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The integrating chatbots in library services for balancing efficiency and interpersonal communication

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ABSTRACT

Background: The increasing use of technology in libraries has made chatbots a solution for responding to questions and providing information more quickly and efficiently. However, the use of chatbots has the potential to reduce the personal aspect that has been inherent in conventional interactions between librarians and library users. **Purpose**: This study examines the application of chatbots in library services and their impact on interpersonal communication. **Methods**: This study employed a systematic literature review method, searching Google Scholar and Taylor and Francis Online databases of the 125 articles identified initially, 15 articles met the inclusion criteria through a PRISMA-based selection process and were used as the primary data sources. The researcher chose this approach because it ensured a systematic and transparent process for identifying, evaluating, and synthesizing the literature. **Results**: The study results showed that chatbots generally provided a positive user experience, particularly in terms of ease of use, flexibility of access, speed, accuracy of information, and responsiveness to student needs. **Conclusion**: In addition to improving service quality, chatbots also contributed to operational efficiency on campus. However, there are several limitations, including the chatbot's inability to understand complex or ambiguous questions, limitations in capturing conversational context and interaction history, and a high dependence on data completeness and accuracy, which can potentially result in inaccurate information. **Implication:** This study implies that libraries should implement chatbots as supportive tools alongside librarians to enhance service efficiency while preserving interpersonal communication for complex user needs.

Keywords: Chatbots; Library service; Interpersonal communication; Library users; Librarian

INTRODUCTION

The library world has undergone significant changes due to advances in information and communication technology. Information technology has become crucial for transforming traditional libraries into modern libraries that better meet reader needs and provide better

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services (Lena et al., 2024). Digital transformation refers to the process of realigning workflows to digital platforms based on emerging technologies aimed at improving the efficiency of educational and administrative models, including staff, services, and daily workflows (Tshabalala & Dube, 2024). Libraries can enhance the user experience by leveraging AI, which enables fast and accurate access to information and supports diverse research and learning activities. Therefore, the Future of Libraries will consider changes not only to the physical library infrastructure but also conceptual changes in the role and function of libraries as knowledge centers in the modern world (Ardyawin & Iswanto, 2024). With the development of information technology and the current digital era, the demand for easy and rapid access to information is growing. Web-based chatbots are the solution (Prayoga et al., 2024).

Due to their low cost and ability to serve multiple users simultaneously, chatbots are gaining popularity in the business industry. Chatbots are more engaging and user-friendly than searching for static content in a list of frequently asked questions. Chatbots provide users with efficient and convenient assistance options when communicating, as they can respond engagingly and provide immediate assistance (Ahwan et al., 2024). A chatbot is a computer program that simulates or convinces a person to interact with it as a conversational partner. As mentioned above, a chatbot can interpret and respond to various human inputs by scanning for keywords in the input and then responding with the most suitable keywords or even similar word patterns from a textual database. Thus, if a user submits a request, the chatbot will send back a customized response based on relevant words (Chandra et al., 2020).

More sophisticated chatbots are more appealing to users because they can provide more natural and informative responses. Chatbots have become increasingly popular with the rise in the use of digital devices, such as computers and smartphones, in recent years. This has fuelled the use of chatbots in various industries, including education (Susanto & Sofyan, 2024). Chatbots are becoming increasingly sophisticated and essential in our interactions with technology and services in the digital world due to the advancement of AI (Supratman & Suhendi, 2022). There is an assumption that the use of chatbots will contribute to greater equity in healthcare and promote social inclusion by expanding the reach of services to previously underserved groups (Brown & Halpern, 2021). Based on the review of articles conducted related to the systematic literature review on integrating chatbots in library services, this research aimed to determine the benefits of Chatbots in libraries, specifically in the context of integrating Chatbots in library services: balancing efficiency and interpersonal communication.

A chatbot is a software program that can initiate intelligent conversations with users via text, voice, or other means while delivering specific, pre-programmed messages (Wijayanti et al., 2019). Chatbots can still communicate with users, even without a human face or mouth. Chatbots respond to topics typed by users as they interact with them. The term ‘chatterbot’ was first used to describe a conversational program by Michael Mauldin, the creator of the first Verbot, in 1994. The primary goal of developing this conversational program was to create a tool that could communicate

so sophisticatedly that users would not even realize they were interacting with software.

A library is typically defined as a location where information is collected, processed, and disseminated in both print and digital forms through various media, including books, magazines, newspapers, films, tapes, videos, and computers. All collections of these information sources are systematically organized and used for educational purposes, which include reading and information-seeking activities for all who need them (Rodin et al., 2021). A library is a place to store and manage collections of books, magazines, and written works that contain information (Aryanto & Suratman, 2021).

