ARTIFICIAL INTELLIGENCE LITERACY AS A CORE COMPETENCY FOR DIGITAL LIBRARY USERS

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Abstract: Artificial Intelligence (AI) technologies are innovative character of rapid change of digital library ecosystems by transforming information retrieval, scholarly communication, metadata generation, and user interaction. AI-based systems such as ChatGPT, Google Gemini, and Microsoft Copilot are being integrated into academic workflows. AI literacy has become a must-have skill for digital library users. The paper constructs a theoretical framework in which AI literacy is considered an upgrade of information literacy, digital literacy, and data literacy, which are the foundational skills in knowledge environments mediated by AI. Based on the interdisciplinary research in information science, AI ethics, and educational technology. The paper identifies key sets of competences that the users of AI-enabled digital libraries should have to be effective and responsible. It defines operational, critical, ethical, algorithmic, and governance-oriented competencies, and explores the library's institutional role in developing AI literacy. Finally, the paper proposes that AI literacy be made a staple academic skill to secure scholarly integrity, critical autonomy, and sustainable knowledge practices in educational ecosystems at the tertiary level.

Keywords: Artificial Intelligence literacy; Digital libraries; Information literacy; Algorithmic awareness; AI ethics; Academic libraries.

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1.0 Introduction
The slight integration of Artificial Intelligence (AI) technologies in higher education has been a major factor in the change of the academic information landscape. For instance, digital libraries utilize AI, based tools in various ways such as semantic search, recommender services, automated metadata creation, plagiarism detection, research analytics, and conversational assistants. These changes indicate that the traditional information retrieval settings are replaced by algorithmically mediated knowledge ecosystems. On the one hand, AI brings efficiency, personalization, and accessibility and it leads to epistemic, ethical, and governance issues.

In this changing environment, AI literacy has become a necessary skill for the users of digital libraries. Traditional digital literacy focuses largely on the users' functional skills, whereas AI literacy involves understanding, to a greater extent, the working principles, limitations, and ethical issues of algorithmic systems. Digital library users such as students, research scholars, and teaching staff encounter AI-generated summaries, automated citation proposals, predictive recommendations, and generative text outputs in their everyday work. Users face the difficulty of becoming overly dependent, being misinformed, engaging in academic dishonesty, and losing interest in critically questioning without sufficient literacy.

The present manuscript is a theoretical work that argues for the establishment of AI literacy as a fundamental skill of digital library users. It draws on theoretical perspectives in information science, educational theory, and AI ethics to offer a structured competency framework that can be adopted by academic institutions.

2.0 Objectives of the Study
1. This study sets out to achieve the following aims:
2. To develop a conceptual understanding of Artificial Intelligence (AI) literacy within the framework of digital library environments.

3. To find out the core competency domains that are essential for AI-literate digital library users.
4. Investigate the interrelation of AI literacy with other educational constructs such as information literacy, digital literacy, data literacy, and algorithmic literacy.
5. To discuss the societal responsibilities of academic libraries in promoting AI literacy.
6. To comprehend the policy and governance issues that interfere with embedding AI literacy in higher education.

3.0 Scope of the Study
This paper is a conceptual and theoretical exploration of AI literacy in the academic digital library scenario. It targets higher education library users such as students, research scholars, and faculty members from various institutions in India.

The study reviews the latest scholarly works (2020–2025) on AI literacy, AI in higher education, AI-enabled libraries, algorithmic awareness, and AI governance. The main focus is on creating a well-organised competency framework that can be used in AI-based digital library environments.

4.0 Methodology
The paper uses qualitative, conceptual research design with a systematic literature review as a data source. Articles from peer, reviewed journals, policy documents, and international frameworks published between 2020 and 2025 were examined.

The authors chose the literature from Scopus, indexed journals in the fields of library and information science, educational technology, and AI ethics. A thematic analysis was performed to extract the main competency dimensions, which were understanding at a conceptual level, operational skills, ability to critically evaluate, ethical awareness, algorithmic literacy, and knowledge of governance. It is a synthesis of different subject area that is used to develop a comprehensive AI literacy structure for the users of digital libraries.

5.0 Literature Review
Recent studies agree that being literate in AI is a multidimensional concept that combines knowledge, capacity for critical thinking, and awareness of ethics. Long and Magerko (2020) described AI literacy as the competency to comprehend and critically interact with AI systems. Ng et al. (2021) took this perspective further to include the educational and moral components in their study.

Chiu et al. (2023) identified AI literacy at the level of tertiary education as involving conceptual, practical, and evaluative competencies.

In the context of higher education, the use of generative AI tools has resulted in issues related to academic integrity and authorship (Dwivedi et al., 2023; Kasneci et al., 2023). These changes emphasizes the importance of entrenched literacy over simple technological advancement.

Academic libraries have seen the introduction of AI applications such as semantic search, recommendation systems, and automated metadata generation that have revolutionised information services (Asemi et al., 2021; Cox et al., 2022). On the other hand, research shows that users' readiness and ethical consciousness are still not at the same level (Hervieux & Wheatley, 2021).

Algorithmic literacy literature carried out the role of automated systems in shaping people's access to knowledge (Bucher, 2020), while governance frameworks among which were those by UNESCO (2021) highlights principles such as fairness, accountability, and transparency.

