

Empowering University Librarians in the Age of AI: A Study of Competence and Collaboration in Higher Education

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ABSTRACT

Research Objective. While AI offers transformative potential for information retrieval, it challenges the traditional intermediary role of academic librarians. This research explores the gap between current librarian skills and the technical-pedagogical competencies needed to navigate AI-powered reference services. Focusing on the complex ecosystem of academic libraries, this study identifies the core competencies required to optimize AI tools to meet multifaceted user needs. **Research Method.** This study employs a descriptive qualitative approach with purposive sampling. **Data Analysis.** The findings reveal that librarians have developed digital literacy through both formal and informal activities and have successfully integrated AI into various educational and information consulting services. **Results.** Using the B-Wheel model, the analysis shows the importance of orientation, specialization, experimentation, social learning, and the reinforcement of social norms. The role of the librarian cannot be replaced but is instead supported and enhanced by AI technologies. **Conclusions.** Librarian competencies are a key determinant of effective, efficient, ethical, and sustainable AI use. Librarians who are adaptive, collaborative, and reflective are the main agents of digital-era library services. Thus, librarian competencies are fundamental to the transformation of AI-based library services.

Keywords: *artificial intelligence, librarian competencies, reference services, digital literacy, academic libraries*

A. INTRODUCTION

The advancement of artificial intelligence (AI) has been remarkably rapid, transforming various service sectors in society (Noorzeha et al., 2024). Library services are no exception, as they face both challenges and opportunities in integrating AI. The central issue addressed in this article is the extent to which librarians possess the competencies required to effectively serve users by using AI in their daily work, and how they can adapt to and embrace societal changes brought about by technology (Edna Karina Lira Da Silva et al., 2024). The librarian's role is highly strategic, functioning as the mediator between users and information sources (Varlejs, 2016). This is further driven by the increasing user demands for more effective information retrieval, streamlined library operations, and innovative

services. However, the adoption of AI also raises concerns regarding digital literacy, ethical considerations, and the potential displacement of librarians' roles (Hlatshwako & Tsabedze, 2024).

According to the Indonesian Government. (2007). Law of the Republic of Indonesia Number 43 of 2007 concerning Libraries. A librarian is an individual who possesses competencies acquired through education and/or professional training and is responsible for managing and delivering library services. Thus, librarians are required to have adequate competencies to manage libraries effectively. (RUSA Task Force on Professional Competencies, 2003) defines competence as behaviors consistently and effectively demonstrated by high-performing professionals. Similarly, competencies can be defined as the knowledge, skills, and abilities that determine and contribute to performance in a given profession (*Federal Librarian Competencies*, 2011). The Indonesian Ministry of Manpower Decree Number 236 of 2019 also defines competence as an observable ability encompassing knowledge, skills, and work attitudes required to complete a task or job in accordance with established performance standards.

In the context of higher education, librarians are expected to adapt and collaborate with information technologies. However, in practice, librarians often face limitations in accessing or providing the full range of services for users. Therefore, higher education librarians must possess competencies in information technology, particularly in understanding, adapting to, and fulfilling users' information needs. The rise of the Industrial Revolution 4.0 era demands that librarians be competent in effectively utilizing automated technologies integrated into library systems. AI should not be seen as a replacement for librarians, but rather as a way to support them by reducing workloads and enhancing service delivery.

Nonetheless, not all librarians inherently possess the competencies required to manage complex or multitasking services. Innovation is therefore essential to assist librarians in communication and user services, which can be achieved through information technology or collaboration with AI. Academic librarians, in particular, play an essential role in managing academic information resources, providing information literacy instruction, and guiding users through the reference-seeking process. However, the application of AI to support reference services in higher education libraries has not yet been optimized and is scarcely discussed in the Indonesian literature. This reveals a research gap concerning the intersection between librarian competencies and AI implementation in reference services.

