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Assessing Artificial Intelligence Literacy among Academic Library Professionals

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Artificial Intelligence (AI) literacy means the ability to understand and utilize AI consciously. This paper aims to measure the artificial intelligence (AI) literacy of library professionals from universities in Bangladesh. In this study, a quantitative method was used with a cross-sectional survey design. Here, a total of 225 data were collected from library professionals who work in different public and private universities in Bangladesh. For the data collection, a structured questionnaire was distributed through Google Forms randomly. The data reliability was tested using Cronbach's alpha, which was found to be acceptable. The results showed that the professionals have a medium level of AI literacy because of inadequate formal training and technical expertise. It was also found that they prefer strongly AI-related workshops and training for their organization's development. The study contains a comprehensive information about the current conditions of AI understanding of university library professionals in Bangladesh. It also provides suggestions for the development of policy and sustainable AI integration in academic libraries.

Keywords: Artificial Intelligence, AI Literacy, Library Professionals, Digital Transformation, Academic Libraries, Technology Adoption

Introduction

Artificial Intelligence (AI) is transforming the method of information curation and sharing around the world. Academic libraries play significant roles in the development of learners' knowledge by integrating AI into their workflow[1,2]. For this reason, library professionals require basic competencies in AI, as it provides not only literacy in AI tools but also facilitates such technologies in a rapidly evolving information environment[3,4]. AI literacy refers to possessing artificial intelligence technologies for educational and personal purposes effectively. These interrelated elements help to create a holistic understanding of AI. For library professionals, this involves grasping AI's limitations and ethical implications within the existing library infrastructure[5,6]. However, there is a pronounced disparity between developed and developing countries in terms of AI adoption and literacy among library professionals[7]. There are several obstacles to installing AI in library services within developing countries, such as inadequate resources, limited skilled personnel, insufficient data-privacy regulations, a persistent digital divide and the high costs associated with AI solutions[4]. The developed nations have successfully implemented AI in libraries with academic domains. However, developing countries, like Bangladesh, still face noticeable barriers to integrating technologies within the library services and LIS education. Mannuru et al.[4] noted that the lack of digital infrastructure and limited training facilities for AI technologies are common problems for developing countries. Though numerous evidences are common in digital challenges in Bangladesh. But a limited number of studies have been conducted aimed at AI literacy preparation of library professionals in Bangladeshi universities.

The research addresses that gap by investigating the AI literacy of university library professionals in Bangladesh. The Technology Acceptance Model (TAM) proposed by Davis[9] is the theoretical foundation of the research. Because TAM incorporates information-seeking behavior with technology adoption. This study investigates the level

of AI understanding; therefore, TAM aligns with it perfectly to adopt AI tools in their professional practice. There are several studies now about AI in libraries; this study contains the overall knowledge and practice of AI in university libraries by professionals in Bangladesh. It also explores opportunities for professional development and institutional advancement in this domain.

Research Objectives

This study explores the AI literacy of university library professionals in Bangladesh. The specific objectives are as follows:

- To assess the level of AI literacy among librarians in selected universities of Bangladesh.
- To identify the challenges faced by librarians in acquiring AI knowledge and skills.
- To explore the potential opportunities AI presents for enhancing library services in Bangladesh.
- To provide recommendations for improving AI literacy among librarians in Bangladesh.

