

Research Article

Abid Fakhre Alam, A. Subaveerapandiyan*, Dalitso Mvula, Neelam Tiwary

AI Literacy and Zambian Librarians: A Study of Perceptions and Applications

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Abstract: This study delves into artificial intelligence (AI) literacy within Zambian academic libraries, focusing on librarians' perceptions and applications of AI. The research aims to gauge the AI literacy level among Library and Information Science Professionals in Zambia, identify their awareness and knowledge of AI applications in libraries, and explore their perceptions regarding the advantages and challenges of implementing AI technologies in library services. Data from 82 diverse participants were gathered using purposive and convenience sampling methods. The findings indicate a solid understanding of AI fundamentals among Zambian librarians and positive attitudes towards AI's potential benefits in library services. However, challenges such as the need for enhanced AI expertise, resistance to change, and budgetary constraints are acknowledged.

Keywords: AI literacy, AI applications, AI ethics, AI awareness, librarian perceptions, privacy concerns

1 Introduction

The emergence of artificial intelligence (AI) has revolutionised various sectors globally, prompting a significant shift in operational paradigms (Jacobides, Brusoni, & Candelon, 2021; Weber-Lewerenz, 2021; Zhou, Yang, Hyman, Li, & Munim, 2022). This transformation is particularly relevant in Library and Information Science (LIS), where AI presents both challenges and opportunities demanding attention (Tait & Pierson, 2022). Traditionally bastions of printed knowledge, libraries have adapted to the digital era, expected to offer dynamic, personalised, and efficient services (Wahler, Spuller, Ressler, Bolan, & Burnard, 2022). AI technologies hold promise in modernising library services, yet their successful integration hinges on the AI literacy of information professionals, especially librarians, who are crucial in managing and disseminating information (Dwivedi et al., 2021; Gill et al., 2022; Ridley & Pawlick-Potts, 2021; Watkins, 2020).

1.1 The Changing Landscape of Libraries

Libraries have historically been sanctuaries of printed knowledge, evolving over centuries to house and curate physical collections. Nevertheless, the digital revolution has disrupted this traditional role, necessitating

* **Corresponding author: A. Subaveerapandiyan**, Department of Library, Bennett University, Greater Noida, India; Department of Library, DMI-St. Eugene University, Lusaka, Zambia, e-mail: subaveerapandiyan@gmail.com

Abid Fakhre Alam: Global Library, O.P. Jindal Global University, Sonipat, Haryana, India, e-mail: abidf.alam@jgu.edu.in

Dalitso Mvula: Department of Library, Lusaka Apex Medical University, Lusaka, Zambia, e-mail: dalitsomvula02@gmail.com

Neelam Tiwary: School of Computer Science and Information Technology, DMI-St. Eugene University, Lusaka, Zambia, e-mail: neelamtiwary06@gmail.com

ORCID: Abid Fakhre Alam 0000-0002-3864-9126; A. Subaveerapandiyan 0000-0002-2149-9897; Dalitso Mvula 0000-0002-8930-1496

libraries to adapt to the age of information abundance (Michel, 2005). In this contemporary landscape, libraries extend beyond physical walls, offering digital resources, online catalogues, and interactive platforms (Farid, Warraich, & Iftikhar, 2023; Ikenwe & Udem, 2023; Tsang & Chiu, 2022). The role of librarians has evolved to encompass not only cataloguing and preservation but also fostering digital literacy, providing access to electronic resources, and supporting research endeavours (Martzoukou, 2020; Rafi, JianMing, & Ahmad, 2019).

AI technologies have become indispensable tools in this transformation. They enable libraries to automate routine tasks, such as cataloguing and indexing, freeing librarians to focus on more value-added activities (Adetayo, 2023a,b; Alex, Vrushank, & Sita, 2023). AI-driven recommendation systems can provide users with personalised reading lists, while natural language processing can enhance search capabilities, making information retrieval more efficient. Furthermore, AI-driven analytics can offer insights into user behaviour and preferences, aiding collection development and resource allocation. These advancements promise to enhance library services and ensure libraries remain relevant in the digital age (Chen, 2023; Xiao & Gao, 2020).