One of the most important abilities for humans as social beings is the ability to communicate with others. Interpersonal communication encompasses many aspects of life and has the potential to expand. Interpersonal communication can encompass all types of human relationships, from the most fleeting, simple, and mundane, often influenced by first impressions, to the most profound and enduring. Interpersonal communication refers to the transmission of messages from one person to another (Mustofa et al., 2020). In the library context, visitors (library users) and staff (librarians) engage in interpersonal communication. It occurs when visitors interact with library staff to obtain the information they need (Silvia et al., 2021). Interpersonal communication and exchange information that fosters openness, empathy, support, positivity, and equality (Mustofa et al., 2023).

RESEARCH METHODS

This research employed a Systematic Literature Review method (SLR), is a method used to systematically collect and analyze scientific evidence to answer specific research questions. This process is conducted in a transparent, structured, and replicable manner by searching through all relevant published evidence. In addition to summarizing existing findings, an SLR also assesses the quality of each piece of evidence identified. The aim is to provide a strong and objective basis to support decision-making in both scientific contexts and evidence-based practice (Lame & Guillaume, 2019).

Based on this, literary analysis aims to identify, quantify, and summarise all literature relevant to a particular topic. To analyze the literature effectively, a procedure is necessary to determine the scope and depth of the topic to be discussed. In general, three aspects must be present in a literature review: the research question, the search and extraction process, and the presentation of the review results. Table 1 shows the literature review procedure used in this study (Nakano & Muniz, 2018).

Based on the literature review procedure, this study identified five relevant articles that focus on the utilization of chatbots, particularly in the context of library services and user support. It should be noted that this study did not concentrate on the technical or programming aspects of chatbot development. Therefore, the researcher excluded scientific literature related to the design, coding, or architecture of chatbot systems from the review. The articles were selected based on their relevance to practical implementation, user experience, and the role of chatbots in enhancing service efficiency. The lists the primary literature used as data in this study, along with an overview of the studies conducted on the data availability.

Table 1
Literature review procedure

No.	Stage	Procedures performed
1	Defining the theme of the study	The theme of this research is a synthesis of Chatbot Integration in library services, balancing efficiency and Interpersonal Communication. The Research question is: What is meant by Chatbot Integration in Library Services: Balancing Efficiency and Interpersonal Communication?
2	Search the scientific literature	Keywords used for the search: Chatbot, library, and library services. The search was conducted on Google Scholar and Taylor and Francis Online between September 25 - October 3, 2024.
3	Read, summarize, synthesize and test the scope and depth of the review	Literature search results will be re-selected using inclusion and exclusion criteria. The following explains both criteria: Inclusion Criteria: Research describing or analyzing the benefits of chatbots in a library. Exclusion Criteria: Technical research, designing, or developing chatbot technology. The researcher will analyze the literature that meets the inclusion criteria and extract its core concepts to facilitate conceptual synthesis.
4	Write a literature review	In this study, the results of the literature review are presented in the results and discussion section. The results are divided into several major themes.

Source: Research result, 2025

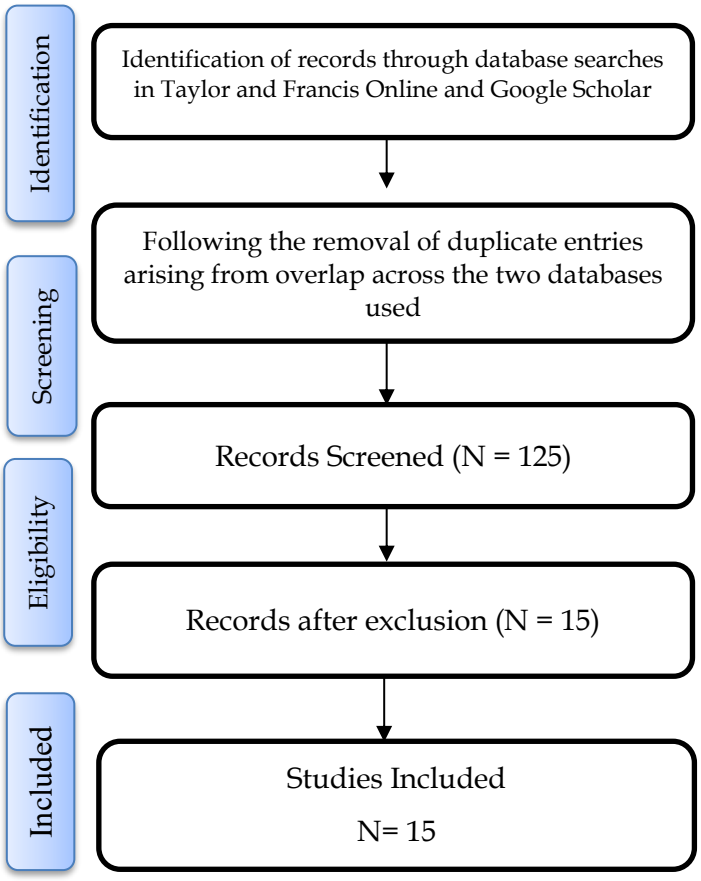

Figure 1. PRISMA steps
Source: Result of research, 2025

This study employed data from Taylor and Francis Online and Google Scholar. Keywords used included "*chatbot,*" "*library services,*" and "*interpersonal communication*." The dataset comprised peer-reviewed articles published between 2015 and 2025, offering robust coverage of current trends and relevant scholarly contributions. To ensure quality and relevance, this study applied strict inclusion and exclusion criteria. Articles must be published between 2015 and 2025 and available in their final published version.