Literature Review

Artificial intelligence (AI) continues to surpass all aspects of modern life, particularly in the areas of access to information and user service. It has equally and unequivocally become an inevitable competency for modern library professionals to ensure fit-for-purpose solutions to today's information seekers. In broad terms, AI literacy refers to the user's ability to understand and critically evaluate by practically applying AI technologies within the various facets of library management[10]. This goes beyond mere familiarity with tools such as automation and natural language processing (NLP) to include the ability to assess their ethical standards and implications relevant to specific institutional arrangements[5]. To structure this study, the Technology Acceptance Model (TAM) is employed[9]. TAM entails that two factors-perceived usefulness and perceived ease of use- influence users' quest to adopt technology. Given the TAM's widespread application in technology adoption research across educational and library environments, this framework is particularly relevant in assessing librarians' readiness to integrate AI. Core library functions such as cataloguing, information retrieval, user engagement and reference services are increasingly enabled by AI tools[11]. Nowadays, librarians interact with AI-enabled systems, which may include chatbots, automated classification tools, as well as intelligent search engines to improve workflows and user experience[12]. However, technical expertise alone, as noted by several researchers, is not enough; librarians must also ensure contextual relevance, ethical standards and implications of AI in their service design[13,14].

Librarians are increasingly expected to embrace AI concepts in users' education and information literacy programs[15]. Developed countries have already transitioned into structured efforts to strengthen librarians' confidence and competence. Sweden's learning circles that have significantly improved participants' ability to engage with AI tools in practice[16] and embedding AI literacy into curricula of the academic institutions in the US and China to foster a deeper understanding of AI's societal impacts are cases in point[17]. These developments of AI integration into academic institutions, particularly in the context of library and information science, are not symmetric across the world. While the examples above highlight progress in certain parts of the world, developing countries such as Bangladesh, Nigeria and Zambia lag due to systemic barriers, primarily attributable to poor infrastructure, inadequate training and insufficient policy support[18,19]. These asymmetric progress in AI integration further widens the global digital divide, where LIS professionals are not an exception. Research in terminology for AI literacy emphasizes the importance of experiential learning, especially for professionals in academic institutions. Online classrooms and cross-cultural collaborations have proven models with positive impact in enhancing AI understanding and confidence among university staff[20]. Adult learners particularly value the importance of hands-on training and real-world simulations[21]. Although children's inherent quest for learning has been aroused by early learning tools like PopBots[22], such approaches are not equally applicable to higher education professionals. Instead, professionals in higher education are more focused on ethically grounded and interdisciplinary adult learning frameworks[23]. Higher education research also demonstrates that users with prior exposure to AI or STEM disciplines have stronger literacy, reflecting disparity in education requiring a targeted support regime[24]. Thus, the pursuit of developing a comprehensive AI literacy program for librarians entails a structured, context-sensitive instructional design. Culture of adaptation and aspects of behavioural attitude also play a crucial role in AI

adoption. With a culture of change, many librarians express a positive attitude towards AI's potential, particularly in areas like cataloguing and customized services[25]. However, concerns about job displacement, ethical ambiguity including the potential loss of human interaction in library services cannot be over emphasized[26]. In such a paradigm, as suggested by research, behavioral aspects, such as willingness to engage with AI tools, are significantly influenced by institutional support and assurances[27]. In this study, AI proficiency includes both-the technical capabilities and cognitive understanding while behavioral challenges refer to resistance to AI adoption from anxiety and a lack of strategic guidance in institutional settings[28].

Practical implementation of AI remains a challenge, despite the availability of theoretical models like the AI Citizenship Framework[29]. In Asian countries, for example, library professionals may possess general awareness but lack depth in ethical reasoning and technical skill due to resource constraints[30]. At the same time, infrastructural barriers and access limitations to formal training are consistently cited as major impediments to AI integration in libraries in countries like Bangladesh and Nigeria[31]. In a relatively advanced system, negative social consequences, widening of skill gaps and inability to keep pace with technological advancement are considered as issues of concern for librarians[32]. As such, leveraging the full potential of AI in academic libraries, particularly in developing regions, remains a difficult task without ensuring comprehensive strategic planning, institutional investment and cross-sector collaboration[33]. Like many other developing countries, study of AI integration in libraries in Bangladesh is still at an early stage. While references to Bangladesh's digital landscape exist, empirical work in this area specifically evaluating AI literacy among Bangladeshi university library professionals is limited. A comprehensive, comparative study with regional peers such as India, Indonesia and other Asian countries could provide valuable context for national capacity building. Although research on AI literacy is expanding globally, there is a notable gap in the literature addressing AI readiness in Bangladesh's academic libraries. This study addresses that void by exploring current AI competencies and conceptual barriers, and librarians' attitudes toward AI.