Academic libraries are among the most complex types of libraries, with a primary mission to support the academic community's needs for teaching, research, and community service (Hasugian & Lubis, 2021). The use of AI is increasingly relevant in addressing the needs of students and researchers (Jatto & Tella, 2024), and higher education libraries are encouraged to integrate AI into their services (Harisanty et al., 2024). In this context, librarians' role in reference services is crucial, as they assist users in exploring information across multiple subject areas (Rahmawati, 2023). Consequently, the integration of AI into library services becomes imperative (Ajani et al., 2022). However, this also raises the

question of how librarians can deliver high-quality, efficient services while using AI as an interface for interacting with users.

The novelty of this article lies in synthesizing recent empirical and conceptual findings to argue that librarian competence in AI is not merely a technical matter, but a multidimensional construct encompassing digital literacy, ethical awareness, adaptability, and collaborative skills. This highlights that librarians' role in the AI era is hybrid and dynamic, while human expertise remains indispensable to ensuring ethical and equitable AI integration (Cox, 2023).

Based on these phenomena, this study seeks to identify the competencies librarians must possess to utilize AI in reference services. The central research question is: What librarian competencies are needed to employ AI in reference services within academic libraries effectively? How do these competencies shape the role of librarians in providing high-quality reference services? This article aims to provide a comprehensive overview of the competencies librarians need to integrate AI into reference services and meet users' evolving information needs. The overall objective is to analyze the current state of librarians' competencies in AI utilization, identify challenges and enabling factors, and propose practical recommendations to foster a culture of continuous learning and innovation in academic library environments.

B. METHODS

This study employed a descriptive qualitative approach, with data collected through interviews and observations conducted in June 2025. Semi-structured interviews were conducted using an interview guide developed from indicators of reference librarian competencies and the use of AI technologies. Each interview lasted 30–60 minutes per informant and was conducted online via Zoom. This study employed a purposive sampling technique, focusing on key informants who met specific expertise criteria: certified academic librarians holding senior positions or serving as heads of reference services. Although the study was conducted via Zoom, the number of informants was determined by data saturation, ensuring that the collected insights provided a profound and comprehensive understanding of AI integration rather than merely a statistical representation. Observations were undertaken to examine AI-based reference service practices within academic library environments, focusing on user–librarian interactions and the forms of technological support employed.

A purposive sampling technique was used to select informants who met the researcher's criteria, which included certified academic librarians engaged in reference services. The informants were senior librarians and heads of reference services at two institutions. The collected data were analyzed using thematic analysis, encompassing transcription, coding, categorization, and theme extraction. The process involved systematic data reduction through manual coding, data display in thematic matrices to identify patterns, and conclusion drawing to synthesize the findings. This manual approach ensured deeper immersion in the data, enabling a more nuanced interpretation of the librarians' professional experiences.

C. RESULT AND DISCUSSION

1. Implementation of AI in Libraries

Librarians have indirectly utilized AI in their daily activities, both for personal needs and for library service-related tasks. This is reflected in the statement of VI (54), who noted:

The implementation of AI in academic libraries is already multifaceted, as described by one of the senior informants :

“AI has already been used for literacy classes, search strategies, Authentic Reality, and voice-GPT.” (VI, 54 years old, June 16, 2025).

Similarly, CS (37), an informant from a different university, also stated :

“AI is used for daily tasks such as grammar checking, email, searching for scholarly sources, and teaching students. However, it has not yet been applied to service chatbots.” (CS, 37 years old, June 24, 2025).

Both informants have begun to use AI to support library services, though with different focal points. VI (54) focused on augmented reality, holograms, voice-GPT, and interactive, visually based recommendation systems, while CS (37) concentrated on the use of AI for research and academic literacy activities (e.g., Elicit, Scispace, ChatGPT, DeepSeek).

2. Librarians' Readiness

The readiness of librarians to utilize AI in various library activities largely depends on their ability to adapt to technological developments. In this regard, VI (54) stated:

“Each librarian has different abilities. However, some of them are actually ready and have begun to use AI for services. They are provided with internal training and task distribution.” (VI, 54 years old, June 16, 2025).