Additionally, only articles with a Digital Object Identifier (DOI) were included to ensure the reliability of the academic sources. Preprints and works-in-progress were excluded. Based on adjustments related to publication year, document type, and DOI availability, the final dataset for bibliometric analysis was narrowed down to 15 eligible articles.

RESULTS AND DISCUSSION

A chatbot is a computer program designed to interact and communicate with humans through text or short messages. This technology utilizes Artificial Intelligence (AI) and Natural Language Processing (NLP) to understand and respond to user commands or questions. Chatbots can be implemented on various platforms, including mobile apps, websites, and instant messaging services. Their primary function is to provide information or services to users quickly, interactively, and efficiently (Akirini et al., 2024).

Library services are a series of activities designed to meet the information needs of library users. These services involve various elements, including collections, technology, librarians, and information management systems. The goal is to provide effective and efficient access to information resources, both physical and digital. Library services are not limited to book lending but also include user guidance, reference services, database access, and information literacy training. All these activities focus on improving service quality to enhance user satisfaction and ease in accessing information (Hastuti, 2022).

To be successful, a chatbot must be able to understand and respond to commands, even if those commands are expressed in various ways. This capability is fundamental to natural language processing, or NLP. Using speech act theory, Twitchell, Adkins, Nunamaker, and Burgoon presented a method at the 9th International Working Conference on Language-Action Perspectives on Communication Modelling (LAP 2004) to model business conversations that can be used to categorize other business communications. This communication classification method helps facilitate information retrieval by basing searches not only on what the user says but also on what the user means (Erickson & Kim, 2020).

AI has predicted demand and optimized storage space for collection management. Finally, AI-based chatbots and virtual assistants have improved customer service and user satisfaction. The use of artificial intelligence in library data management is a result of technological advancements. Consequently, the use of AI in libraries not only enhances efficiency but also improves the user experience (Zubaidillah, 2020).

A chatbot is an artificial intelligence-powered service that enables interaction between users and systems through a

conversational or dialogue-based interface. This technology is designed to simulate human communication, allowing users to engage naturally without needing to understand technical commands. In a library setting, chatbots serve as responsive information tools, helping users locate details about library collections, services, and policies. Users type their questions into the chat field available on a specific website or application, and the chatbot automatically provides relevant answers. With this convenience, chatbots offer a digital solution that supports fast, efficient, and user-friendly access to library information (Pratiwi et al., 2024).

Chatbots can interact with users using text or typing. When users interact with a chatbot, it automatically provides answers. By processing user-entered text, the chatbot service can provide the user with relevant information. Text mining is the process of mining data from text using data sources from documents. This is one of the technological developments that can be utilized in data processing (Puteri et al., 2022).

Chatbots are a new promotional tool for brand engagement, as they cost less than apps, require no bot uploads, reach a wider range of customers, and are more cost-effective than hiring staff (Wijayanti et al., 2019). Chatbots make library users more comfortable using their services. The University of Technology Sydney academic library developed the Lib-Bot chatbot to reduce undergraduate students' anxiety towards libraries and books (Sugiono, 2021).

This system enables users to interact with one another and answer their questions. Test results obtained using the black-box testing method indicate that the WIDYA Chatbot system is both accurate and functional. The calculation accuracy is 90%, and the UAT accuracy is 95% (Pratiwi et al., 2024). Chatbots offer a generally positive user experience. This positive experience is driven by ease of use, flexible accessibility, prompt information support, accuracy, and responsiveness to student needs. The chatbot is well-received as a useful tool to enhance student experiences and services on campus. Chatbots, thanks to student support, improve efficiency and service delivery in higher education (Damayanti & Nuzuli, 2023).

Implementing artificial intelligence in libraries may face several obstacles. These challenges include 1) insufficient funding for maintaining AI and robotics infrastructure; 2) AI is replacing the impact of job losses and increased unemployment as librarians' tasks; and 3) the lack of knowledge, skills, experience, and technological expertise required to operate artificial intelligence and robotics (Setiawan et al., 2023). Chatbots' limitations in providing services: 1. Chatbots cannot understand complex or ambiguous questions or requests, and are better at handling routine and simple questions. This can be problematic in providing adequate assistance in more complex situations. 2. Chatbots may have trouble understanding the context of a conversation. Chatbots cannot always remember the user's previous questions, which can disrupt the user experience. 3. Chatbots rely on accurate customer data; if the data is incomplete or inaccurate, the chatbot may provide incorrect or irrelevant information (As-syiva & Nasution, 2023).