1.2 The Significance of AI Literacy

The effective integration of AI technologies into library services hinges on the AI literacy of librarians and information professionals. AI literacy encompasses understanding the fundamentals of AI, its applications, and its ethical considerations. AI-literate librarians are better equipped to make informed decisions about AI adoption, assess the potential benefits and risks, and navigate the ethical complexities inherent in AI-driven systems.

1.3 Research Question

To address the complex interplay between AI literacy and librarians' perceptions of AI in the Zambian library landscape, this study focuses on the following research questions:

Q1: How does the level of AI literacy among information professionals in the LIS field impact their perceptions of AI's potential benefits and challenges for library services?

1.4 Objectives of the Study

The primary objectives of this research are as follows:

- To assess the level of AI understanding among Zambian librarians.
- To investigate attitudes and perceptions of Zambian librarians regarding AI in libraries
- To evaluate the competence and awareness levels of Zambian librarians in using AI tools
- To identify perceived benefits of AI integration in libraries.

By pursuing these objectives, this study endeavours to provide a comprehensive understanding of the AI literacy landscape among librarians in Zambia, as well as their perceptions of AI's role in the future of library services. This knowledge will serve as a foundation for developing strategies to enhance AI literacy in the LIS field and guide the responsible integration of AI technologies in Zambian libraries. Furthermore, it contributes to the broader discourse on AI in libraries, addressing the global need for informed and responsible AI adoption in this critical sector.

2 Review of Literature

The increased impact of AI has seen the development of intelligent systems utilised in many fields. LIS has witnessed and utilised developed systems that help manage Library and other Information Science activities. Many studies have been conducted regarding AI awareness, benefits, and anticipated obstacles.

2.1 AI Awareness in Libraries

Knowledge and awareness of AI systems can be used to evaluate their current and prospective impact. Resistance is inevitable without awareness of AI systems and how they affect different fields. Many libraries have been using different systems to help in service delivery. However, amid rapid system development innovations, librarians as information custodians are expected to be at par in integrating AI systems in libraries. Research has been conducted on AI awareness in libraries. Asim et al. (2023) conducted a study on the application of AI in Pakistan university libraries; the findings showed a favourable level of awareness as librarians utilised AI-based library services such as Radio Frequency Identification (RFID) systems to provide patrons effective check-in and check-out services. It is evident that many knowledge management experts in Pakistan universities are aware and eager to adapt to the world dominated by AI; this can be noted from their willingness to integrate AI systems in meeting the demand of users through user feedback as well as through their association with AI experts and other professionals. Adithya et al. (2022) add that knowledge management and AI are interlinked in that they both deal with data, which is the primary key. Therefore, integrating AI in libraries influences vibrant technology readily available to improve access to information, increase efficiency and productivity, and enhance user experience (Barsha & Munshi, 2023; Hussain, 2023).

Similarly, Harisanty, Anna, Putri, Firdaus, and Noor Azizi (2022) conducted a study on AI awareness in libraries with key personnel, including scientists, leaders, and practitioners in Indonesia. The study found that the majority were fully aware of AI systems in libraries and showed a favourable outlook towards AI integration in libraries. It is clear from the aforementioned studies that most information experts are aware of AI and its integration into libraries. These findings can be necessitated by moving at par with technological innovations to meet patrons' information needs, embrace change, and enhance job capacity (Gul & Bano, 2019). On the other hand, studies such as those conducted by Kaur and Kaur (2023) and Ajani, Tella, Salawu, and Abdullahi (2022) revealed that librarians had mixed feelings and perceptions about incorporating AI systems in libraries. These were necessitated by fear of job losses and fear of embracing change. The findings indicate possibilities of resistance by some professionals, which also directly affects their level of knowledge of AI integration in libraries.

