a standard deviation of 0.46. Also, 64.3% of librarians feel that chatbots can assist users in finding specific books or resources within

the library, yielding a mean score of 1.64 and a standard deviation of 0.49. When it comes to handling reference inquiries outside of regular library hours, 57.1% of librarians think chatbots are effective, resulting in a mean score of 1.57 and a standard deviation of 0.50. A significant majority, 78.6%, believe that chatbots improve the overall efficiency of reference services, with a mean score of 1.79 and a standard deviation of 0.41.

Regarding Chatbot can effectively work with human librarians to enhance reference services, 68.6% of librarians agree that chatbots can enhance reference services when working with human librarians, which is reflected in a mean score of 1.69 and a standard deviation of 0.47. Additionally, 61.4% of librarians are confident that library users will trust and utilize chatbots for reference services, with a mean score of 1.61 and a standard deviation of 0.49. On the question of whether chatbots can handle complex reference queries accurately, 54.3% of librarians agree, leading to a mean score of 1.54 and a standard deviation of 0.50. Integration of chatbots into library reference services is viewed positively by 74.3% of librarians, who see it as a beneficial technological advancement, with a mean score of 1.74 and a standard deviation of 0.43.

Regarding personalised recommendations based on users' previous inquiries and preferences can be provided through Chatbots, 67.1% of librarians believe that chatbots can provide recommendations based on users' previous inquiries and preferences, reflected in a mean score of 1.67 and a standard deviation of 0.47. Lastly, 71.4% of librarians think that chatbots can reduce the workload of library staff by handling routine reference questions, with a mean score of 1.71 and a standard deviation of 0.46.

Table 3: Frequency, percentage, mean and standard deviation of the effectiveness of Chatbots in addressing both routine and complex user inquiries

S/N	Effectiveness of the Chatbots	SA	A	N	D	SD	Mean	Std.D
1.	Ease of Use	30 (42.9)	25 (35.7)	10 (14.3)	4 (5.7)	1 (1.4)	4.23	0.83
2.	Accuracy of Responses	28 (40)	30 (42.9)	8 (11.4)	3 (4.3)	1 (1.4)	4.21	0.80
3.	Fast response time	35 (50)	25 (35.7)	8 (11.4)	2 (2.9)	0	4.33	0.71
4.	Efficiency in handling routine inquiries	32 (45.7)	28 (40)	8 (11.4)	2 (2.9)	0	4.29	0.71
5.	Efficiency in handling complex inquiries	25 (35.7)	30 (42.9)	10 (14.3)	5 (7.1)	0	4.07	0.85
6.	Improved user satisfaction	27 (38.6)	30 (42.9)	9 (12.9)	4 (5.7)	0	4.20	0.79
7.	Increased user engagement	28 (40)	29 (41.4)	10 (14.3)	3 (4.3)	0	4.21	0.80
8.	Consistent improvement over time	24 (34.3)	31 (44.3)	12 (17.1)	3 (4.3)	0	4.11	0.83
9.	Adaptability to user needs	33 (47.1)	25 (35.7)	10 (14.3)	2 (2.9)	0	4.31	0.72
10.	Improved library services	29 (41.4)	28 (40)	9 (12.9)	4 (5.7)	0	4.21	0.80

Table 3 shows the effectiveness of Chatbots in addressing both routine and complex user inquiries in libraries in Kwara State. Chatbots are highly rated for their ease of use, achieving a mean score of 4.23 with a standard deviation of 0.83, indicating that 42.9% of respondents strongly agree and 35.7% agree that they are user-friendly. The accuracy of chatbot responses is similarly well-regarded, with a mean score of 4.21 and a standard deviation of 0.80, showing that 40% strongly agree and 42.9% agree that the responses are accurate. The fast response time of chatbots receives the highest mean score of 4.33 and a standard deviation of 0.71, reflecting that 50% of respondents strongly agree and 35.7% agree that chatbots respond quickly. In terms of efficiency in handling routine inquiries, chatbots score a mean of 4.29 with a standard deviation of 0.71, suggesting that 45.7% strongly agree and 40% agree with their effectiveness.