Methodology

This research employed a quantitative method where a cross-sectional survey design was adopted. It helped to measure the level of artificial intelligence capabilities among library professionals in Bangladesh. Notably, Wasti et al.[34] stated that the quantitative method assists researchers by generalizing data from a vast range of populations to point out trends and accessibility. Moreover, stratified random sampling was used, which is a unique technique in research. For this purpose, library professionals from not only public but also private universities in Bangladesh were chosen, ensuring geographic diversity. They were contracted through official institutional websites with their emails. On the other hand, universities were identified from the database of the University Grant Commission (UGC) of Bangladesh.

For data collection, a structured questionnaire developed by the authors was designed with the help of Google Forms and sent through email. The survey was sent through the emails of library professionals, and a total of 225 responses were gathered. It took around 3 months to collect this proportion of data (March-May 2025). The questionnaire contained statements covering mainly the following areas: demographic information, artificial intelligence awareness with training, present usage of AI in library functions, barriers with challenges, and professional behaviors toward AI adoption. The respondents rated the questionnaire on a 5-point Likert scale and other parameters. The data was analysed through SPSS version 25 of IBM's statistical analysis software. This was performed to calculate the frequencies, percentages, mean(s), and standard deviation(s). Additionally, the Cronbach's Alpha (CA) for the Likert-scale-based variables was measured. For instance, the value of the variable from Table 2 was 0.882 and the AI potential in Table 3 was 0.725. Then, measuring the value of challenges in understanding the AI in Table 4 came out to 0.825. Similarly, for the Table 5 variable named major barriers to AI integration in libraries, the value of CA was 0.838, whereas the value of AI role in libraries in Table 6 was 0.889. Overall, these values confirm that the variables are reliable and valid because all the values are more than 0.70. In this line, Cortina[35] stated that the CA value is acceptable when it is .070, and the greater the value is, the better it is. However, due to time and convenience circumstances, there is a limitation of the study in that it did not conduct any pilot test. The survey instruments were formed from a diverse range of literature reviews; future studies

could demonstrate pre-testing among experts to further validate the study.

Considering the ethical paradigm, the study confirms that all the respondents were initially informed about the objectives and no personal information, such as name, email, phone number, and national identification data, was collected. They could leave the survey at any moment while filling out the questionnaire. Participating was totally voluntary and the study followed strict ethical protocols.

Analysis and Results

In this study, data are analyzed focusing on the descriptive techniques that represent frequencies, percentages, means and standard deviation (SDs). Moreover, firstly, the demographic information of the study is presented in Table 1. Then, various variables, statements and categories are presented through tables and figures.

Table1 provides information about the participants' demographic data. The majority of the respondents were male, while a significant portion of their age group was from 25 to 36. In terms of educational qualifications, most of them hold a master's degree in information and library science. The institutional category for public and private respondents is nearly leveled off, while half of them have experience in the library field. When they are asked if they attended any formal training on AI integration, most of them have not received any training. Conversely, they showed a keen interest in AI workshops and training programs.

Use of Chatbots

Librarians use chatbots for numerous purposes, such as cataloging, classification, reference services, information searching, and research[36]. Figure 1 depicts that most respondents of the study use ChatGPT, while Gemini and DeepSeek have also been used widely in their daily work in both office and personal settings.

Level of Knowledge of AI's Applications in Libraries

The literacy rate on AI applications among librarians has been demonstrated in Table 2. Here, the responses show a moderate to good understanding and awareness. While most of them stayed neutral in terms of cataloging and classification, others suggested that they feel fairly confident using AI for user services tools, library automation, information searching and retrieval. Furthermore, they also keep knowledge about the limitations of AI in libraries.