2.2 AI Applications in Libraries

Many tools that support libraries have been and are still being developed to provide efficient service delivery in the face of a rapid information explosion. These systems include Google Assistant, Google Translate, Chatbots, ResearchRabbit, Robots, NLP, Endnote, Andisearch, and many more. However, these systems can only be appreciated if they are integrated to use by those who are mandated to use them in providing library services to patrons. For instance, Yao, Zhang, and Chen (2015) describe the development and application of a robot to provide self-learning, language, and other reference services in libraries.

AI in libraries is also being applied in organising and providing large volumes of information in seconds through Andisearch (ALA, 2019). Generally, the management of digital libraries is in the hands of AI, as noted by Sridevi and Shanmugam (2017). This simply means that AI and libraries are inseparable as they depend on each other in providing information and effectiveness in service delivery to users. A study by Gundakanal and Kaddipujar (2019) on intelligent libraries integrated AI-identified valuable tools for library operations,

including pattern recognition, robotics, expert systems, and NLP. Among the four tools, expert systems are regarded as essential tools as they can integrate resources, patrons, librarians, and databases, which are the central aspects of a library. Similarly, some others have reported on how a drone aids special libraries in transforming through automating tasks, improving efficiency, and expanding outreach (Adewojo, Dunmade, & Akanbiemu, 2023).

Adetayo (2023a,b) adds the Bing Chat tool, which can integrate visual content to provide a more dynamic interface conversation that empowers personalised learning for patrons. However, the use of these AI systems is dependent on skilled patrons. Since they are responsible for integrating AI in libraries, they should have extraordinary skills to orient patrons.

2.3 AI Familiarity in Libraries

It is beyond reasonable doubt that library professionals express different perceptions of integrating AI systems with all library functions. This perception affects how library professionals familiarise themselves with these systems. It is therefore assumed that those who are eager and willing to adapt to change acquaint themselves with AI, while those who are not willing resist familiarising themselves. To a large extent, AI has been championed to play a pivotal role in information technology, impacting library services positively (Mckie & Narayan, 2019).

Wood and Evans (2018) further highlighted that 56.3% of librarians in the United States accepted that integrating AI, such as supercomputers, would positively impact the librarianship profession. While 44% of the other librarians chose to perceive the impact of supercomputers in libraries to be fully effective in the next 30 years, the majority have thoroughly familiarised themselves with AI systems. Another study by Ali, Naeem, and Bhatti (2020) showed that most librarians in Pakistan were thoroughly familiar with AI systems such as NLP, Google Assistant, voice search, Google Translate, OneDrive, and Google Drive. Subaveerapandiyani *et al.* (2023) comprehensively assessed AI literacy among LIS researchers in the ASEAN and SAARC regions. Their comparative study unveils proficiency variations, identifying challenges like technical complexities and proposing strategies such as tailored training and collaborative networks. This research uniquely highlights regional disparities, emphasising the need for bespoke interventions to bolster LIS AI literacy.

2.4 AI Impact on Libraries

The impact of AI on libraries is visible. There is an irresistible shift from traditional libraries to smart libraries. While most traditional libraries are automated, the impact of AI in libraries goes beyond that, as it includes creating intelligent, rational systems that imitate librarians with little or no intervention (Omame & Alex-Nmecha, 2020). Many new systems created to operate sophisticated roles, such as dictating check-in and check-out of books in seconds, are penetrating libraries to improve service delivery and complement the roles of information professionals. Similarly, robots developed to provide patrons with precise information leading to book locations with an accuracy of 97% are being witnessed, thereby saving time and human efforts. Also, integrating RFID in library collections has positively impacted the development of wireless quick scanners/readers for handheld books. Smart shelves, in the vein, automatically alert librarians when a book is checked out or checked in on the stack (Omame & Alex-Nmecha, 2020; Li, Huang, Kurniawan, & Ho, 2015).

