Empowerment of Liaison Librarians in the AI Era for the Field of Engineering and Architecture: A Case Study at the International Islamic University Malaysia(IIUM)

Faizal Hazri bin Mat Ripin, Engku Norulizati Engku Aziz

Dar al-Hikmah Library, International Islamic University Malaysia,
Jalan Gombak, 53100, Kuala Lumpur.

Corresponding Email*[1] faizalhazri@iium.edu.my, * [2] nuruliza@iium.edu.my

ABSTRACT

In the rapidly evolving era of artificial intelligence (AI), the role of liaison librarians within specialised fields such as engineering and architecture, is becoming increasingly important. This study investigates on the empowerment of liaison librarians at the International Islamic University Malaysia (IIUM), highlighting their significant contributions to academic success and research advancement. Given that the engineering and architecture field requires accurate, up-to-date, and easily accessible information, the responsibilities of liaison librarians are becoming increasingly complex and important to all parties, whether for the advancement of the library or the faculty and students as users. This study explores various initiatives and strategies implemented by liaison librarians at Dar al-Hikmah Library, IIUM, to ensure they remain relevant and integral to the development of librarians' careers in general and to the faculties of engineering and architecture in particular. By leveraging AI, librarians can become agents of more efficient and organized information retrieval, whether it involves literature searches or data management, thus significantly impacting the academic and research capabilities of faculty and students. The study's findings indicate that the integration of AI has significantly impacted the roles of liaison librarians, necessitating continuous professional development and adaptation to new technologies. Therefore, to enhance the quality of services and be proactive, appropriate training and implementation of the latest technologies must be carried out among them, especially in the fields of engineering and architecture.

Keywords: Liaison Librarians, AI Integration, Empowerment, Engineering & Architecture, Research Advancements

ABSTRACT

Dalam era kecerdasan buatan (AI) yang berkembang pesat, peranan pustakawan perhubungan, terutamanya dalam bidang khusus seperti kejuruteraan dan seni bina, menjadi semakin penting. Kajian ini menumpukan kepada pemerkasaan pustakawan penghubung di Universiti Islam Antarabangsa Malaysia (UIAM), menekankan sumbangan signifikan mereka terhadap kejayaan akademik dan kemajuan penyelidikan. Memandangkan bidang kejuruteraan dan seni bina memerlukan maklumat yang tepat, terkini, dan mudah diakses, tanggungjawab pustakawan penghubung menjadi semakin kompleks dan penting kepada semua pihak, sama ada untuk kemajuan perpustakaan atau kepada fakulti dan pelajar sebagai pengguna. Kajian ini meneroka pelbagai inisiatif dan strategi yang dilaksanakan oleh pustakawan penghubung di Perpustakaan Dar al-Hikmah, UIAM, untuk memastikan mereka kekal relevan dan integral kepada pembangunan kerjaya pustakawan secara umum dan kepada fakulti kejuruteraan dan seni bina khususnya. Dengan memanfaatkan AI, pustakawan boleh menjadi agen pencarian maklumat yang lebih cekap dan teratur, sama ada melibatkan carian literatur atau pengurusan data, dengan itu memberi impak yang signifikan terhadap kemampuan akademik dan penyelidikan fakulti dan pelajar. Penemuan kajian menunjukkan bahawa integrasi AI telah memberi impak yang signifikan terhadap peranan pustakawan penghubung, memerlukan pembangunan profesional yang berterusan dan penyesuaian kepada teknologi baharu. Oleh itu, untuk meningkatkan kualiti perkhidmatan dan menjadi proaktif, latihan yang sesuai dan pelaksanaan teknologi terkini mesti dijalankan dalam kalangan mereka, terutamanya dalam bidang kejuruteraan dan seni bina.

Kata Kunci*:* Pustakawan Penghubung, Integrasi AI, Pemerkasaan, Kejuruteraan, Seni Bina, UIAM, Sokongan Akademik, Kemajuan Penyelidikan

INTRODUCTION

Background of the Study

In the dynamic fields of engineering and architecture, the role of liaison librarians remains crucial in bridging the gap between extensive information resources and the specific needs of students and researchers. With the emergence of artificial intelligence (AI), the landscape of higher education is undergoing a significant transformation, profoundly reshaping how information is accessed, analyzed, and utilized in public universities in Malaysia (Atan et al., 2023)

The increasing demand for more efficient research support and innovative resource management in academic libraries highlights the need for liaison librarians to adapt to AI. (Munshi et al., 2024). They must adapt by integrating AI tools and technologies to enhance their service delivery (Basak et al., 2024). Rapid information and communication technology developments require librarians to enhance their digital competencies, maintain a flexible attitude, and extensively review external references to improve service quality (Hallis, 2017). The shift from paper-based

mediums to electronic databases and websites has led to new trends in information-seeking behaviour among researchers, presenting new challenges to academic libraries. As intermediaries in this digital age, liaison librarians must remain open and more creative in embracing any innovations (Al Hijji & Al-Busaidi, 2019; Hodonu-Wusu, 2024).

