AI Literacy in UAE Libraries: Assessing Competencies, Training Needs, and Ethical Considerations for the Digital Age

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The study explores the current state of artificial intelligence (AI) literacy levels among library professionals employing a quantitative approach consisting of 92 surveys of LIS professionals in the United Arab Emirates (UAE). Findings of the study revealed the presence of strong cognitive competencies, while there were gaps observed in behavioral and normative competencies, especially related to AI biases, AI-powered learning, and ethical considerations. There was a disconnect observed between the perceived importance of AI skills and the effectiveness of the current training programs.

Introduction

Generative AI has created massive disruption in all sectors, including manufacturing, services, agriculture, medicine, and education, and has transformed a range of operations and services. Libraries are also starting to transform as they harness the power of AI; AI has the potential to enhance efficiency, accessibility, and personalization of services, thereby reshaping the traditional library landscape. This AI-related transformation has affected several traditional library services, such as automating routine tasks (e.g., cataloguing and classification of collections), and enhancing search functionalities and information retrieval. This can help create a much more accurate and organized library system in which librarians have more time to focus on intellectually stimulating activities (Preethi, 2024). The race to integrate AI into library services at a global level has presented both opportunities and challenges in terms of AI literacy among library professionals. AI literacy involves understanding of AI tools, their applications, and ethical considerations surrounding their use. AI in libraries has grown into prominence but has also left a significant gap in terms of AI literacy. This gap must be addressed both for the effective use of AI technologies and to educate library users. This study explores the existing status of the AI literacy level of professionals working in different libraries in the United Arab Emirates (UAE). Currently, no studies focus on the UAE or the Gulf Cooperation Council (GCC) region, and very few studies related to generative AI and libraries have focused on the developed world. Most librarians lack the necessary skills and have very limited or no

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knowledge or understanding of basic AI concepts, algorithms, and ethical issues concerning AI technologies (Kizhakkethil & Perryman, 2024). The librarian's role has been evolving over the years due to technological advancement; now, AI literacy is a crucial skill that can bridge the gap between digital literacy and ethical AI usage (Diyaolu et al., 2024). There is a growing concern related to the impact of AI on the media landscape and the lack of AI skills among library professionals (Andersdotter, 2023). Chigwada (2024) advocated for developing frameworks for AI digital literacy courses for LIS professionals in academic libraries to address these gaps, whereas Andersdotter (2023) recommended AI-related courses for librarians, as they have shown promising results. Proposing a framework for AI literacy courses in academic libraries requires collaboration among library professionals, students, faculty, and information communication technology (ICT) staff to address constraints and promote safe AI practices (Chigwada, 2024; Kizhakkethil & Perryman, 2024).

Research Problem

There exists little literature related to AI literacy in the Middle East compared to the other regions of the world. This study creates a roadmap and a framework for AI literacy specific to the context of academic libraries in the UAE but that other types of libraries throughout the Middle Eastern regions can also apply. Several studies are based in Western, South Asian, or African contexts, which cover various aspects and elements of AI literacy, competencies, and ethical consideration in libraries (Ali & Richardson, 2025; Hossain et al., 2025; Kautonen & Gasparini, 2024; Lo, 2024; Monyela & Tella, 2024). Current literature focuses on the need for AI literacy among library and information science (LIS) professionals; however, there is insufficient empirical data related to actual competency level, preparedness level of library staff, and specific training needs in the context of UAE to integrate AI into various library services and operations (Ali & Richardson, 2025; Kautonen, & Gasparini, 2024; Lo, 2024). There is also a lack of research related to unexplored ethical considerations (Mannheimer et al., 2024; Monyela & Tella, 2024), and no tailored frameworks and guidelines exist in the context of the UAE. Most frameworks and guidelines for AI literacy are generic or are adapted from other regions with little evidence of adaptation or development for academic libraries in the UAE, due to a lack of studies to investigate (Chee et al., 2024; Lo, 2023). UAE public libraries are exploring and updating the current information literacy programs to develop digital awareness, especially related to AI, and focusing on the need for responsible and safe use of AI tools and technologies (Abd AlSamad et al., 2024). Najdawi (2020) emphasizes the need to consider AI adoption strategies across different organizations from both public and private sectors, involving different domains in the UAE, but faces challenges in implementation due to the lack of a framework for AI integration. This gap impedes the ability of libraries to fully adopt, utilize, and responsibly integrate AI tools and technologies.

Objectives of Research

1. To measure the current level of AI literacy among library and information professionals, focusing on cognitive, behavioral, and normative competencies.
2. To evaluate the effectiveness of existing AI literacy training programs for library professionals.
3. To examine the ethical considerations and challenges associated with AI integration in library services.

Literature Review

AI Literacy and Key Competencies

This study defines AI literacy as the ability to understand, engage, and critically evaluate AI-related tools and technologies. It encompasses a wide range of competencies to navigate and interact with various AI tools and systems effectively and responsibly (Almatrafi et al., 2024; Yuan et al., 2024; Zhang et al., 2024). The key components of AI literacy are cognitive competencies, behavioral competencies, and normative competencies. The cognitive competencies include understanding of AI features and processing and algorithm influences (Almatrafi et al., 2024; Yuan et al., 2024). The behavioral competencies correspond to user efficacy (Yuan et al., 2024) and application and creation (Almatrafi et al., 2024). The normative competencies comprise ethical considerations and threat appraisal influences (Almatrafi et al., 2024; Yuan et al., 2024).