The transformational changes are reshaping the traditional activities of accessing, sharing, and engaging with knowledge, which is not time or distance bound (Oladokun, Yahaya, & Enakriri, 2023). This shows that AI will impact how information is searched, processed, accessed, and disseminated. Another study by Cox, Pinfield, and Rutter (2018) found that expert systems such as RefSearch, POINTER, Online Reference Assistance (ORA), and PLEXUS are AI tools used for search discovery, scholarly publishing, and learning. Kumar and Sheshadri (2019) also add that these tools substitute reference librarians as they can locate reference resources and factual data.

However, it can be argued that the assertion made by Kumar and Sheshadri (2019) on the substitution of reference librarian is debatable in that some AI systems available, such as Machine Learning, which permits computer systems to absorb data or information from previous experience which need to be fed to it for it to deliver to the patrons may therefore require the presence of librarian (Nguyen et al., 2019).

2.5 Envisioning AI Benefits on Libraries

AI arguably presents more benefits than challenges in libraries. This is visible in that libraries deal with huge sets of information and data, demanding a lot of time and human resources. Systems such as the machine-readable Catalog (MARC) initiated by the Library of Congress over 40 years ago seem to have provided the genesis for properly handling huge information and organisation. This confirms the benefits that AI systems will have on libraries.

In addition, to meet the needs of new technological inventions, the Library of Congress, using its computer vision and neural network, is on course to develop advanced online prototypes that can search through large volumes of data (Castellano & Vessio, 2021). This is another excellent benefit for libraries in the face of AI. Advancement in large volumes of data would mean improving efficiency and accuracy and increasing access to information. AI in libraries will allow users to engage in interactive learning styles and information-sharing platforms at the click of a button (Oladokun et al., 2023). This means that AI provides users with boundless platforms that can, at any point, allow them to engage with world audiences.

Notably, these developments will provide access to information without boundaries. As noted by Massis, higher learning institutions may need to start considering programs where several AI devices could be provided to learners for use in their dormitory rooms. The library could also take advantage of the prospect of delivering audio reference responses and citations to those learners researching and writing papers from the luxury of their own spaces (Massis, 2018). Arguably, the assertion by Massis is not new, as we are already witnessing many learners and other scholars utilising platforms such as Google Scholar, ResearchGate, and academia.edu from the comfort of their rooms. These AI-related tools increase the relevance and diversity of resources and expand access.

AI in libraries presents benefits such as locating patrons' positions using GPS, Wi-Fi, and utilising RFID; user's behaviour will be analysed using image acquisition and trajectory tracking, thereby offering tailor services to determining patrons by age, nationality, education, and other characteristics (Cao, Liang, & Li, 2018). Such services will minimise errors and inconsistencies in data by providing tailored recommendations to patrons. Shorris and Tarlow (2016) add that libraries will no longer be spaces for books but controlled environments with equipment sensors that can determine temperatures and safety systems and alarms that can dictate, measure, and control fire using voice systems and displays. However, this advancement may not eliminate book spaces in developing countries as Shorris and Tarlow stated.

2.6 Anticipating Obstacles in AI Integration

Obstacles to AI integration in libraries are many. However, those discussed in this study have been examined from three angles. The first is necessitated by information professionals who resist change as a result of fearing job losses, the second is from a lack of funds to support the purchase and integration of these AI tools, and the third is a lack of skills from librarians.

Studies by Cox et al. (2018), Cao et al. (2018), and Kumar and Sheshadri (2019) show that many librarians foresee job losses as a result of AI integration in libraries. This may imply that some information professionals will be resistant to AI integration as a way of protecting their jobs. These librarians may also be unwilling to adapt and familiarise themselves with the development of AI, which Jha (2023) referred to as a "librarian" attitude.