On the other hand, CS (37) shared a similar view regarding librarians' readiness to implement AI. In his statement, CS noted:

“Certain individuals still dominate the use of AI and have not yet spread evenly across the staff. It still depends on active staff with broader experience. However, the leadership has already tried to provide training so that everyone can develop relatively similar skills.” (CS, 37 years old, June 24, 2025).

Both institutions acknowledged the uneven distribution of AI-related competencies among librarians. Nevertheless, they continue to provide training to enhance capabilities and readiness in line with ongoing developments, particularly in the use of AI.

3. Required Competencies

Librarians' competencies must be continuously sharpened to keep pace with the development of AI, as a commitment to providing the best services in libraries. Libraries have undertaken several initiatives to enhance librarians' skills. As stated by VI (54):

"Digital literacy training, such as mastery of websites, digital features, word processing, and data management, has already been conducted as part of efforts to improve our human resource competencies." (VI, 54 years old, Juni 16, 2025).

A similar effort was carried out in the library where CS (37) works, who noted :
"In-house training has been conducted so that other staff can provide backup. His training is more focused on exploring AI tools for academic activities." (CS, 37 years old, June 24, 2025).

The competencies required of librarians in utilizing AI include the ability to explore AI tools such as word and data processors, develop digital features, and manage websites, all aimed at delivering the best services to library users.

4. Library Programs and Innovations

Librarians must continually generate various innovations to maintain their relevance, whether in the form of work programs or library products. Moreover, AI has become part of daily activities, prompting librarians to sharpen their skills continually. Based on the interviews conducted, VI (54) highlighted several innovations implemented in his library:

"We use it for AR-based book reviews, creating book summary videos, the LIB+ program, and voice-GPT." (VI, 54 years old, June 16, 2025).

Similarly, the library where CS (37) works has also developed innovations to assist users in finding the information they need:

"The library system already has a collection recommendation feature based on books frequently borrowed together. In addition, students are taught to use free AI tools such as Elicit, Consensus, and Scispace for scholarly article analysis. ChatGPT is also used under principles of responsibility." (CS, 37 years old, June 24, 2025).

This information indicates that AI can assist librarians in meeting users' information needs. Librarians can provide book recommendations for article references or create concise analyses of research papers. However, they still accompany and guide users in employing AI, reflecting their academic responsibility to deliver accurate information. Thus, librarians can harness AI to innovate continually.

5. Institutional Support

The rise of AI has inevitably been recognized by the institutions in which libraries operate. Institutions provide support to libraries in various ways. VI (54) acknowledged that his university supports the adoption of AI in libraries, as reflected in his statement:

"Strong support from the university comes in the form of internship opportunities, training, and priority library programs. In addition, seven librarians have completed international digital literacy certifications. There are also occasional requests to provide education on the use of AI, although it is not part of the formal curriculum." (VI, 54 years old, June 16, 2025).

At the institution where CS (37) works, similar support was provided to librarians:
"The institution has provided in-house training." (CS, 37 years old, June 24, 2025)

Furthermore, CS (37) noted that the institution has established policies regarding AI use:

“Students are allowed to use AI, but they must clearly state a disclaimer on the extent to which AI was used in their academic work.” (CS, 37 years old, June 24, 2025)

AI has already permeated the fabric of educational institutions, making it necessary for them to formulate policies regarding its application. This includes initiatives such as training and certification for librarians, as well as requiring academic staff and students to declare AI contributions in their scholarly works through disclaimers.

6. Challenges and Strategies

Every development brings challenges, and every achievement requires a strategy. Libraries are expected to address emerging issues effectively. The presence of AI today presents unique challenges for librarians in advancing both library services and their own competencies, particularly in meeting users' information needs. Thus, appropriate strategies must be prepared. VI (54) remarked that AI presents certain challenges in libraries:

“Organizational barriers, routines, and the fact that AI is not yet part of the formal curriculum. The validity of data from AI, especially free versions, is still questionable. We support ethical policies for AI use, accountability, and mandatory referencing.” (VI, 54 years old, June 16, 2025)

CS (37) shared a similar perspective:

“Challenges arise because most staff are senior, and it is difficult to recruit younger staff with passion and technological skills. AI is very helpful, but its results are not 100% accurate. Sources are often invalid or fictitious and must be rechecked and integrated with critical thinking. Students are allowed to use AI, but they must clearly state a disclaimer on the extent of its use in academic work.” (CS, 37 years old, June 24, 2025).