For efficiency in handling complex inquiries, have a mean score of 4.07 and a standard deviation of 0.85, with 35.7% of respondents strongly agreeing and 42.9% agreeing that chatbots handle these effectively. Chatbots also contribute positively to improved user satisfaction, scoring a mean of 4.20 and a standard deviation of 0.79, where 38.6% strongly agree and 42.9% agree that they enhance satisfaction. Regarding increased user engagement, chatbots receive a mean score of 4.21 and a standard deviation of 0.80, indicating that 40% strongly agree and 41.4% agree with their effectiveness in engaging users. The consistent improvement of chatbots over time is rated with a mean of 4.11 and a standard deviation of 0.83, showing that 34.3% strongly agree and 44.3% agree that chatbots demonstrate ongoing enhancement.

Chatbots are also highly rated for their adaptability to user needs, with a mean score of 4.31 and a standard deviation of 0.72, suggesting that 47.1% strongly agree and 35.7% agree that they are well-adapted to these needs. Finally, chatbots are seen as improving library services, with a mean score of 4.21 and a standard deviation of 0.80, indicating that 41.4% strongly agree and 40% agree with this assessment.

Table 4: Frequency, percentage, mean and standard deviation of the impact of impact of Chatbots on user satisfaction and engagement with library services

S/N	Impact of Chatbot on User Satisfaction and Engagement	SA	A	N	D	SD	Mean	Std.D
1.	Chatbot has improved my user experience.	34 (48.6)	25 (35.7)	8 (11.4)	2 (2.9)	1 (1.4)	4.29 0.77	4.29 0.77
2.	Chatbot brings higher user satisfaction	30 (42.9)	28 (40)	10 (14.3)	2 (2.9)	0	4.24 0.74	4.24 0.74
3.	Through Chatbot integration, user have easier access to information	31 (44.3)	27 (38.6)	10 (14.3)	2 (2.9)	0	4.25 0.73	4.25 0.73
4.	Chatbot has increased my engagement with library services	29 (41.4)	31 (44.3)	8 (11.4)	0	2 (2.9)	4.25 0.71	4.25 0.71
5.	With the integration of Chatbots, the frequency of library use will increase	28 (40)	29 (41.4)	10 (14.3)	3 (4.3)	0	4.18 0.78	4.18 0.78
6.	Chatbot has improved my perception of reference services.	33 (47.1)	26 (37.1)	9 (12.9)	0	2 (2.9)	4.29 0.76	4.29 0.76
7.	Chatbot supports self-service options effectively.	32 (45.7)	28 (40)	8 (11.4)	2 (2.9)	0	4.29 0.75	4.29 0.75

Table 4 above examines the impact of chatbots on user satisfaction and engagement with library services based on various factors. Chatbots have significantly improved user experience, with a mean score of 4.29 and a standard deviation of 0.77. This is reflected in the fact that 48.6% of respondents strongly agree and 35.7% agree that their experience has been enhanced by chatbots. The impact of chatbots on overall user satisfaction is also positive, with a mean score of 4.24 and a standard deviation of 0.74. This indicates that 42.9% of respondents strongly agree and 40% agree that chatbots bring higher user satisfaction. Regarding ease of access to information through chatbot integration, the mean score is 4.25 with a standard deviation of 0.73. This suggests that 44.3% of respondents strongly agree and 38.6% agree that chatbots facilitate easier information access.

Chatbots have increased engagement with library services, as evidenced by a mean score of 4.25 and a standard deviation of 0.71. Here, 41.4% of respondents strongly agree and 44.3% agree that their engagement with library services has risen due to chatbots. The integration of chatbots is believed to potentially increase the frequency of library use, with a mean score of 4.18 and a standard deviation of 0.78. This finding reflects that 40% of respondents strongly agree and 41.4% agree with this expectation. Chatbots have also improved perceptions of reference services, with a mean score of 4.29 and a standard deviation of 0.76. This demonstrates that 47.1% of respondents strongly agree and 37.1% agree that their view of reference services has been positively affected. Lastly, chatbots are seen as supporting self-service options effectively, achieving a mean score of 4.29 and a standard deviation of 0.75. This indicates that 45.7% of respondents strongly agree and 40% agree that chatbots enhance self-service capabilities.