On the other hand, factors such as funding for these AI-advanced systems will also slow down or ultimately lead to the altering and mixing new skills to cope with the changing patrons and communities (Hussain, 2023). This, therefore, may require training and collaboration with experts to train those who are willing. However, the skill level in diverting from digital libraries to smart libraries is also proving to be a big gap and will undoubtedly affect AI adoption and integration. Similarly, a study on AI knowledge and perception among Zambian LIS professionals revealed concerns about job displacement and adoption barriers. The findings stress the need to consider technology, librarian proficiency, and leadership roles before implementing AI in libraries. Competencies identified include electronic communication, data analysis, and algorithm design (Subaveerapandiyani *et al.*, 2023).

Other issues identified include ethical concerns, illiteracy among users navigating the new AI systems, personal privacy, data manipulation, and consent issues (Cox *et al.*, 2018). Also, the lack of technological infrastructure and state-of-the-art data facilities, which require reliable power sources, are obstacles to adopting and integrating AI in some developing countries. Recent studies also noted challenges related to regulatory frameworks, accuracy algorithm bias, and the digital divide (Adewojo *et al.*, 2023; Amini, Vakilimofrad, & Saberi, 2021; Adetayo, 2023a,b; Barsha & Munshi, 2023).

3 Research Methodology

The research methodology employed a quantitative survey approach to capture a snapshot of AI literacy levels, attitudes, and perceptions among Zambian Library and Information Science professionals within a specific timeframe.

A purposive and convenience sampling method ensured a diverse representation of academic librarians from Zambia, covering various demographics such as gender, experience, level of study, current role, and institution of employment. The final sample included 82 participants.

The questionnaire underwent a meticulous developmental process, starting with a comprehensive literature review and a self-assessment questionnaire. Pilot testing with a small group of librarians refined the questionnaire, enhancing its clarity, comprehensibility, and relevance. Content validation by LIS experts and survey methodology further ensured accuracy while minimising biases.

Data collection utilised a user-friendly online survey platform distributed through professional networks, associations, and online communities specific to LIS. The survey remained open for 4 weeks, allowing participants ample time to contribute.

Quantitative data analysis was pivotal, conducted using the statistical software SPSS. Descriptive statistics summarised demographic characteristics and responses to Likert-scale items, including frequency distributions, means, standard deviations, and t-tests. These metrics comprehensively overview participants' attitudes, perceptions, and AI knowledge within library contexts.

The study acknowledged limitations regarding the generalizability of findings beyond the Zambian librarian population. Interpreting outcomes in the broader international context of librarian perceptions was recommended due to this limitation (Table 1).

4 Results

4.1 Section 1: Demographic Information

The demographic profile of Zambian Library and Information Science professionals reveals a predominantly female workforce with diverse experience levels and roles. Females constituted 58.5% of respondents, indicating gender disproportion. Experience varied, with 29.3% having 6–10 years and 14.6% possessing over a

Table 1: Demographic Profile of Zambian Library and Information Science Professionals

Demography	Item	Respondents	Percentage
Gender	Male	34	41.5
	Female	48	58.5
Years of experience (library)	0–2 years	23	28
	3–5 years	23	28
	6–10 years	24	29.3
	More than 10 years	12	14.6
The current level of study in LIS	Certificate	4	4.9
	Diploma	2	2.4
	Undergraduate	53	64.6
	Graduate (Master's)	20	24.4
	PhD	3	3.6
Current role	Chief Librarian	13	15.9
	Librarian	15	18.3
	Deputy Librarian	3	3.6
	Records Officer/Information Officer	10	12.2
	Assistant Librarian	20	24.4
	Library Assistant	21	25.6

decade of experience. Most respondents (64.6%) pursued undergraduate studies, while 24.4% held graduate degrees. Various roles were represented, with library assistants (25.6%) and assistant librarians (24.4%) being typical.