These statements indicate that implementing AI in reference services faces significant challenges, particularly regarding information reliability. AI outputs cannot always be fully trusted and sometimes generate fictitious content, requiring verification. In such cases, human judgment remains indispensable, with librarians' roles becoming evident through their ability to analyze and validate AI-generated information. Ultimately, these challenges may lead to the formulation of new policies, such as mandatory disclaimers on AI use in academic outputs.

7. Collaboration and Promotion

Librarians work as a team with a strong orientation toward user services, which encourages them to build relationships with students, faculty, and institutional leaders. In this context, VI (54) consistently applied collaborative principles in his work, stating:

“Actively collaborating with lecturers and students, including focus group discussions (FGDs) and informal sharing.” (VI, 54 years old, June 16, 2025).

To promote the library, VI (54) also employed various methods and platforms:

"We do it through the helpdesk, social media, and the 'Serasi' self-learning program, so they know who we are and what we do." (VI, 54 years old, June 16, 2025).

Meanwhile, CS (37) engaged in collaboration by playing an active role in consultations with the academic community:

"Librarians actively provide in-depth consultations (lasting 2–3 hours) for students and lecturers, particularly on bibliometric analysis and data cleaning." (CS, 37 years old, June 24, 2025)

These accounts illustrate the importance of collaboration in library services. Librarians' presence also helps promote the library within the academic community, demonstrating that librarians can serve as partners in scholarly activities.

8. Perspectives on the Future of the Profession

The sophistication of AI technology will not replace librarians' roles in fulfilling users' information needs. After all, AI is merely a technological product with inherent limitations. Thus, librarians will continue to be needed. VI (54) recognized that AI can assist but not replace librarians, as reflected in his statement:

"AI helps but does not replace librarians. The librarian's role remains crucial. Librarians continue to learn independently and exploratively, learning by doing." (VI, 54 years old, June 16, 2025)

CS (37) also agreed that AI cannot replace librarians, emphasizing the human capacity for critical thinking and reasoning:

"AI will not replace librarians. Justification, analysis, and education still require human roles. Librarians will continue to exist as evaluators and guides of information." (CS, 37 years old, June 24, 2025).

Librarians hold a strategic role in every corner of the library, while AI is merely a tool. No matter how far technology advances, librarians will always have a place within this development because they possess critical thinking and wisdom. AI can provide information or resources as needed, but it is the librarian who determines the accuracy and relevance of the information it generates. Therefore, librarians must continually enhance their competencies through various means to become the best partners for users in meeting their information needs.

From the interview findings presented above, it is evident that the rapid development of AI significantly influences both the challenges and opportunities across all aspects of library work. This highlights the need for librarians to strengthen their knowledge and skills to be well prepared for ongoing changes.

Table 1. Summary of Interview Findings

Aspect	Findings
Utilization of AI	AI has begun to be used in supporting library and academic services
Purpose of Use	Used to assist in information retrieval, preparing materials, grammar checking, and supporting teaching and learning processes.
Attitude toward AI	Not opposed to AI ; AI is regarded as a supporting tool, not a replacement for the librarian's role.
Ethical Awareness	Both emphasize the importance of responsibility in using AI and validating information.
Student Consultation	Librarians actively provide academic consultations to students, including guidance on AI usage.
Human Resources Challenges	Both institutions acknowledge the limited number of librarians with evenly distributed AI competencies.
Institutional Support	Supported by the university, although execution still largely depends on individual librarian initiatives.