Table 1 — Demographics of Respondents

Variables	Category	Frequency	Percentage
Gender	Male	151	67.1 %
	Female	74	32.9 %
	Total	225	100.0%
Age	Below 25 y/o	2	0.9 %
	25-35 y/o	150	66.7%
	36-45 y/o	46	20.4 %
	46-55 y/o	24	10.7 %
	Above 55	3	1.3 %
Highest Level of Education	Bachelor's Degree	11	6.6 %
	Master's Degree	196	87.1 %
	Doctoral Degree	3	1.3 %
	PGD in Library Science	1	0.4 %
Type of Institution	Public	116	51.6 %
	Private	109	48.4 %
Years of Experience in the Library Field	Less than 1 year	23	10.2
	1-5 years	112	49.8 %
	6-10 years	54	24.0 %
	11-20 years	30	13.3 %
	Above 20 years	6	2.7 %
Formal Training for AI Adoption	Yes	67	29.8 %
	No	159	70.2 %
Interested in AI workshops and training programs	Yes	200	88.9 %
	No	12	5.2 %
	Maybe	13	5.8 %

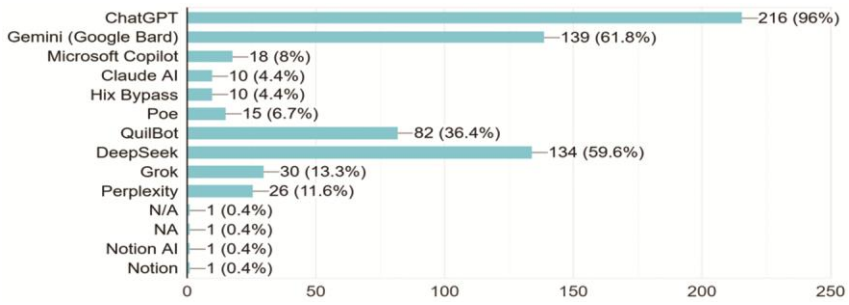

Figure 1 — Use of Chatbots

Table 2 — AI Application Knowledge Among the Library Professionals

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
I understand how AI can be applied in cataloging and classification	7.6%	12.4%	39.1%	27.6%	13.3%	3.27	1.082
I am aware of AI-driven user service tools in libraries	5.3%	14.2%	29.3%	38.2%	12.9%	3.39	1.051
I can explain AI applications in library automation	6.7%	10.2%	30.7%	38.2%	14.2%	3.43	1.067
I feel confident using AI-based search and retrieval tools	5.8%	8.0%	28.0%	36.0%	22.2%	3.61	1.093
I am knowledgeable about the limitations of AI in libraries	8.0%	12.0%	23.6%	37.8%	18.7%	3.47	1.161

[N.B. Scale: 1 = Not confident at all, 5 = Very confident]

Table 3 — AI's Potential to Enhance Library Services

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
AI can improve the efficiency of library services	2.7%	2.7%	14.7%	43.1%	36.9%	4.09	.926
AI can personalize user experiences in libraries	4.4%	3.1%	16.0%	44.0%	32.4%	3.97	1.006
AI helps in decision-making through analytics	4.9%	4.9%	18.2%	40.9%	31.1%	3.88	1.059
AI will improve the accessibility of library services	5.3%	1.3%	15.6%	43.6%	34.2%	4.00	1.018
AI reduces human error in library operations	3.6%	3.1%	17.3%	43.1%	32.9%	3.99	.975

[N.B. Scale: 1 = Strongly disagree, 5 = Strongly agree]

Potential of AI to Enhance Library Services

Table 3 demonstrates AI's potential to enhance library services, where most of the participants believe AI has considerable capacity to optimize library services. A great number of Library Professionals agreed that AI can personalize user experience, help in decision-making through analytics, improve the accessibility of library services, and reduce human error in library operations. It is clearly visible that they possess nearly the same attitude towards AI's prospects to enhance library services.