4.2 Section 2: AI Knowledge and Awareness

The data in Table 2, titled “Attitudes and Perceptions Towards AI in Libraries,” present a comprehensive snapshot of respondents’ viewpoints regarding AI within library settings. The survey covered various aspects of AI knowledge, attitudes, and perceptions.

Overall, respondents displayed a strong inclination towards learning more about AI and its applications in libraries. They expressed a high willingness (mean = 4.87, SD = 0.57) and interest (mean = 4.63, SD = 0.85) in exploring AI’s implications and its potential to improve library services (mean = 4.6, SD = 0.73). In addition, optimism about AI’s future in libraries was notably positive (mean = 4.34, SD = 0.85).

However, alongside this positivity, there were concerns. Respondents acknowledged the potential for AI to create new challenges in libraries (mean = 4.12, SD = 0.85) and expressed worry about its malicious use (mean = 4.07,

Table 2: Attitudes Towards AI in Libraries

Attitudes Towards AI in Library Settings	Mean	SD	T-value	P-value	Result
I am willing to learn more about AI and its applications in libraries	4.87	0.57	-52.7	<0.00001	Significant
I am interested in learning more about the ethical implications of AI	4.63	0.85	-33.08		
I believe that AI has the potential to improve library services	4.6	0.73	-39.52		
I am optimistic about the future of AI in libraries	4.34	0.85	-30.21		
I believe that AI has the potential to create new challenges for libraries	4.12	0.85	-27.87		
I am concerned about the potential for AI to be used for malicious purposes	4.07	0.85	-27.2		
I have a good understanding of what AI is	4	1	-21		
I am confident that I can explain AI to a colleague or friend	3.97	1.03	-19.73		
I am familiar with some types of AI, such as machine learning and natural language processing	3.78	1.03	-18.06		
I know how AI is being used in libraries today	3.73	1	-18.7		

SD = 0.85). Despite these concerns, the data suggest a generally favourable outlook towards AI's capabilities and its impact on library services.

While respondents exhibited a decent understanding of AI (mean = 4, SD = 1), confidence in explaining AI concepts to others was slightly lower (mean = 3.97, SD = 1.03). Similarly, familiarity with different types of AI, such as machine learning and natural language processing, while present (mean = 3.78, SD = 1.03), showed room for improvement.

Overall, the findings indicate a positive and open attitude towards AI in libraries and a nuanced awareness of potential challenges. The statistically significant results suggest a strong interest in further exploring AI's role in libraries and a need for enhancing understanding and communication about this technology among library professionals and stakeholders.

Table 3 illustrates perceptions and competencies in AI applications for library advancement. Participants expressed high enthusiasm for AI's potential to transform library services (mean = 4.54, SD = 0.80) and improve resource accessibility (mean = 4.53, SD = 0.90), both statistically significant ($p < 0.00001$).

They felt relatively comfortable using AI tools in their work (mean = 4.15, SD = 1.09) and moderately confident in communicating AI's benefits and risks to users (mean = 3.78, SD = 1.10), with statistical significance in both cases ($p < 0.00001$).

Awareness of ethical implications of AI use in libraries was notable (Mean = 3.71, SD = 1.03), as was their moderate familiarity with AI applications like cataloguing, personalisation, and virtual assistants (mean = 3.35 to 3.47, SD = 0.85 to 1.19), all statistically significant.

Participants demonstrated moderate competence in evaluating AI tools' accuracy and reliability (mean = 3.42, SD = 1.10), along with a moderate understanding of AI's role in automating user engagement analysis (mean = 3.35, SD = 1.19), both significant ($p < 0.00001$).

The data showcases strong positive perceptions and moderate-to-high competencies across various library AI applications. These findings underscore a consistent belief and understanding among participants regarding AI's potential and its practical implications for enhancing library services.