Generative AI creates personalized user experience; machine learning algorithms analyze the user information seeking behavior and provide personalized recommendations, which enhances user engagement and satisfaction (Amalia et al., 2024). AI in libraries can improve service delivery through advanced data analytics by understanding and responding to user needs in real time (Okwu et al., 2024). One of the key applications of AI technologies is providing AI-powered assistive technologies, such as translation services, text-to-speech, and navigation systems, which can significantly enhance accessibility to people of determination and disabilities. Virtual assistants, such as chatbots utilizing natural language processing, are assisting patrons in navigating library systems and answering queries (Chauhan, 2024). Promoting AI literacy will be integral to the professional development of library professionals who will be tasked with ensuring ethical use of AI, data privacy, and aligning AI tools and applications with library values of inclusivity and accessibility (Okwu et al., 2024; Tzanova, 2024). Lo (2024) emphasizes hands-on training and reskilling programs, while Scotti and Beltran (2024) advocate for workshops like "Python for all" for library professionals. Deshen and Aharony (2024) suggest promoting AI acceptance and usage among the library professionals, while Sen (2024) advocates for the integration of AI tools, like ChatGPT and other library services.

Various other studies, such as Garnier et al. (2024), point toward addressing ethical and societal implications and concerns to develop AI literacy among library professionals. Kautonnen and Gasparini (2024) advocate for the B-wheel model, which is related to behavioral changes, is inspired by design thinking, and has the capabilities to build AI competencies among library and information professionals in academic libraries. Alam et al. (2024) point out a few barriers and challenges of implementation of these strategies, including resistance to change, budgetary constraints, and the need for enhanced expertise to ensure successful integration of AI literacy programs in library settings.

AI Literacy, Critical Thinking, and Lifelong Learning

Hollands and Breazeal (2024) assess several STEAM projects in various schools in Spain and conclude that evaluation and critical thinking skills are the key components of AI literacy. They suggest that students and teachers involved in STEAM projects should be well-equipped with STEM-based competencies and instructional design knowledge to critically assess AI tools and technologies while identifying their key strengths and limitations. AI literacy also involves critical thinking skills, as it assists people in identifying the challenges posed by AI

technologies and in finding innovative solutions within their work environment (Allen & Kendeou, 2023). AI is always rapidly evolving; therefore, to cope with these technologies, the curricula from different disciplines need to emphasize continuous learning and adaptability and promote a culture of lifelong learning. Information professionals must continue learning and to stay up to date with the latest developments in AI and best practices (Breazeal et al., 2023; Kizhakkethil & Perryman, 2024). Information professionals need to enhance and continue their professional development journey by attending new AI-related courses, training, and workshops and participation in various AI-related projects (Kautonen & Gasparini, 2024). Participating in learning circles, in which information professionals can discuss and collaborate on AI-related content and its application and integration in library services, is another way to continue learning; learning circles can foster a learning environment and build confidence among library professionals (Andersdotter, 2023). UNESCO's AI competency framework for teachers can guide the development of AI literacy through structured pathways for learning and assessment, as it can help differentiate between use and misuse in education and help develop knowledge, skills, and values for responsible use of AI technologies in classrooms (Faruqe et al., 2022; Mutawa & Shruthi, 2025). Research finds that evaluation and feedback mechanisms must be incorporated to measure the effectiveness of AI technologies and information sources to ensure that learners are acquiring the necessary AI skills and competencies (Allen & Kendeou, 2023; Holland & Breazeal, 2024). Having hands-on experience with these tools will equip learners to use them for creating bibliographic records and for enhancing library services (Snow et al., 2024). Machine learning technologies and data analytics are used for important tasks such as classification of resources, clustering, and visualization of data. Acquiring these skills will provide a competitive advantage in managing big data and improving the overall library operations and services (Luca et al., 2022).

Key Challenges, Barriers, and Concerns

Information professionals must become familiar with and understand AI concepts, such as generative AI, machine learning, and natural language processing, to make informed decisions about AI tool integration with various library services and operations (Pickett & Pennington, 2024). Library and information professionals are exploring various AI-powered tools to enhance their services in information retrieval, personalized and adaptive learning experiences, and tailored recommendations (Bhuvaneswari & Rajakumar, 2024; Molopa et al., 2024). The ability to convey complex technical information in an accessible manner will create rapid awareness related to AI literacy among users (Zhang et al., 2024). Collaboration among information professionals requires working in tandem with AI and humans; this machine-human interaction can foster teamwork, especially in AI-driven projects (Du, 2024). One of the key challenges associated with AI is ethics. It is paramount that information professionals not only have a deep understanding of the ethical implications of AI—including, but not limited to, data privacy, hallucinations, biasedness, and unreliable and misinformation—but that they address these challenges (Bhowmick et al., 2024). Information professionals need to approach personalized learning and digital literacy with a growth mindset, as AI tools can facilitate personalized and adaptive learning (Parra-Valencia & Massey, 2023). Information professionals must collaborate with educators to develop AI literacy modules for students that are interdisciplinary in approach and that ensure students and faculty members have the necessary skills and knowledge to thrive in an AI-driven environment (Merceron & Best, 2024).