Source: Processed data

In this regard, AI in academic libraries strongly drives basic competencies and librarians' readiness, requiring librarians to master new skills. Librarians' competencies are also tested through direct experiences in adopting and implementing AI in library services. This aligns with the study by Shahzad et al. (2024), which states that librarians must continuously enhance their competencies to master AI in library services. Therefore, developing librarians' competencies is crucial—not only in terms of technical skills but also in ethics, collaboration, and understanding the social impact of AI adoption. Similarly, Kautonen & Gasparini, (2024), using the B-Wheel model for building AI competencies in academic libraries, highlight that concrete application of its principles can be described as follows:

1. Orientation toward AI fundamentals is achieved through training or librarians' self-development, forming the basic competencies of an AI-literate librarian.
2. The selection of service areas or focus should align with librarians' interests and institutional needs. Librarians are encouraged to choose specialized domains such as metadata, information literacy, research, or collections for AI development. This helps prevent fatigue and supports professional specialization in targeted areas.
3. Hands-on experimentation with AI tools is essential. Beyond theoretical knowledge, learning by doing should be emphasized and continuously practiced.
4. The wheel's center represents collaboration and collective learning. Transforming from individual learning into group learning allows librarians to exchange information, experiences, and insights.
5. Values and ethics serve as guiding principles in AI use. Although AI does not explicitly provide ethical frameworks, librarians must emphasize this dimension in their user education.

The B-Wheel model thus offers a systematic framework for libraries to develop AI in a gradual, contextual, and inclusive manner. The findings of this study highlight librarians' role as agents of change. With their competencies in AI

development, librarians can adapt and position AI as a mediator in reshaping academic literacy culture within higher education libraries. Librarians' involvement in decision-making and strategic planning for digital transformation is crucial in meeting users' information needs.

Furthermore, collaborative learning across different stakeholders—through sharing experiences, exchanging knowledge, and peer-to-peer training—provides opportunities to strengthen AI-related competencies. Institutional and leadership support for human resource development is also essential to address existing skill gaps. Thus, the B-Wheel model, combined with field findings, not only reflects librarians' current competencies but also provides a conceptual roadmap for strengthening their skills to meet the challenges and opportunities posed by AI in the future.

E. CONCLUSION

The rapid integration of Artificial Intelligence into academic libraries marks a significant paradigm shift, in which a librarian's professional value is no longer defined solely by information curation but by the ability to adopt, adapt, and innovate within an AI-driven ecosystem. This study underscores that modern librarian competencies must transcend basic operational skills. Instead, they require a sophisticated blend of digital fluency, critical thinking, and a robust commitment to information integrity. By mastering these areas, librarians ensure that they remain pivotal intermediaries who can navigate the complexities of AI while upholding the rigorous standards of academic research and teaching.

The findings highlight the B-Wheel model as a vital framework for professional development. Through its stages of orientation, exploration, and collaboration, this model provides a structured pathway for librarians to not only embrace technological tools but also to safeguard ethical academic values. The research also reveals that successful AI integration is rarely a solitary endeavor; it is a collective journey. It demands institutional strategies that prioritize fair task distribution and foster a culture of active peer support. Such synergy is essential to transform AI from a disruptive force into a powerful facilitator that enhances the efficiency and depth of reference services.

Ultimately, AI serves as an augmentative tool rather than a replacement for human expertise. The future of academic libraries will be shaped by librarians' resilience and readiness to respond to the dynamic interplay between technological advancements and the evolving needs of the scholarly community.

To further strengthen the study's findings, several avenues for future research are recommended. First, there is a clear need to investigate the long-term impacts of the B-Wheel model across different types of academic institutions to assess its broader scalability. Second, future studies should focus on developing a standardized AI-competency framework to integrate into national library policies and professional certification programs. Additionally, expanding this research with quantitative methods would help measure the direct correlation between librarians' AI proficiency and user satisfaction. Finally, deeper exploration into the ethical governance of specific generative AI tools in reference services will be crucial for maintaining academic integrity in an increasingly automated world.

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