Difficulties in Understanding AI Concepts and Technologies

Challenges in understanding AI concepts and technologies have been shown in Table 4. Most of the participants believe that they face substantial challenges to perceive the idea of AI, its terminology, relation to library services, insufficient training and technical needs of AI systems. Although some people strongly disagree with finding it hard to relate AI to Library Science, the majority of them find it difficult to connect AI to Library Science. Overall, it represents that most of the library professionals face hurdles to understand the concept of AI and Technologies.

Biggest Barriers to Integrating AI in Libraries

This table demonstrates major barriers to integrating AI in libraries related to data and organizational capacity. Participants showed various impediments like a lack of standardized data practices, privacy and data protection concerns, a lack of standardized processes and technical expertise, and insufficient resources. It clearly shows that data management and governance appear more prominent

than funding limitations. Overall, structural readiness is a greater concern than financial limitations.

Reducing the Workload of Librarians Through AI

Table 6 depicts the respondents' general understanding of artificial intelligence as helpful in reducing librarians' workload. Respondents believe AI helps automate routine and repetitive tasks, improve task allocation and management and reduce physical and cognitive workload. This table indicates an overall positive perception of artificial intelligence in reducing librarians' workload.

Training preferred to improve AI Literacy among Librarians

Figure 2 illustrates library professionals' preferred exercises to improve AI literacy. The findings suggest that there is a strong fondness for workshops and seminars and hands-on experience using AI tools. On the contrary, collaboration with AI developers or institutions is the least chosen approach among all. Online courses about AI and guest lectures by AI experts are also shown as effective learning methods.

Discussion

The study investigates the level of AI competencies among the library professionals of Bangladeshi university libraries. It fundamentally focuses on AI integration challenges, opportunities and institutional readiness. (Table 4). In the library professionals' field in Bangladesh, most of the respondents marked that AI is not simple, but they are understanding it day by day. In Table 5, the responses show that their libraries lack enough data structures to support AI in their work and

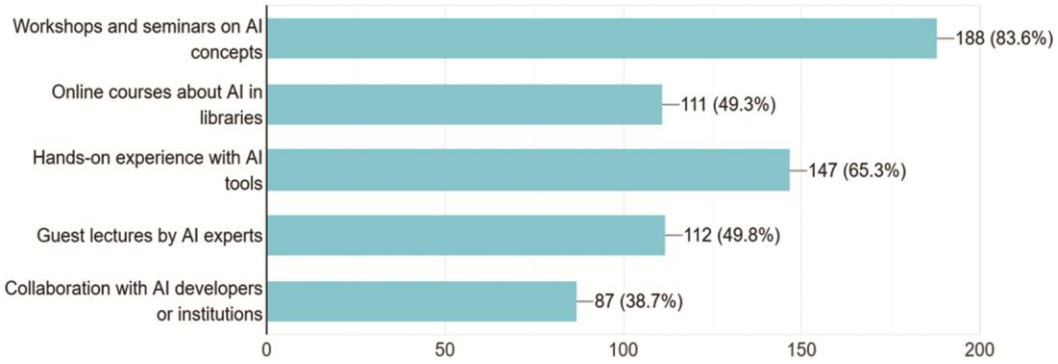

Figure 2 — Preferred AI Training for Librarians

Table 4 — Challenges in Understanding AI Concepts and Technologies

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
Understanding AI concepts is challenging	7.1%	15.1%	38.7%	29.3%	9.8%	3.20	1.042
The terminology used in AI is confusing	7.1%	7.6%	32.0%	40.0%	13.3%	3.45	1.047
I find it hard to relate AI to library science	4.4%	8.9%	28.9%	40.9%	16.9%	3.57	1.016
Training on AI has been insufficient	6.7%	8.0%	31.1%	36.4%	17.8%	3.51	1.082
I struggle with the technical needs of AI systems	7.1%	10.7%	24.4%	35.1%	22.7%	3.56	1.160