Budget constraints are a challenge for libraries wishing to invest in information technology infrastructure to support AI applications, as well as their integration into library services (Chatikobo & Pasipamire, 2024). Higher education requires interdisciplinary collaboration between the library professionals, educators, and other stakeholders to develop a comprehensive AI literacy program (Merceron & Best, 2024). Lo (2024) finds that academic library professionals in the United States have a modest self-rated understanding of AI concepts, have very little hands-on experience with AI tools, and have notable gaps in knowledge related to ethical implications and collaborative AI practices. Human-AI collaboration is critical to the success of AI implementation and integration, as information professionals need to collaborate with various AI systems and to understand their limitations and strengths to enhance human capabilities. Human-centric AI values must also be maintained to ensure AI tools and applications augment human decision-making rather than replace it (Yanyi, 2024). Integration of AI information literacy (IL) into all existing IL programs will enhance students' and users' capabilities in searching, retrieving, evaluating, and using information effectively in an AI-driven environment (Carroll & Borycz, 2024; Ndungu, 2024). Information literacy professionals need to upskill themselves to teach AI literacy to users and to help them understand and navigate AI tools and technologies (Andersdotter, 2023). Data literacy is a key skill that information professionals need to acquire to understand data management and big data technology awareness; it will enable them to manage and analyze large datasets, understanding data security and ensuring the integrity of data used in AI (Jinghua, 2021; Daxing, 2021). Knowledge of AI algorithm literacy and algorithm transparency are important to information professionals as knowing how AI algorithms work can help them to identify potential biases and to interpret algorithmic outputs. Furthermore, advocating for algorithm transparency in AI algorithms helps ensures that they are clear and accountable (Ndungu, 2024). Another key skill professionals need to acquire is digital literacy, which will help them navigate misinformation, such as deep fakes produced by AI tools, and will ensure the promotion of responsible digital citizenship and ethical use of AI technologies (Adetayo, 2021).

AI Literacy Frameworks for Academic Libraries

Many general AI literacy frameworks exist, but only two studies propose AI literacy frameworks specifically for LIS professionals and focused on academic libraries. Lo (2025) proposes a framework composed of five core components and three cross-cutting themes. The core components include technical knowledge, ethical awareness, critical thinking, practical skills, and societal impact, while cross-cutting themes include human-AI collaboration, lifelong learning and adaptation, and equity and access. This study also advocates for a dual-implementation approach that involves professional development and training for staff, community engagement through collaboration with educators across disciplines, and integration with current information literacy programs. Hossain et al. (2025) propose a human-centered AI literacy framework (see Figure 1), which conceptualizes AI literacy through four interconnected dimensions: foundational AI literacy, operational AI literacy, transformational AI literacy, and critical AI literacy. It classifies AI literacy skills along normative and cognitive axes.

Figure 2 shows the proposed framework on AI literacy for LIS professionals based on the review of the existing literature. This conceptual framework outlines the key concepts, variables, and their relationships that guide the design of this study.

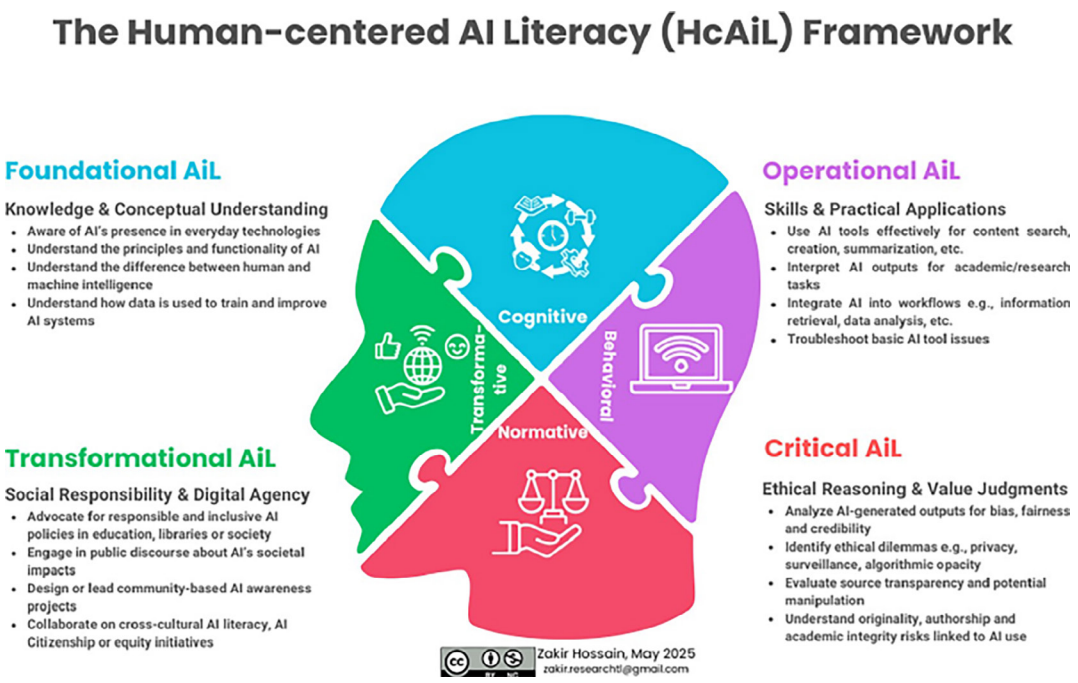


Figure 1. Human-Centered AI Literacy Framework. Source: Hossain et al., 2025.



Figure 2. Proposed Conceptual Framework on AI Literacy for LIS Professionals. Source: Author, self-generated.