This paper explores how the International Islamic University Malaysia (IIUM) empowers liaison librarians through AI integration, enhancing information accessibility, user engagement, and academic research. In the context of the Dar al-Hikmah Library, IIUM, empowerment involves training librarians in AI technology and the strategic aspects of library management, offering insights relevant to the needs of the faculty and students. Academic libraries have moved swiftly to grasp the challenges and opportunities of the new Artificial Intelligence (AI) technologies. Across these accounts, librarians express concern about their competence, skills, and knowledge of the latest technology and its implications for the research community (Kautonen & Gasparini, 2024)

AI systems are designed to learn from data and adapt over time, enhancing their performance in various applications, including libraries and information services. Mikalef et al. (2023) suggest that AI can redefine resource management and is integral to the professional development of library staff, enhancing decision-making and learning experiences. However, despite these potential benefits, AI is in its nascent stages and faces numerous challenges. Subaveerapandiyan et al. (2023) emphasize that addressing these challenges is crucial before AI can be fully integrated into library practices.

As the AI landscape rapidly evolves, academic libraries are transforming from passive observers to active participants, addressing new challenges and opportunities head-on. Liaison librarians play an important role as links between educational content and its users. In the digital age, characterized by an abundance of information, the role of librarians has undergone a profound transformation. They have moved from gatekeepers of physical collections to facilitators of digital access and information literacy. Librarians actively engage with technology to enhance user experiences, curate digital resources, and promote information literacy skills (Thiruppathi, 2024)

Empowerment of Liaison Librarians

The concept of empowering liaison librarians encompasses a strategic initiative aimed at enhancing their knowledge, skills, and capabilities to provide more effective support to students and researchers, especially in specialized fields such as engineering and architecture. This process involves continuous professional development, access to the latest technological tools, and an in-depth understanding of subject-specific resources. By equipping liaison librarians with advanced research tools and methodologies, institutions can ensure that these key personnel are

not only well-prepared to handle complex queries but also capable of fostering a deeper level of academic engagement.

Moreover, the empowerment of liaison librarians facilitates the creation of a dynamic learning environment where interactive and innovative educational practices thrive, significantly contributing to academic success and research excellence within universities. The work of reference, subject, and liaison librarians is evolving, rapidly in some cases. Liaison librarians, traditionally responsible for bridging the gap between library resources and user needs, have seen their roles expand significantly in response to educational and research demands changes. Historically, reference, liaison, and subject librarians connected people to the information they needed in a visible way, sitting behind a reference desk or, since the 1970s, in front of a classroom full of students for information literacy instruction. Even the presence of print reference collections indicated the librarians who worked with those materials (Johnson, 2018).

However, the process of working as a librarian has changed rapidly, especially in modern technologies such as artificial intelligence (AI) to enrich their role in managing and providing access to academic information. Empowerment is a compelling concept inside and outside of community psychology, but widespread use has diffused its meaning such that it has come to mean almost any action intended to help a person. (Boehm & Staples, 2004).

Liaisons are adopting two new roles: advocate and consultant, both emphasizing campus engagement. As advocates, they act as a research library's "sales force," speaking on various topics and trends in higher education, influencing campus stakeholders, and serving as ambassadors of change. As consultants, liaisons identify faculty needs and refer them to colleagues with specialized, often technical, expertise. (Hübner & Wagner, 2023).

As the scope of academic libraries expands, the role of liaison librarians becomes increasingly important in various areas. They are not only involved in curriculum development but also provide technological support and serve as global consultants. Their extensive expertise helps achieve institutional goals more effectively. This expanded role not only enhances the visibility of librarians within the academic community but also strengthens the library's role in supporting retention and graduation success.

Purpose and Objectives of the Study

This study aims to explore the empowerment of liaison librarians through AI, focusing on the International Islamic University Malaysia (IIUM). The objectives are to:

1. **Assess the Current Utilization of AI Tools by Liaison Librarians**:
   To evaluate how AI technologies are currently being employed by liaison librarians in the fields of engineering and architecture at IIUM and to identify the most commonly used AI applications.