Table 5: Frequency, percentage, mean and standard deviation of the integration challenges and user acceptance of Chatbots technology

S/N	Integration Challenges and User Acceptance	Yes	No	Mean	Std.D
1.	Chatbot is easy to integrate with existing library systems	40 (57.1)	30 (42.9)	1.57	0.50
2.	Staff members find the Chatbot easy to use	35 (50)	35 (50)	1.50	0.50
3.	Technical difficulties occur during Chatbot integration	20 (28.6)	50 (71.4)	1.29	0.46
4.	Users readily accept the use of Chatbot for reference services	45 (64.3)	25 (35.7)	1.64	0.48
5.	There is adequate training provided for using Chatbot	30 (42.9)	40 (57.1)	1.43	0.50
6.	Chatbot has improved the efficiency of reference services	38 (54.3)	32 (45.7)	1.54	0.50
7.	Users prefer Chatbot over traditional reference services	28 (40)	42 (60)	1.40	0.49
8.	Chatbot's responses are satisfactory	50 (71.4)	20 (28.6)	1.71	0.46

Table 5 above examines the integration challenges and user acceptance of Chatbots technology in libraries in Kwara State. The ease of integrating chatbots with existing library systems is largely seen as positive, with 57.1% of respondents agreeing that integration is straightforward, while 42.9% disagree. This results in a mean score of 1.57 and a standard deviation of 0.50. Regarding ease of use for staff, opinions are divided: half of the respondents find chatbots easy to use, while the other half do not, yielding a mean score of 1.50 and a standard deviation of 0.50. Technical difficulties during chatbot integration are reported by only 28.6% of respondents, with 71.4% not experiencing such issues. This leads to a mean score of 1.29 and a standard deviation of 0.46.

User acceptance of chatbots for reference services is notably high, with 64.3% of respondents agreeing that users readily accept chatbots, compared to 35.7% who disagree. This results in a mean score of 1.64 and a standard deviation of 0.48. Adequacy of training for using chatbots is a concern, as 42.9% of respondents agree that training is sufficient, while 57.1% disagree. This is reflected in a mean score of 1.43 and a standard deviation of 0.50. Chatbots are perceived to enhance the efficiency of reference services, with 54.3% of respondents agreeing and 45.7% disagreeing, resulting in a mean score of 1.54 and a standard deviation of 0.50. There is a mixed

opinion on whether users prefer chatbots over traditional reference services, with 40% agreeing and 60% disagreeing. This yields a mean score of 1.40 and a standard deviation of 0.49.

Discussion of Findings

The research findings shows a positive perception among librarians to use Chatbots to provide reference services. Librarians generally view chatbots as effective tools for delivering accurate information and assisting users in locating specific resources. The effectiveness of chatbots in managing inquiries outside regular library hours is also acknowledged, suggesting they can extend service availability. The data indicates a strong belief that chatbots enhance the overall efficiency of reference services. This perception underscores the value placed on chatbots in streamlining operations and potentially improving service delivery. Additionally, there is support for the idea that chatbots can work synergistically with human librarians to bolster reference services, reflecting a view that chatbots complement rather than replace human roles. Librarians also express confidence in user acceptance of chatbots, believing that library patrons will trust and utilize these tools effectively. However, there are mixed feelings about chatbots handling complex reference queries, suggesting some limitations in their current capabilities. The integration of chatbots is seen as a beneficial technological advancement, reinforcing the positive outlook on their role in libraries. Chatbots are also perceived as capable of offering personalized recommendations and reducing the workload on library staff by managing routine inquiries.

The findings on the effectiveness of Chatbots in addressing both routine and complex user inquiries revealed that Chatbots are highly regarded for their ease of use, reflecting a general consensus among respondents that they are user-friendly. This ease of use is crucial for ensuring that users can effectively interact with the technology without significant learning curves. The accuracy of the responses provided by chatbots is also well-received, indicating that users find the information supplied by chatbots to be reliable. This reliability enhances the overall user experience by ensuring that the information retrieved meets their needs. Chatbots excel in delivering quick responses, a feature that is particularly valuable for maintaining engagement and user satisfaction. The high ratings for fast response time suggest that chatbots are effective in managing routine inquiries efficiently, which helps in handling high volumes of queries swiftly. However, while chatbots are seen as effective in managing routine inquiries, their performance in

handling complex inquiries receives slightly lower but still positive evaluations. This implies that while chatbots are good at addressing straightforward questions, there may be room for improvement in their handling of more intricate queries. In terms of user satisfaction and engagement, chatbots contribute positively by enhancing user interaction with library services. The consistent improvement over time reflects ongoing enhancements to the technology, which is crucial for adapting to evolving user needs.