Research Methodology

This study involves quantitative methodology, employing a survey to assess the need to build AI literacy among library professionals in the UAE. The study primarily targeted a diverse sample population of library professionals from universities, colleges, schools, and public libraries across the country. The survey instrument was developed and designed to measure various levels of AI competencies in terms of behavioral, cognitive, and normative competencies; AI literacy skills and knowledge; effectiveness of AI training; and ethical considerations and challenges associated with AI. The survey instrument was developed using the literature covered; each variable was identified by critically evaluating the literature review without centering any specific study or studies. The survey consists of five demographic data–related questions with multiple choice options and six constructs (i.e., 30 variables in the form of Likert scale items), to measure and evaluate participants' attitudes, skills, and knowledge toward AI application in library services. The constructs and variables were developed and identified through the literature review and critically examined in the context of AI literacy. The structured online survey was designed using Microsoft Forms. The response collection link was distributed following random sampling, and further snowball sampling techniques were used for a broader reach. Participants were requested to share the survey link within their professional networks, which expedited the data collection process. The study adhered to a rigorous ethical framework, ensuring compliance with all established guidelines and protocols under the ethical standards of the Declaration of Helsinki. Participants in the study were provided with informed consent forms, clearly outlining the purpose of the study and the measures taken to ensure confidentiality during the research process. All the data collected were managed securely, and respondents' anonymity was strictly maintained throughout the study. A total of 92 responses were collected from library and information science professionals across the UAE. The statistical analysis included descriptive statistical analysis to summarize demographic information and pattern of response, correlation analysis to examine the relationships between variables, and an independent sample T-test to compare variables between genders.

Data Analysis and Findings

The data analysis involved employing a range of statistical techniques to examine the dataset comprehensively. Table 1 shows the demographic data distributions of the independent variables. The gender distribution among the respondents shows higher proportions of male librarians (60.87%) compared to female librarians (39.13%). The data related to age groups suggest that most of the respondents are between 35 and 54 and comprise almost 80% of the total respondents, while there were no respondents in the 18–24 age group. The age group 55 and above is relatively small (13.04%) but suggests that a significant number of older adults participated in this study. The average age of the respondents is 42.5 years. The largest group (57.61%) of library professionals are working in higher education, comprising university and college libraries, while school libraries account for 32.61% and special libraries 9.78% of the respondents. There was no representation of public library professionals in this study, which is one limitation of this study. Data related to the highest level of education shows that most library professionals have a master's degree (55.43%), followed by PhDs (27.17%) and bachelor's degrees (17.39%). Most library professionals (60.87%) have more than 15 years of experience, with an average of 12.8 years of experience, which suggests a very experienced

TABLE 1
Demographic Details of the Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	**Male**	56	60.87%
	Female	36	39.13%
Age	**18–24**	0	0%
	25–34	10	10.87%
	35–44	36	39.13%
	45–54	34	36.96%
	55 and above	12	13.04%
Type of Library	**Higher Education (Colleges/Universities)**	53	57.61%
	School Library	30	32.61%
	Special Library	9	9.78%
	Public Library	0	0%
Highest Level of Education	**Bachelor's**	16	17.40%
	Master's	51	55.43%
	PhDs	25	27.17%
Years of Experience	**0 to 5**	6	6.52%
	6 to 10	20	21.74%
	11 to 15	10	10.87%
	16 and above	56	60.87%

sample population in this study, which can contribute towards a more in-depth understanding of the importance and need of AI literacy among library professionals.

Table 2 shows that most respondents depict a positive self-assessment of their AI literacy and understanding, responding with agree or strongly agree with the statement across all variables in this construct. Almost 85.87% of the total respondents selected agree or strongly agree for explaining basic principles of AI (M = 4.09, SD = 0.78) to others. This suggests that most of the librarians are confident in their ability to communicate fundamental AI concepts with others. The understanding of AI technologies (M = 3.80, SD = 0.81) among librarians still suggests a positive inclination, but the lower mean value might indicate that they feel less confident when it comes to in-depth understanding of specific AI technologies as compared to general principles. Familiarity with AI tools (M = 4.16, SD = 0.71) data suggests that the majority (85.87%) of librarians are very confident in their knowledge of popular AI tools used in the library. As for AI applications in libraries (M = 4.00, SD = 0.72), 77.26% of respondents either strongly agree or agree, suggesting that librarians are equipped to identify potential AI applications in various library services and how they can be integrated into their operations. The librarians (79.35%) also seem to have a high awareness level and understanding of the limitations of AI (M = 3.91, SD = 0.80).

Table 3 shows an overall positive sentiment, but the responses are distributed across the agreement scale, which indicates a wider range of engagement among librarians with AI. Using AI for creating bibliographic records (M = 3.29, SD = 1.05) indicates that there is a

TABLE 2
Current Level of AI Literacy (Cognitive Competencies)

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N)	Mean (M)	Standard Deviation (SD)
Explain the basic principles of artificial intelligence to others.	1 (1.09%)	3 (3.26%)	9 (9.78%)	53 (57.61%)	26 (28.26%)	92 (100%)	4.09	0.78
Understand the differences between various AI technologies (e.g., machine learning, natural language processing, generative AI).	1 (1.09%)	4 (4.35%)	23 (25.00%)	48 (52.17%)	16 (17.39%)	92 (100%)	3.80	0.81
Familiar with popular AI tools used in library services (e.g., ChatGPT, Gemini etc.).	0 (0%)	2 (2.17%)	11 (11.96%)	49 (53.26%)	30 (32.61%)	92 (100%)	4.16	0.71
Identify potential applications of AI in library and information services.	0 (0%)	2 (2.17%)	18 (19.57%)	50 (54.35%)	22 (22.91%)	92 (100%)	4.00	0.72
Understand the limitations of current AI technologies.	1 (1.09%)	5 (5.43%)	13 (14.13%)	55 (59.78%)	18 (19.57%)	92 (100%)	3.91	0.80