2. **Examine the Impact of AI on the Roles and Responsibilities of Liaison Librarians**: To investigate how the integration of AI tools has transformed the traditional roles and duties of liaison librarians, enhancing their ability to support faculty and students.

3. **Identify Challenges and Barriers to AI Adoption**: To explore the specific challenges and barriers that liaison librarians face in adopting and integrating AI technologies into their workflows, including technical, organizational, and personal factors.

4. **Evaluate the Benefits of AI for Library Services in Specialised Fields**:
   To analyze the benefits that AI tools bring to library services in the specialized fields of engineering and architecture, focusing on improvements in efficiency, resource management, and user support.

5. **Develop Recommendations for Empowering Liaison Librarians with AI**:
   To formulate practical recommendations for empowering liaison librarians through targeted training programs, institutional support, and effective strategies for AI integration, aiming to enhance professional development and service delivery.

Literature Review

Overview of Existing Research on AI in Librarianship

Artificial Intelligence (AI) technologies have been progressively integrated into library systems, offering new functionalities such as automated indexing, chatbots for user assistance, and predictive maintenance of library resources. Previous studies highlight the transformative potential of AI but also point to significant barriers, including the need for technical skills and resistance to adopting new technologies.

Basak et al. (2024) discussed how the integration of AI into libraries impacts the utilisation of information resources, facilitates search functions, and promptly addresses user requests. They highlighted innovative services such as robots reading books and organising shelves, reference service expert systems, and virtual reality applications for immersive education.

Similarly, Hodonu-Wusu (2024) emphasises that AI is one of the most promising technologies for libraries. AI can help automate processes, provide personalised services, and significantly improve user experiences, making libraries more efficient and user-friendly.

Role and Impact of Liaison Librarians

Liaison librarians are essential in bridging academic departments with library resources, enhancing research support, and promoting information literacy. With the advent of artificial intelligence, their roles have expanded to include utilising advanced data analysis tools, tailored resource recommendations, and enhanced user interaction strategies (Bairagi,Lihitkar,2024). As library research undergoes a significant paradigm shift, these librarians are increasingly

integrating AI tools into their workflows, allowing for more customised and efficient service delivery.

Moreover, as AI applications become more prevalent, including those used for unethical purposes, librarians with a strong, experience-backed human-first approach play a crucial role in defending against misinformation. Their expertise ensures the maintenance of reliable information and rigorous fact-checking, which are more important than ever in the AI era (Hodonu-Wusu, 2024).

Hübner & Wagner (2023) further underscore the significance of liaison librarians in nurturing collaborative relationships between libraries and academic departments. This aspect of their work is greatly enhanced by AI, enabling them to foster deeper and more productive connections, thus advancing the library's mission in the academic landscape.

Challenges and Opportunities in Engineering and Architecture

Ghimire et al. (2024) note that the fields of engineering and architecture are characterised by rapidly evolving knowledge and diverse information needs. AI can help manage this complexity by offering personalised and context-aware information services. However, AI adoption in these fields also faces significant challenges, such as ensuring data accuracy and addressing specialised terminologies. Additionally, integrating generative AI in construction involves challenges like domain-specific knowledge, potential hallucinations in AI outputs, accuracy in AI predictions, model generalisability, frequent updates, cost implications, and ethical considerations regarding data privacy, bias, and accountability (Ghimire et al., 2024).

According to Dzhusupova et al. (2022) the success of AI projects critically depends on the people driving them. AI solutions are not generic and must be customised to fit a company’s specific business context and data. This need for customisation highlights the importance of understanding the unique challenges in the business and architecture sectors, and that a company’s resources must be carefully estimated and managed for successful AI implementation.

Methodology

Research Design and Approach

This study employs a qualitative research design, focusing on the observation method, to gather in-depth insights into the empowerment of liaison librarians in the AI era. The case study approach is chosen to provide a detailed and contextual analysis of the specific environment at the Dar al-Hikmah Library at the International Islamic University Malaysia(IIUM) Gombak. This methodology allows for a comprehensive understanding of the practical implementation and impact of AI on liaison librarians’ roles and responsibilities.

Observation Method

The primary data collection method used in this study is direct observation. This method involves systematically watching and recording the activities and interactions of liaison librarians within the IIUM Library. The observation method is particularly suitable for capturing real-time behaviours, practices, and challenges faced by librarians as they integrate AI tools into their workflows.