[N.B. Scale: 1 = Very easy, 5 = Very difficult]

Table 5 — Major Barriers to AI Integration in Libraries

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
The library lacks sufficient high-quality data to support AI applications	4.4%	16.9%	32.9%	31.6%	14.2%	3.34	1.058
Data in our library systems is fragmented across multiple platforms, making AI integration difficult	8.0%	10.7%	28.9%	35.6%	16.9%	3.43	1.132
Concerns about user privacy and data protection limit our ability to collect data for AI use	4.4%	8.9%	26.2%	43.1%	17.3%	3.60	1.018
There is no standardized process for collecting and managing data needed for AI projects	5.8%	6.7%	21.8%	44.9%	20.9%	3.68	1.058
Staff lack the technical expertise to collect and prepare data suitable for AI systems	14.2%	9.3%	17.3%	40.4%	18.7%	3.40	1.289
Limited funding and resources prevent the development of a robust data collection infrastructure	8.0%	15.1%	36.4%	28.0%	12.4%	3.22	1.099

[N.B. Scale: 1 = Strongly disagree, 5 = iStrongly agree]

AI integration in library activities is something they find difficult. They even agreed that the lack of support from institutions and standard policies regarding the usage of AI in libraries is also a significant factor as barriers. These findings resonate with several studies, for example, Ivchyk[39], Ghosh et al.[40], and Harisanty et al.[41].

Potential of Artificial Intelligence in Advancing Library Services

AI has numerous opportunities in library services, including higher levels of transformation of information in different locations. It also helps to access improved functionality of online resource usage from libraries[14]. Similar to prior studies, e.g., Oyetola et al.[42] and Akinyemi[43], this research shows that most library professionals of Bangladesh agreed that AI is a prominent innovation in science and technology that advocates efficiency in library services. Table 3 depicts that respondents think AI can be used to personalize user experience and decision-making. It also reduces human-errors in library services and enhances accessibility. Though there are a few challenges of implementing AI in libraries in Bangladesh, as previously mentioned, a significant proportion of respondents appreciate AI's functionality. These perceptions align with the global discourse on "intelligent libraries," where AI supports advanced decision-making, predictive analytics, and automated workflows[1,12,44].

AI Influence on Librarian Roles and Skill Development

University librarians' knowledge of intellectual property, information privacy and ethical practices makes them essential participants in institutional AI implementation[15]. The findings of the study from Table 6 suggest that 47.1% of library professionals agreed that libraries help to automate routine library tasks, whereas the average of them around 30% thinks AI reduces their time in classification, cataloging, and other in-house activities. Results also suggest that AI can help users to engage in the library more compared to traditional systems. Studies of Hodonu-Wusu[45] and Vijesh[11] also demonstrate that AI is offering customized service with better and prompt responses that ultimately enhance user experience. Consequently, the current survey shows that in terms of task allocation and management of library resources, AI is a game-changer innovation that reduces the mental and physical workload of library professionals. Figure 2, it illustrates the preferred training or workshop by Bangladeshi library professionals. Most of them agreed that AI training is crucial for library service and workshops and seminars will also play an important role in their IT skill development. They also want wide collaboration with IT specialists and online courses for AI literacy training. These facilities will empower librarians to learn AI applications and work with the flow of cutting-edge technologies.

Objectives and theoretical alignments

The research is based on the Technological Acceptance Model (TAM) as earlier mentioned. We developed survey tools based on TAM theory. Because it is one of the dominant theories that aligns with every new technology adoption research. While the whole world is using AI for daily work tasks, studies, and many other functions, in the library field, it has been working as a catalyst. Basically, this study finds a relevant connection to TAM theory because TAM helps to understand AI and how it could be used perfectly. Moreover, TAM's core elements, perceived ease of use, attitudes and behavioral intentions influence individuals' willingness to engage with AI technologies to help to strengthen this study. The statistics shown in the tables match the aim of the study. A study on how well university librarians understand AI shows they have a fair amount of knowledge. Their average scores were between 3. 27 and 3.61, with similar levels of variation (SD around 1. 05 to 1.16). This means they have a decent but inconsistent understanding of how AI can be used in organizing information, automation, and search tools.