moderate experience, and there is significant variation. A little more than half of the respondents (53.27%) agree or strongly agree with this statement. For the AI-powered data analytics (M = 3.46, SD = 0.94) variable, the trend is the same: just a little over half of the respondents (56.52%) have this competency. When it comes to the integration of AI into library services (M = 3.72, SD = 0.84), respondents showed an upward swing, as almost 69.56% either agree or strongly agree. This suggests that most librarians are comfortable when it comes to integrating AI tools into existing library services. Using AI for information retrieval (M = 3.80, SD = 0.78) also showed a high level of confidence among the respondents, with almost 78.26% of respondents agreeing or strongly agreeing. This was the highest-ranking variable in this construct, which suggests that most librarians show a high degree of confidence when it comes to using AI to enhance information retrieval processes. AI-powered personalized learning (M = 3.23, SD = 1.08) shows a decline in confidence level, as less than half (48.92%) agree or strongly agree on this competency level.

Table 4 shows the current level of AI literacy among librarians in terms of normative competencies encompassing critical evaluation and ethical implications of AI in the context of a library. Identifying potential AI biases is a key challenge, and the data shows that 55.44% of the respondents agree or strongly agree that they can identify potential biases in AI algorithms and their outputs (M = 3.39, SD = 0.96). This moderate confidence level in recognizing

TABLE 3
Current Level of AI Literacy (Behavioral Competencies)

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N)	Mean (M)	Standard Deviation (SD)
Experience using AI tools for creating bibliographic records.	5 (5.43%)	19 (20.65%)	19 (20.65%)	42 (45.65%)	7 (7.62%)	92 (100%)	3.29	1.05
Use AI-powered data analytics tools to improve library operations.	1 (1.09%)	17 (18.48%)	22 (23.91%)	43 (46.74%)	9 (9.78%)	92 (100%)	3.46	0.94
Comfortably integrating AI tools into existing library services.	1 (1.09%)	8 (8.7%)	19 (20.65%)	52 (56.52%)	12 (13.04%)	92 (100%)	3.72	0.84
Use AI to enhance information retrieval processes in my library.	1 (1.09%)	7 (11.96%)	12 (13.04%)	61 (66.3%)	11 (11.96%)	92 (100%)	3.80	0.78
Designed AI-powered personalized learning experiences for library users.	6 (6.52%)	20 (21.74%)	21 (22.82%)	37 (40.22%)	8 (8.7%)	92 (100%)	3.23	1.08

TABLE 4
Current Level of AI Literacy (Normative Competencies)

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N) / %	Mean (M)	Standard Deviation (SD)
Identify potential biases in AI algorithms and their outputs.	2 (2.17%)	18 (19.57%)	21 (22.82%)	44 (47.83%)	7 (7.61%)	92 (100%)	3.39	0.96
Aware of the privacy implications of using AI in library services.	3 (3.26%)	5 (5.43%)	26 (28.26%)	48 (52.17%)	10 (10.88%)	92 (100%)	3.62	0.87
Critically evaluate the reliability and accuracy of AI-generated information.	3 (3.26%)	9 (9.78%)	24 (26.09%)	42 (45.65%)	14 (15.22%)	92 (100%)	3.60	0.97
Understand the ethical considerations of using AI in information retrieval and dissemination.	2 (2.17%)	3 (3.26%)	17 (18.48%)	52 (56.52%)	18 (19.57%)	92 (100%)	3.88	0.83
Explain the concept of AI accountability to library users.	3 (3.26%)	2 (2.17%)	20 (21.74%)	54 (58.70%)	13 (14.13%)	92 (100%)	3.78	0.83

bias suggests that there is room for improvement. Privacy awareness (M=3.62, SD = 0.87) was much better placed as 63.05% of the respondents agree or strongly agree that they are aware of the privacy implications while using AI in library services. For evaluation of AI-generated information (M = 3.60, SD = 0.97), 60.87% of respondents agree or strongly agree on their ability to critically evaluate the reliability and accuracy of AI-generated information. This suggests that librarians are well capable of assessing AI outputs critically and identifying false or "hallucinating" information. The variable related to ethical consideration (M = 3.88, SD = 0.83) scored the highest, with 76.09% respondents agreeing or strongly agreeing with it. This is a positive sign, and it implies that librarians are highly aware of the ethical aspects of using AI in information retrieval and dissemination. When it comes to the question of AI accountability (M = 3.78, SD = 0.83), it was also rated highly, with 72.83% respondents agreeing or strongly agreeing to it. This suggests that librarians have a good understanding of the concept of AI accountability and can explain it to library users.