Observation Procedure

1. **Selection of Observational Sites**: This study focuses on the Dar al-Hikmah Library at the International Islamic University Malaysia (IIUM), specifically targeting programs in the field of artificial intelligence (AI) involving the liaison librarians for Kulliyyah of Engineering and Architecture. Specific sites include the main library, the other liaison librarian offices, and areas where AI tools are actively used, such as digital resource centres.
2. **Duration and Frequency**: Observations were conducted over three months. The observation is based on the programmes conducted, either once a week, biweekly, or monthly.
3. **Observation Checklist**: An observation checklist was developed to ensure consistency and comprehensiveness. Key areas of focus included:
    - Use of AI tools for data analysis and resource recommendations.
    - Interaction between liaison librarians and faculty/students.
    - Problem-solving and decision-making processes involving AI.
    - Training sessions and professional development activities related to AI.
    - Challenges and barriers encountered in AI integration.
4. **Recording Observations**: Field notes were taken during each observation session. These notes documented specific incidents during AI training sessions, librarian interactions, and any reactions or feedback from users. Additionally, statistics and diagrams were used to document the layout and progress of the program.

Case Study Context

The case study focuses on the IIUM Dar al-Hikmah Library, a leading academic library known for its innovative use of technology in enhancing library services. The library serves a diverse population of students and faculty members, particularly in the fields of Engineering and Architecture. By examining the real-life context of this library, the study aims to provide practical insights into how AI tools are utilized and the impact they have on liaison librarians.

Limitations

This research project has several limitations that need to be considered. First, the study is based solely on the classes that have been conducted and the observations made by the

author. Second, the data collected is limited to surveys and observations carried out by the author. This may lead to observer bias and limitations in data interpretation. The presence of the author as an observer also has the potential to influence participants' behaviour, a phenomenon known as the Hawthorne effect. For more comprehensive findings, future studies need to include a more diverse range of data collection methods and more in-depth data analysis.

Results

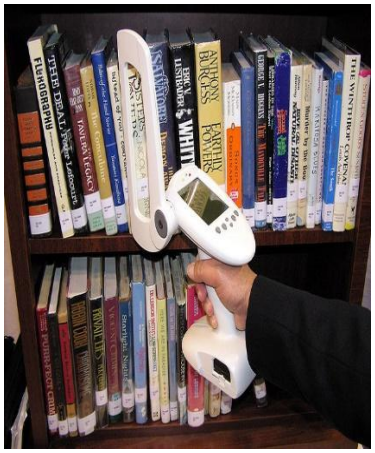
Findings from Data Collection The study found that AI tools are increasingly being used by liaison librarians at IIUM, particularly for tasks such as information retrieval, resource management, and user support. However, the extent of use varies significantly among individuals, influenced by factors such as familiarity with technology and institutional support.

Impact of AI on Roles and Responsibilities AI has significantly enhanced the efficiency of liaison librarians, allowing them to handle larger volumes of information and provide more personalized services. Specific AI applications, such as machine learning algorithms for resource recommendations and natural language processing for user queries, have been particularly impactful.

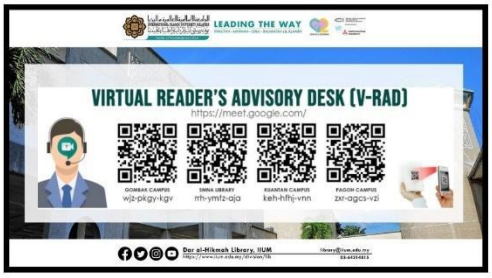
Case Studies from IIUM:

Efforts and Steps to Empower the Role of Liaison Librarians

Effort	Steps
Organised AI Training and Workshops	Organizing training and workshops to enhance the AI skills of librarians. Types of training: 1. Managing Literature Review Using Ai 2. Image Creator: Basic Prompt To Image Using Bing.Ai & Co-Pilot 3. Data Cleaning And Machine Learning (Ml) Mastery 4. Ai-Powered Research Proposals: A Step-By-Step Guides

Offer as an AI instructor to students and staff	
Attending AI Workshops	External training and workshops organized by other institutions/ organizations. List of trainings: 1. Chat GPT for Librarians AI Literacy for Librarians: The Future Skill of Research Support' Workshop at Pustaka Raja Tun Uda, Shah Alam, Selangor 2. Bengkel ChatGPT untuk Guru dan Pendidik 3. Penulisan Literature Review Menggunakan ChatGPT
Digital Resource Development for Users' Needs 	Creating and managing digital resources relevant to users' needs. List of digital resource development using AI: 1. Scanner Barcode for Shelf-reading 2. Self-check Machine (Borrowing) 3. Smart Book Drop (Returning) 4. 3M Gate (Exit) 5. Barrier Gate (Entrance)  