The findings show a positive impact of chatbots on user satisfaction and engagement with library services. The chatbots are credited with significantly enhancing the user experience, as evidenced by high ratings reflecting improved interactions. This suggests that users find the integration of chatbots to be a valuable addition to their library experience. In terms of overall user satisfaction, chatbots are seen as effective in increasing satisfaction levels. This is supported by strong agreement that chatbots contribute positively to how users perceive their interactions with library services. The ease of access to information is also notably improved through chatbot integration, indicating that these tools facilitate smoother and more efficient retrieval of information. Chatbots have also been found to increase user engagement with library services, reflecting a broader trend of users becoming more involved with available resources. This enhanced engagement suggests that chatbots play a role in fostering a more interactive relationship between users and library services. Moreover, there is an expectation that the presence of chatbots might boost the frequency of library visits, pointing to their potential in encouraging regular use of library facilities. The positive impact of chatbots on perceptions of reference services further underscores their effectiveness in enhancing these traditional library functions. Also, Chatbots are recognised for their support of self-service options, reinforcing their role in empowering users to manage their interactions with library services more independently.

The findings revealed the integration challenges and user acceptance of Chatbots technology, revealing both positive and challenging aspects of this technological adoption. Integration with existing library systems is generally perceived as favorable. Many respondents find the integration process straightforward, although a significant minority disagree. This indicates a general acceptance of chatbots' technical compatibility with current systems, though some integration

hurdles may still exist. When it comes to ease of use for staff, opinions are divided. While some find chatbots user-friendly, others do not, reflecting a mixed experience in terms of usability. This division suggests that while chatbots can be effective tools, their ease of use may vary depending on individual perspectives or technical familiarity. Technical difficulties during chatbot integration appear to be less of a concern for the majority of respondents. Only a small proportion report facing such issues, which implies that for most, the integration process is relatively smooth. However, this positive view contrasts with the challenges reported by the minority. User acceptance of chatbots is high, indicating that users are generally receptive to this technology for reference services. This positive reception is crucial for the successful implementation and utilization of chatbots in libraries. Training adequacy is identified as a concern. A notable proportion of respondents feel that the provided training may not be sufficient, which could impact the effective use of chatbots. This highlights the need for enhanced training programs to ensure that staff can fully leverage chatbot capabilities. Chatbots are viewed as improving the efficiency of reference services, though this is also met with some skepticism. While many agree on the efficiency boost, a substantial number remain unconvinced, suggesting that the perceived benefits of chatbots may not be uniformly experienced across all contexts. Finally, there is a mixed opinion on whether users prefer chatbots over traditional reference services. This indicates that while chatbots have their advantages, they may not yet fully replace the traditional methods that some users still value.

Conclusion

The study shows insights into the implementation and impact of chatbots in library reference services. The demographic profile of the participants, predominantly male and aged 41 or older, highlights the varied backgrounds of those involved in the study. Their positions within the library system reflect a range of roles from Assistant Librarians to Principal Librarians, indicating a diverse perspective on the integration of chatbot technology. Librarians generally view chatbots positively, recognizing their ability to provide accurate information, assist with resource discovery, and handle inquiries outside regular hours. This perception extends to their belief that chatbots can enhance the efficiency of reference services and reduce staff workload. However, there are mixed opinions regarding chatbots' capacity to handle complex queries and their overall preference compared to traditional methods. The effectiveness of chatbots is evaluated favorably, particularly

in terms of ease of use, response time, and accuracy. They are appreciated for managing routine inquiries efficiently and contributing to user satisfaction and engagement. Their adaptability and continuous improvement also stand out as significant benefits. Despite these positive assessments, challenges persist. Integration with existing systems is generally seen as manageable, but opinions vary regarding ease of use for staff and the adequacy of training. User acceptance of chatbots is high, though there is some skepticism about their preference over traditional services.

Recommendations

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

1. Libraries should invest in comprehensive training programs for staff to ensure they are fully equipped to use chatbot technology effectively.
2. Government agencies and library authorities should collaborate to streamline the integration of chatbots with existing library systems.
3. Funding should be allocated for research into the continual improvement of chatbot technology.
4. Libraries should actively seek feedback from users on their experiences with chatbots and use this data to refine and improve the technology.
5. Government and library associations should lead initiatives to raise awareness about the benefits of chatbots in library services.

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