Table 5 relates to essential AI literacy skills and knowledge areas. This is one of the key constructs, and it deals with the variables related to the importance of and need for AI literacy skills in the field. The first variable related to understanding of AI algorithms (M = 3.92, SD = 0.87) showed a high positive confidence, with 75% of respondents agreeing or

TABLE 5
Essential AI Literacy Skills and Knowledge Areas

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N) / %	Mean (M)	Standard Deviation (SD)
Understanding AI algorithms and machine learning principles is crucial for LIS professionals.	1 (1.09%)	5 (5.43%)	17 (18.48%)	46 (50.00%)	23 (25.00%)	92 (100%)	3.92	0.87
Practical experience with AI tools should be a core component of LIS education.	2 (2.67%)	1 (1.09%)	13 (14.13%)	47 (51.09%)	29 (31.52%)	92 (100%)	4.09	0.86
Knowledge of data management and analysis is essential for working with AI in libraries.	0 (0%)	0 (0%)	9 (9.78%)	55 (59.78%)	28 (30.44%)	92 (100%)	4.21	0.60
Critical thinking skills for evaluating AI tools are vital for LIS professionals.	1 (1.09%)	1 (1.09%)	9 (9.78%)	51 (55.43%)	30 (32.61%)	92 (100%)	4.17	0.73
Understanding the societal impact of AI should be part of the LIS curriculum.	1 (1.09%)	3 (3.26%)	16 (17.39%)	45 (48.91%)	27 (29.35%)	92 (100%)	4.02	0.84

strongly agreeing. This suggests that understanding of AI algorithms and machine learning principles is crucial for the LIS professionals and that technical AI knowledge is particularly important. For the practical AI experience (M = 4.09, SD = 00.86), the data shows that 82.61% of respondents agree or strongly agree that practical experiences with AI tools need to be the core component of LIS education, and that hands-on experience and learning on AI technologies is strongly recommended. The variable related to data management knowledge (M = 4.21, SD = 0.60) is the highest-ranked variable in the construct, with 90.22% agreeing or strongly agreeing on this. This implies that there is near unanimity among the respondents in relation to the importance of data management skills for working with AI in libraries. The critical thinking for AI evaluation (M = 4.17, SD = 0.73) was equally highly rated, with 88.04% of respondents either agreeing or strongly agreeing that critical thinking skills for evaluation of AI tools are crucial and vital for LIS professionals, as they can equip them with strong analytical skills for evaluation of AI tools and technologies. Respondents also emphasized the societal impact of AI (M = 4.02, SD = 0.84), as 78.26% agreed or strongly agreed on its inclusion as part of the LIS curriculum, suggesting a recognition of the wider implications of AI beyond just the technical aspects of it.

Table 6 shows the effectiveness of existing AI literacy training among librarians provided by their institutions, indicating a varying level of satisfaction and exposure with AI training

TABLE 6
Effectiveness of Existing AI Literacy Training

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N) / %	Mean (M)	Standard Deviation (SD)
I participated in AI literacy training programs specifically designed for library professionals.	4 (4.35%)	20 (21.74%)	23 (25.00%)	37 (40.22%)	8 (8.70%)	92 (100%)	3.27	1.03
The AI literacy training I received was comprehensive and covered all necessary aspects.	3 (3.26%)	17 (18.48%)	36 (39.13%)	28 (30.43%)	8 (8.70%)	92 (100%)	3.23	0.96
The training effectively prepared me to use AI tools in my daily work.	3 (3.26%)	16 (17.39%)	35 (38.04%)	31 (33.70%)	7 (7.61%)	92 (100%)	3.25	0.94
The training addressed ethical considerations of AI use in libraries.	4 (4.35%)	15 (16.30%)	30 (32.61%)	34 (36.96%)	9 (9.78%)	92 (100%)	3.32	1.00
I can confidently apply the knowledge gained from AI literacy training in my professional practice.	2 (2.17%)	12 (13.04%)	35 (38.04%)	35 (38.04%)	8 (8.70%)	92 (100%)	3.38	0.90

programs. The first variable in this construct related to participation in AI training (M = 3.27, SD = 1.03), with nearly half of the respondents (48.92%) agreeing or strongly agreeing on their participation in AI literacy training programs specifically designed for LIS professionals. Regarding the comprehensive nature of the training program (M = 3.23, SD = 0.96), only 39.13% agreed or strongly agreed that the AI literacy training they received was comprehensive and covered all three aspects, including cognitive, behavioral, and normative competencies. This indicates a potential gap in the training content. As for the practical application of the training program (M = 3.25, SD = 0.94), only 41.31% of the respondents agreed or strongly agreed on the effectiveness of the use of AI tools in their job. This suggests a moderate level of effectiveness of training in practical skill development. Training addresses ethical considerations (M = 3.32, SD = 1.00) and followed a similar trend, with only 46.74% agreeing or strongly agreeing on this aspect. This suggests a need for improvement and resources required to cover the ethical aspects of AI training. The variable related to confidence in applied knowledge (M = 3.38, SD = 0.90) showed results on similar lines, with 46.74% of the respondents agreeing or strongly agreeing that they feel confident while applying the knowledge gained from the AI literacy training in their professional work.

Table 7 suggests that librarians have shown significant concerns related to several aspects and ethical implications of AI use in libraries. They have shown confidence in