4.3 Section 3: AI Impact on Libraries

Table 4 highlights the perceived benefits of AI implementation in library services, as reported by LIS professionals. Most respondents recognise the potential advantages, with the highest agreement on enhancing search and retrieval of information (96.3%) and improving accessibility (93.9%). Other perceived benefits include creating virtual assistants (76.8%), promoting lifelong learning (70.7%), and enabling advanced data analysis (67.1%). However, not all respondents share the same opinion, with some uncertainty or no opinion expressed

Table 3: Perceptions and Competence in AI Applications for Library Advancement

Perceptions and Competence in AI Applications for Library Advancement	Mean	SD	T-value	P-value	Result
I am excited about the potential for AI to transform library services.	4.54	0.80	-34.69	<0.00001	Significant
I believe that AI can be used to improve the accessibility of library resources.	4.53	0.90	-29.52		
I am comfortable using AI tools and resources in my work.	4.15	1.09	-19.12		
I can communicate AI's benefits and risks to library users.	3.78	1.10	-16.3		
I can identify the ethical implications of using AI in libraries.	3.71	1.03	-17.56		
I am familiar with how AI is used for tasks such as cataloguing and classification.	3.47	0.85	-13.88		
I know how AI is being used to personalise library recommendations.	3.47	0.85	-14.57		
I know the potential for AI to be used for chatbots and other virtual assistants in libraries.	3.46	1.05	-15.22		
I can evaluate the accuracy and reliability of AI-powered tools and resources.	3.42	1.10	-13.86		
I know how AI is applied to automate the process of analysing user engagement with library resources for better insights and decision-making.	3.35	1.19	-11.63		

Table 4: Perceived Benefits of AI Implementation in Library Services

Perceived Benefits of AI in Library Services	Respondents	Percentage (N = 82)
Enhancing search and retrieval of information	79	96.3
Personalising user experiences	53	64.6
Automating routine tasks	46	56.1
Enabling advanced data analysis	55	67.1
Providing personalised recommendations	32	39
Creating virtual assistant	63	76.8
Improving accessibility	77	93.9
Protecting intellectual property	40	48.8
Promoting lifelong learning	58	70.7
Unsure/no opinion	7	8.5

by 8.5% of respondents. Overall, the data underscore a collective recognition of AI's potential to enhance library services by improving information access, personalising experiences, and automating routine tasks while promoting lifelong learning and protecting intellectual property.

Table 5 presents the anticipated challenges in adopting AI technologies in libraries based on responses from LIS professionals. The predominant challenges identified include a need for more AI expertise among library staff (81.7%), resistance to change from traditional methods (80.5%), and budget constraints for AI integration (69.5%). Privacy and security concerns (59.8%) and staff training (65.9%) are notable challenges. Respondents recognise the importance of addressing issues related to data quality, bias, interpretability, and regulation in AI adoption, though they need to be more emphasised. Importantly, respondents indicated needing to be made aware of any challenges. These data underscores the significance of successfully addressing skill gaps, managing change effectively, securing adequate budgets, and addressing privacy concerns to integrate AI technologies in library services.

5 Discussion

The study provides an insightful analysis of Zambian Library and Information Science professionals' perceptions and awareness of AI technologies in library services. It is evident from the demographics that the field predominantly comprises female professionals, showing a diverse range of experience levels and roles. This composition underscores the need for a gender-inclusive approach to fostering AI literacy within the Zambian library domain.

Table 5: Anticipated Challenges in Adopting AI Technologies in Libraries

Challenges in Implementing AI Technologies in Libraries	Respondents	Percentage (N = 82)
Lack of AI expertise among library staff	67	81.7
Privacy and security concerns	49	59.8
Budget constraints for AI integration	57	69.5
Resistance to change from traditional methods	66	80.5
Data quality and availability	28	34.1
Bias	38	46.3
Interpretability	30	36.6
Staff training	54	65.9
Regulation	36	43.9
Not aware of any challenges	0	0

The demographic composition of the respondents highlighted a gender disproportion, with a predominance of females. This aligns with global trends indicating a higher representation of females in LIS fields (Dasgupta, 1998; Doran-Myers, 2017). The varying experience levels and educational backgrounds, predominantly undergraduate studies, reflect the diverse skill sets among professionals in Zambian libraries.