Digital Resource Development for Staff Use	1. DOBIS change to Horizon to Symphony to KOHA 2. MARC21 to RDA
Knowledge Sharing and Innovation	Conducting knowledge-sharing and innovation sessions to promote best practices. Future planning: Conduct knowledge sharing and innovation to promote best practices for staff
Collaboration & Networking	Establishing collaborations with kulliyyah to support academic needs. Engage in professional networks and conferences related to technology and AI. List of collaborators: 1. Kulliyyah of Engineering 2. Centre for Postgraduate Studies Future collaborator: 1. Kulliyyah of Architecture and Environmental Design - related to exhibitions, Digital AI exhibition. 2. Shelf reading and shelving using robotics with Kulliyyah of Engineering. 3. Language using AI with CELPAD and Kulliyyah of Education
Digital Literacy Improvement Programs	Organizing programs to improve digital literacy among library users. List of classes on digital literacy: 1. Basic Library Skill 2. Advanced Library Skill 3. Advanced Research Skill 4. Systematic Literature Search 5. Reference Tool
Marketing and Promotion	Promote the activities or classes conducted on AI to the respective kulliyyah using: 1. Email

	2. Social media 3. WhatsApp 4. Online Poster
Utilization of AI Technology in Library Services	Use AI-based Catboat and virtual assistants: 1. Live Chat Support (Tawk.to) 2. Virtual Reference Advisory Desk (RAD)-during Movement Control Order (MCO)  

Discussion

This study highlights the crucial role of artificial intelligence (AI) is revolutionising the responsibilities and capabilities of liaison librarians at IIUM, particularly in the disciplines of engineering and architecture. The use of AI technology has significantly enhanced their operational efficiency and service quality, enabling the delivery of highly personalised and in-depth information. Tools such as advanced data analytics and automated recommendation systems have become essential instruments, allowing librarians to navigate and manage the complex and ever-changing information landscapes in these fields more effectively. The findings indicate that these AI improvements not only enhance the librarians' efficiency but also their ability to meet the specific needs of their clients (Bairagi & Lihitkar, 2020).

Challenges and Limitations

The study identified several challenges, including a lack of AI-specific training, resistance to change, and the need for continuous updates and maintenance of AI systems. These challenges must be addressed to fully realize the potential of AI in empowering liaison librarians.

Recommendations

Practical Recommendations for Empowering Liaison Librarians

1. **Targeted Training Programs**: Develop and implement training programs focused on AI tools and technologies relevant to library services.
2. **Institutional Support**: Ensure strong institutional support for AI initiatives, including adequate funding and technical resources.
3. **Change Management**: Implement strategies to manage resistance to change, such as involving librarians in the development and implementation of AI tools.
4. **Continuous Professional Development**: Encourage continuous learning and professional development to keep pace with technological advancements.

Suggestions for Integrating AI Tools

1. **AI-powered Chatbots**: Expand the use of chatbots for user assistance, leveraging natural language processing to improve interactions.
2. **Predictive Analytics**: Utilize predictive analytics for resource management, helping to optimize budgets and improve resource allocation.
3. **Personalized Recommendations**: Implement machine learning algorithms to provide personalized resource recommendations to users.

Policy Recommendations for Academic Institutions

1. **AI Adoption Policies**: Develop clear policies and guidelines for the adoption and use of AI in library services.
2. **Collaborative Frameworks**: Foster collaboration between librarians, IT professionals, and academic faculties to ensure successful AI integration.
3. **Evaluation and Feedback Mechanisms**: Establish mechanisms for ongoing evaluation and feedback to continuously improve AI implementations.

Conclusion

The integration of AI into the roles of liaison librarians at IIUM has shown promising benefits in enhancing service delivery and professional collaboration. However, to fully realise these benefits, it is essential to address the challenges and barriers identified in this study. There is no debate that artificial intelligence will have a profound impact on libraries in the years to come. To better meet the changing demands of the next generation, librarians must not only adapt to

AI but also take the initiative to drive its integration. While worries about losing one's work are natural, it's important to remember that cutting-edge technology like artificial intelligence (AI) can open up new doors and positions for librarians. By providing targeted training, institutional support, and ethical oversight, academic libraries can empower their liaison librarians to thrive in the AI era, ultimately contributing to improved educational outcomes in the fields of engineering and architecture.

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