Many users stated that AI language was too rigid; they found it too artificial and unnatural. While AI has made significant progress in understanding and generating text with relatively high accuracy, there is

still room for improvement. However, some users feel that AI lacks an understanding of the context and nuances of human language. While AI has many advantages, it also has some drawbacks (Noviadhi et al., 2024).

Chatbots powered by large language models (LLMs), currently very popular, have great potential as a source of information in the health sector, particularly regarding resuscitation. This technology can be used to educate the general public about basic resuscitation steps, such as CPR, through easy-to-understand, conversational interactions. These chatbots can also serve as valuable tools in emergencies, providing instant, practical guidance to untrained bystanders facing cardiac arrest or other critical conditions. With their ability to deliver information quickly, accurately, and responsively, LLM-based chatbots have the potential to expand access to resuscitation knowledge among the public, improve preparedness, and support improved first aid rates before professional medical assistance arrives. This also encourages more inclusive community involvement in emergency response efforts (Abd-alrazaq et al., 2019).

Interpersonal communication occurs between individuals in a specific relationship. In this relationship, each party views the other as playing an important and special role in their lives. Therefore, the quality of communication is a crucial aspect that must be maintained. These communication qualities include openness, empathy, mutual support, positive thinking, and equality. When communication quality is well maintained, interpersonal relationships will develop healthily and be managed more effectively (Anggraini et al., 2022).

Advances in Artificial Intelligence (AI) technology have had a significant impact on human communication patterns in today's digital age. Among the various innovations in the field of communication, AI holds a significant position due to its ability to transform the way humans interact and convey information. AI not only influences communication technically but also shapes the way people think and behave when interacting, whether directly or through digital media. A study reveals that interpersonal communication increasingly involves topics related to technology, including the application of AI in daily life. However, people still rely on media messages as a tool to understand and assess how AI works and its impact on their lives (Pramana et al., 2023).

Artificial Intelligence (AI) has enabled faster and more efficient interpersonal interactions. For example, the use of chatbots in customer service or virtual assistants like Siri, Google Assistant, and Alexa allows users to issue voice commands and receive responses in just seconds. Furthermore, AI algorithms on social media platforms like Facebook and Instagram are shaping the way we communicate with friends, family, and online communities by filtering and presenting content tailored to each user's preferences. While AI offers unprecedented efficiency and personalization, concerns have emerged about its impact on the meaning of interpersonal communication. This technology is feared to undermine important values such as empathy, physical presence, and emotional engagement that typically arise in face-to-face interactions (Riyadi et al., 2024).

Despite offering various conveniences, the use of artificial intelligence (AI) also presents several

challenges, including excessive dependence on technology, an increased risk of social isolation, potential data privacy violations, and a weakening of interpersonal communication skills. These challenges are of significant concern amid the rapid adoption of AI in everyday life. Interpersonal communication remains the cornerstone for building healthy social relationships, as it involves empathy, emotional expression, and genuine human presence. AI, while sophisticated, cannot completely replace the complex and meaningful quality of human interactions. Therefore, it is essential to maintain a balance between the use of technology and the fundamental human need for authentic social interaction (Kurniati et al., 2025).

CONCLUSION

This study reveals that chatbots provide a positive overall user experience. This positive experience is driven by ease of use, flexible accessibility, prompt information support, accuracy, and responsiveness to student needs. The chatbot is well-received as a useful tool to enhance the student experience and campus services. Chatbots, thanks to student support, improve efficiency and service at universities. Limitations of chatbots in providing services: 1. Chatbots cannot understand complex or ambiguous questions or requests, and are better at handling routine and simple questions. This can be a problem for providing adequate assistance in more complicated situations. 2. Chatbots may have difficulty understanding the context of a conversation. Chatbots cannot always remember a user's previous questions, which can disrupt the user experience. 3. Chatbots rely on accurate customer data; if data is incomplete or inaccurate, the chatbot may provide incorrect or irrelevant information. Further research can empirically examine various libraries in Indonesia that have utilized chatbots in library services, particularly in information services.

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AUTHORS' CONTRIBUTIONS

MBM: conceptualization, writing – original draft, formal analysis, methodology. NE: writing – review & editing, formal analysis, validation. FS: data curation, resources, writing – review & editing. SW: methodology, formal analysis, writing – review & editing. FM: supervision, validation, writing – review & editing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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DATA AVAILABILITY

The 15 selected articles generated during the development of this study has been deposited in a Google Drive, and it is accessible at https://bit.ly/ChatbotinLS.

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