TABLE 7
Ethical Considerations and Challenges

Statement	Strongly Disagree (N)	Disagree (N)	Neutral (N)	Agree (N)	Strongly Agree (N)	Total (N) / %	Mean (M)	Standard Deviation (SD)
Concerned about potential privacy breaches when using AI in library services.	1 (1.09%)	4 (4.35%)	26 (28.26%)	46 (50.00%)	15 (16.30%)	92 (100%)	3.76	0.81
Worry about the potential for AI to perpetuate or amplify biases in information retrieval.	0 (0%)	4 (4.35%)	28 (30.43%)	39 (42.39%)	21 (22.82%)	92 (100%)	3.84	0.83
Challenging to ensure transparency when using AI-powered tools in library services.	1 (1.09%)	5 (5.43%)	27 (29.35%)	47 (51.09%)	12 (13.04%)	92 (100%)	3.70	0.80
Confidence in my ability to address ethical issues related to AI use in libraries.	1 (1.09%)	4 (4.35%)	26 (28.26%)	50 (54.35%)	11 (11.96%)	92 (100%)	3.72	0.77
Clear guidelines for the ethical use of AI in library and information services.	1 (1.09%)	2 (2.17%)	10 (10.88%)	46 (50.00%)	33 (35.87%)	92 (100%)	4.17	0.79

addressing these issues and have highlighted the need for clear ethical guidelines surrounding this. The first variable related to privacy concerns (M = 3.76, SD = 0.81); 66.30% of respondents agreed or strongly agreed that they were concerned about potential privacy breaches while using AI in library services, which indicates a high level of awareness about privacy issues. With regards to bias amplifications (M = 3.84, SD = 0.83), 65.21% showed similar concerns and agreed or strongly agreed on AI potentially perpetuation or amplifying biases in information retrieval. This suggests that librarians have shown concerns related to equity and AI fairness. Transparency challenges (M = 3.70, SD = 0.80) showed a similar trend, with 64.13% of respondents agreeing or strongly agreeing on ensuring transparency as a major challenge while using AI-powered tools in library services. This suggests that librarians have recognized the complexities in communicating AI processes to users. Confidence in addressing ethical issues showed 66.31% agreement in their ability to address ethical issues related to the use of AI in libraries, which suggests a high confidence level among the librarians and self-assurance in addressing ethical challenges. As for the need for ethical guidelines (M = 4.17, SD = 0.79), most of the librarians (85.87%) were unanimous and agreed or strongly agreed on having a clear set of ethical guidelines and standards for AI use in libraries.

There were no statistically significant differences between male and female respondents (p-value was greater than 0.05 for all variables), suggesting that gender does not play any major role in most aspects of AI literacy and attitudes among library professionals.

Figure 3 shows the proposed framework for AI literacy for library professionals based on the findings of this study.

Discussion

This study provides constructive insights into the current state of AI literacy among LIS professionals working in different types of libraries in the UAE. The study highlights the strengths and areas of improvement and provides recommendations to address the gaps. The demographic variable highlighted the fact that a majority of the respondents were male (60.87%) and working in higher education (57.61%). Most of the participants had an advanced level of education (55.43% master's, 27.17% PhDs), and 60.87% had more than 15 years of experience working in libraries. The findings reveal a high level of cognitive competencies (85.87%) related to AI, where librarians demonstrated confidence in explaining basic understanding of AI principles and familiarity with AI tools (85.87%), in line with studies by Alam et al. (2024), Lo (2024), and Mallikarjuna (2024). As for the behavioral competencies, there was moderate to high confidence observed in using AI for various library tasks, where information retrieval showed the highest level of confidence (78.26%) among the librarians. Normative competencies also showed moderate to high levels of confidence with ethical consideration (76.09%), and AI accountability (72.83%) showed the highest confidence. However, there were notable gaps found in certain behavioral and normative competencies, especially in areas related to identifying AI bias learning (Berendt, 2023; Saeidnia, 2023) and AI-powered personalized (Kaswan et al., 2024). Essential AI literacy skills constructs showed high agreement concerning variables such as the need for critical thinking for AI evaluation (88.04%) and data management knowledge (90.22%).

This research highlights the critical importance of AI literacy skills in the field of library and information science. The survey results show consensus among the library profession-