Professionals demonstrated a commendable understanding and positive attitudes towards AI in libraries (Huang *et al.*, 2023; Lund *et al.*, 2020; Shaheen & Khurshid, 2023). Their familiarity with AI concepts and applications resonates with findings from similar studies. However, despite their optimism, concerns regarding AI's potential misuse echoed existing apprehensions highlighted in broader technological discourses (Enakrire & Oladokun, 2023). This cautious optimism is a notable aspect of the professionals' attitudes towards AI.

The findings reflect a positive trend in AI literacy among respondents, demonstrating familiarity with AI concepts, particularly in cataloguing, classification, and understanding the potential for personalising user experiences. These observations align with existing literature, which suggests a growing comfort and proficiency in using AI tools among library professionals. Studies by Hamad, Al-Fadel, and Shehata (2023), Arias-Pérez and Vélez-Jaramillo (2021), and Ali *et al.* (2020) echo similar sentiments, showcasing a global trend in librarians familiarising themselves with AI applications.

Respondents showed a keen recognition of the transformative potential of AI in libraries, emphasising the benefits of enhancing information retrieval, accessibility, and personalised user experiences. These perceptions resonate with the evolving landscape where AI facilitates knowledge access and transcends geographical boundaries. However, challenges such as the need for increased AI expertise among library staff and resistance to change from traditional methods pose significant hurdles. These findings are consistent with prior research highlighting the hurdles posed by inadequate expertise and the reluctance of some professionals to adapt to AI advancements.

The study underscores the promising trajectory of AI literacy among Zambian Library and Information Science professionals. While demonstrating a positive familiarity with AI tools, the study sheds light on the imperative need for continued training and a mindset shift to fully embrace AI's transformative potential. Addressing these challenges will be pivotal in harnessing AI to elevate library services, ultimately benefiting information access and user experiences.

6 Conclusion

The study sought to explore the landscape of AI literacy among Zambian librarians and their perceptions regarding the integration of AI in library services. The findings reveal a nuanced understanding of AI literacy levels, perceptions, and challenges information professionals face in Zambia's library and information science field.

The data elucidate a moderate awareness and interest among Zambian librarians regarding AI fundamentals and their potential applications in library services. However, librarians need a more comprehensive evaluation of AI proficiency levels and technical competencies to navigate and integrate AI tools within their work effectively.

Librarians express a generally optimistic view of AI's potential benefits in enhancing library services, particularly improving information accessibility, automating routine tasks, and personalising user experiences. However, concerns about AI's ethical implications and potential challenges for libraries, including job displacement and resistance to change, warrant deeper exploration.

The study highlights the need for contextual understanding, emphasising the relevance of local ethics frameworks and specific challenges faced within the Zambian library environment. Addressing infrastructural limitations, regulatory aspects, and localised barriers is essential for devising tailored strategies for successful AI integration.

Future research should extend beyond librarian perspectives to include user engagement and experiences with AI-driven library services. Understanding user perceptions, assessing the impact on information access,

and ensuring the usability and effectiveness of AI-integrated services are vital for holistic improvements in library systems.

Examining the long-term sustainability of AI implementations in Zambian libraries is critical. Over time, assessing scalability, maintenance requirements, and adaptability will ensure continued benefits and mitigate challenges that may arise postinitial adoption.

Zambian librarians are inclined to embrace AI in libraries; further exploration of AI proficiency, contextual challenges, user experiences, and long-term sustainability is imperative. This holistic understanding will guide the development of tailored strategies to enhance AI literacy, responsibly integrate AI technologies, and maximise their benefits within Zambian library settings.

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