Table 6 — AI's Role in Reducing Librarians' Workload

Statement	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean	SD
AI can automate routine library tasks	8.0%	8.0%	16.0%	47.1%	20.9%	3.65	1.136
AI reduces the time spent on repetitive work	6.7%	8.4%	36.0%	27.1%	21.8%	3.49	1.122
AI enables librarians to focus on user engagement	5.3%	8.4%	27.1%	40.0%	19.1%	3.59	1.057
AI improves task allocation and management	6.2%	7.6%	28.9%	35.6%	21.8%	3.59	1.099
AI reduces physical/cognitive workload	5.3%	8.0%	25.3%	41.3%	20.0%	3.63	1.058

[N.B. Scale: 1 = Strongly disagree, 5 = Strongly agree]

Librarians said they had trouble understanding AI ideas, words, and technical needs. Their average scores were between 3. 20 and 3.57 (with standard deviations of about 1. 01 to 1.16). This shows there are barriers to learning AI skills. On the other hand, people had very positive views about the possible benefits of AI. The average ratings were between 3. 88 and 4.09, and the differences in opinions were smaller (SD around 0. 93 to 1.06). This denotes that most of them agree that AI can improve their ability to provide library services. Moreover, AI can reduce their work by customizing service tasks (scores between 3. 49 and 3.65, with a standard deviation of about 1. 05 to 1.14). This supports the goal of creating suggestions to improve AI skills among librarians in Bangladesh by identifying where they need more training and support from their organizations.

Practical Implications and Recommendations

Based on the results, the study finds there are several limitations and challenges among library professionals of Universities in Bangladesh. Therefore, the research indicates significant insights into the development of AI applications through library professionals. Firstly, librarians themselves must know how ethically AI can be used in their daily operations. Moreover, self-directed learning is very important, as it leads library professionals to use AI. Thirdly, institutional support is another key component that every university can provide for librarians to get better user satisfaction. Ultimately, this research helps librarians and policymakers to learn and use AI in the 21st century.

Conclusion

The study aims to determine the level of understanding of Artificial Intelligence of library professionals of Bangladeshi Universities. For the diversity of participants, the study surveyed data from different library professionals from both public and private university libraries. In other words, this research is a detailed analysis of the current situation of Library professionals' AI integration within their workplace, as well as personal AI literacy. The study focuses on the librarian's technology adoption in this digital age. The key findings of the study are that the university library professionals show an average but uneven level of AI literacy. Additionally, despite limited formal training, they showed a strong and positive attitude toward AI advantages in library services. Results also reveal that little training and technological difficulties are the main barriers to AI literacy development. On the other hand, institutional constraints also limit AI integration by library professionals. Eventually, the study helped to implement some practical implications in the real-world. Firstly, it improves library practice and professional development. Secondly, the study fosters the development of institutional policy and leadership for the reinforcement of AI in academic libraries. Finally, the study's findings can be used to integrate AI for library services. Though this study was only aimed at university library professionals and no pilot testing of the questionnaire was conducted, the findings are very important for future AI literacy research in the library science field. Moreover, the data analysis is limited only to descriptive, in the future, inferential statistical techniques or structural equation modeling (SEM) could be performed. This research finds that university library professionals in Bangladesh find that AI is a potential technology. However, they face several difficulties related to training and university support. AI is a significantly effective tool for enhancing accessibility and service quality, while its logical adoption depends on adequate training and organizational support. Addressing these gaps will be crucial for enabling academic libraries to transition toward ethical, sustainable and intelligent library services in the digital era.

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