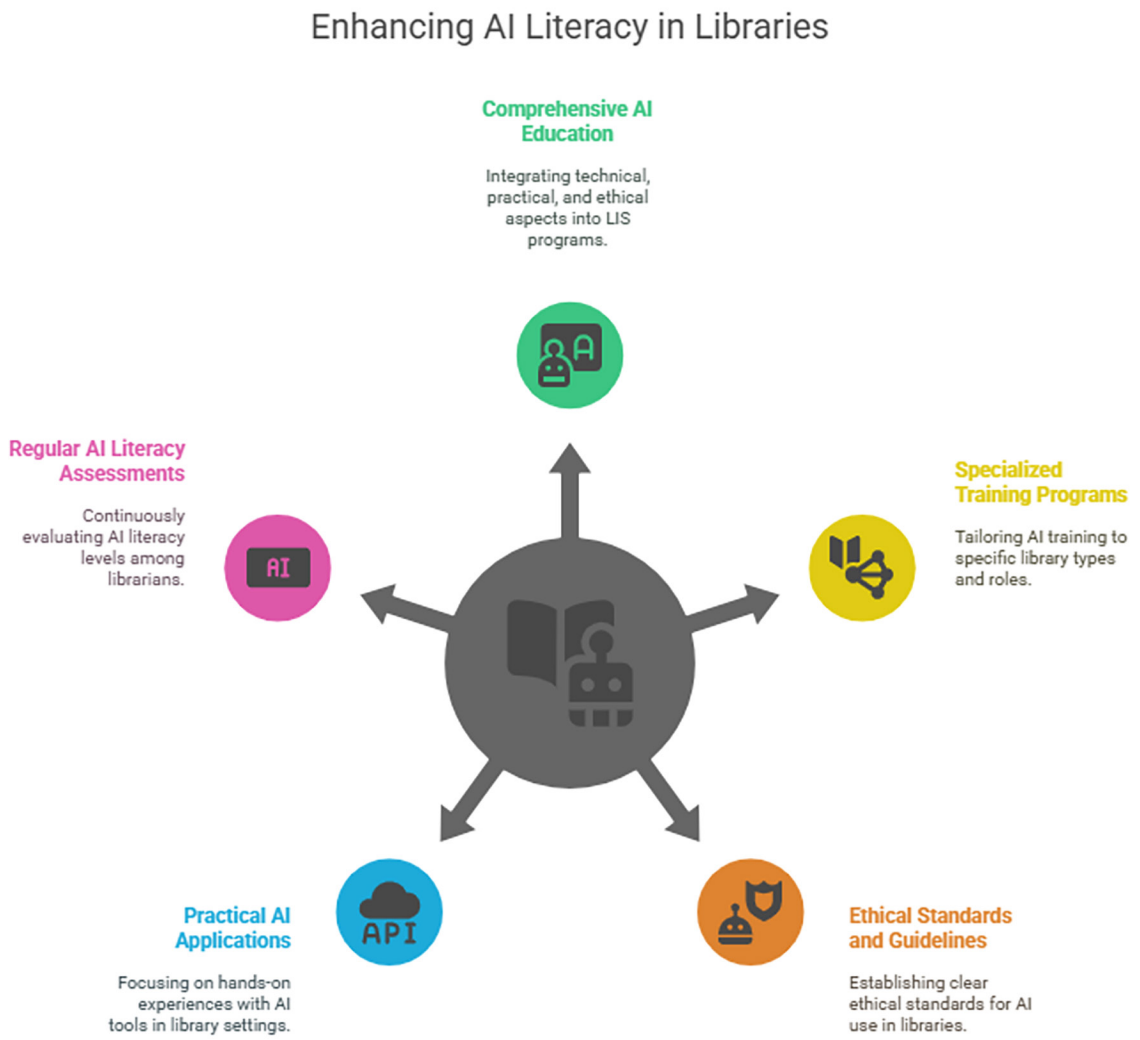


Figure 3. Proposed Framework for AI Literacy for Library Professionals. Source: Author, self-generated.

als regarding the need for comprehensive AI education in the field of LIS, encompassing technical knowledge and understanding, practical experience, critical thinking, and ethical considerations (Chigwada, 2024; Kizhakkethil & Perryman, 2024; Lo, 2023; Tzanova, 2023). The demand for an AI literacy program for LIS professionals aligns with the rapidly changing technological environment in which libraries function and the increasing integration of AI into various library services.

This study also found that there is a significant disparity between the perceived importance of AI competencies and the effectiveness of existing training programs (Lo, 2024; Mallikarjuna, 2024). This is a major challenge and demands an urgent need for targeted, specialized practical AI literacy training for LIS professionals. The moderate satisfaction level with the current AI training programs suggests that there is tremendous room for improvement, both content-wise and delivery method, with a need for more practical and workshop-related training initiatives. In this study, ethical considerations emerged as one of the most crucial aspects of AI literacy (Diyaolu et al., 2024; Lo, 2024). LIS professionals showed consensus regarding the concerns about privacy implications and the need to have clear ethical standards and guidelines for

AI implementation in libraries (Adewojo & Amzat, 2024; Kavak, 2024; Rajkumar et al., 2024). The study accentuates the dual roles of librarians in terms of implementers of AI technologies and as the ethical custodians of the use and access of information.

Recommendations and Conclusion

This study has both theoretical and practical implications, as it tries to evaluate and assess cognitive, normative, and behavioral competencies related to AI in the field of library science. It is a unique addition to the literature encompassing artificial intelligence, librarianship, and social sciences. There is a substantial gap between the perceived importance of AI skills and competencies level and the effectiveness of the existing training programs in the UAE. The practical implication of this study recommends specialized, tailored intervention of AI training programs for library professionals, which need to be more practically oriented to enhance learning. The study also highlights the need for libraries to adopt ethical standards and guidelines for the implementation of AI technologies. AI literacy and AI education need to be prioritized in professional development plans at organizational levels. Such education should be integrated into the LIS curriculum, ideally in collaboration with computer science departments, so that LIS professionals can understand the concept behind algorithms and coding patterns. Addressing these gaps can enhance AI implementation across all types of libraries and enable the library professionals to use AI tools and technologies effectively and in a responsible manner, addressing all ethical concerns and issues (Deshen & Aharony, 2024; Kizhakkethil & Perryman, 2024; Tzanova, 2024).

Another aspect of training is to equip the librarians with identify and mitigate AI biases. The study also recommends that universities and library associations create clear ethical standards and guidelines for AI use in libraries to address privacy concerns and ethical implications. Practical knowledge and hands-on experience with AI tools and technologies should be integrated into both formal education (LIS) and professional development programs. This study recommends investment and providing resources to support AI literacy initiatives in LIS education programs, as proposed by Chatikobo and Pasipamire (2024). One limitation of this study is that it is based on self-assessment of the library professionals, and it provides data about the perceived competencies and knowledge. This study does not cover an in-depth analysis of various training methods, and, as such, there is a limited assessment of training effectiveness.

This study recommends future studies in measuring the effectiveness of training related to AI in libraries, assessing AI literacy levels among LIS professionals and LIS students through a framework, and a study involving the identification and measurement of practical applications of AI in library services and operations. This study provides a comprehensive foundation for understanding the current state and future needs of AI literacy in libraries and the LIS profession. The findings of this study can serve as a valuable guide for library associations, professional organizations, and educational institutions in developing strategies to enhance AI literacy among library professionals.

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