There are lot of research focusing on AI in education and libraries, however, only some works have tried to merge these two research areas into a single competency model targeted to digital library users. This research contributes to the literature by recommending that AI literacy becomes one main academic skill in AI-driven knowledge ecosystems.

6.0 Conceptual Foundations of AI Literacy
6.1 AI literacy can be defined as the awareness, abilities, mental faculties, and ethical sensitivity that are necessary to grasp, judge, and use AI systems in a responsible manner. Digital education experts have pointed out that AI literacy is not just about being proficient in the operation of AI but also includes understanding of algorithmic mechanisms, probabilistic results, and innate systemic prejudices (Long & Magerko, 2020). In the case of libraries, AI literacy overlaps with the previously existing frameworks like information literacy, data literacy, and algorithmic literacy.

6.2 Information literacy has been defined by the Association of College and Research Libraries (ACRL, 2016) as the skill to find, assess, and proper use of information. AI-driven systems can create content on the go rather than just fetching the already existing documents. Hence, the users need to be aware of how generative models operate. It is important to know that in what way the training data affect the outcome, and the reasons of having AI systems may produce fake references or biased interpretations.

6.3 Algorithmic literacy is about knowing how algorithms influence people's access to information and the decision-making processes (Beer, 2017).

6.4 Data literacy refers to the knowledge about data sources, structures, and analytical interpretations (Ridsdale et al., 2015). AI literacy represents a combination of these aspects in a computationally intelligent environment. Thus it demands users to be able to question automated systems critically instead of just accepting their outcomes of data to be explored by users.

Therefore, AI literacy in digital libraries might be viewed as a multidimensional framework which combines deep conceptual understanding, high-level operational skills, advanced critical thinking, ethical sensitivity, and awareness of the policy landscape.

Fig. 1. AI Framework for considering AI Literacy

7.0 AI in Digital Library Ecosystems

Digital libraries have been increasingly integrating AI technologies to improve discovery and user engagement. AI-driven search interfaces employ natural language processing to understand the meaning of queries rather than just the words. Recommendation systems offer personalized reading materials based on the analysis of user preferences. Automated indexing programs create metadata on a large scale, thus enhancing retrieval effectiveness. Generative AI tools can help with the preparation of research plans, write research summaries and perform translations.

These innovations have opened the opportunities to more inclusive access and the speed up the research. Nevertheless, they also raise several epistemological issues. For instance, AI-generated summaries might fail to highlight the full context. There may be a possibility that recommendation algorithms have the potential to limit users' intellectual exposure. It will take up to generative tools may invent references and predictive analytics can endanger privacy.

Therefore, users of digital libraries should acquire a set of skills that will help them use AI technologies critically and ethically. The evolution from human information mediators only to hybrid services that include algorithmic components have led to a necessary improvement of the user literacy.

8.0 Core Competency Domains of AI Literacy

Users of a digital library need to be familiar with basic AI concepts like machine learning, neural networks, natural language processing, and generative modeling. They do not have to be experts in the field of technology, but having a concept-level understanding helps them to correctly interpret the outputs. It also helps them to realize that AI systems provide probabilistic answers rather than absolute truths and thus, be less confident in what they know.

8.1 AI, Enhanced Information Retrieval Competency

As users can get help from an AI-based discovery platform, they should be able to create good prompts for the AI, fine-tune their search queries step by step, and understand semantic search results. It is also necessary that they know the distinction between a curated database and AI-generated results. Being able to construct a prompt effectively and formulating a strategic query are thus vital skills of AI, mediated digital libraries.

8.2 Critical Evaluation Competency

Generative AI tools can hallucinate, be biased, and have outdated training data. Therefore, users are expected to check the citations from other sources, judge the trustworthiness of the source, and be aware of algorithmic bias. The requirement of a critical evaluation of the information corresponds to the knowledge base of information literacy but it goes further to include the evaluation of machine, generated content.

8.3 Ethical and Responsible Use Competency

Ethical means being aware of plagiarism, transparency in authorship, data privacy, and algorithmic fairness. Schools are now coming up with regulations on the use of AI that necessitate revealing AI, assisted writing. Those who use the digital library have to be acquainted with these rules in order to maintain the level of scholarly integrity.

8.4 Algorithmic Awareness Competency

Algorithm Awareness means exploration to knowledge is being increasingly influenced by recommendation systems and personalization algorithms. Algorithmic literacy enables users to be aware of the filter bubble, personalization bias, and profiling based on data. As a result this understanding of these mechanisms helps with the development of intellectual autonomy.

8.5 Data and Analytical Literacy

Most of AI tools are capable of generating statistical analyses and predictive insights. However, users have to be very careful when interpreting data outputs and also should be able to point out the limitations of the methodology. This skill is importance particularly to research scholars who depends on AI-assisted data analysis tools.

8.6 Governance and Policy Awareness

Literacy word itself means being able to have capability to know and search anything on internet by own. In terms of AI means, among other things, that one is conversant with institutional policies, copyright rules, and data protection regulations. It is the ability to know the governance structures and to ensure that your participation in an AI-facilitated academic environment is responsible.

9.0 Role of Academic Libraries in Fostering AI Literacy

Academic libraries hold a pivotal local role in developing AI literacy. Traditionally, they have been charged with providing instruction in information literacy, but libraries can broaden their scope to encompass AI literacy education as well. To be more specific, librarians may lead workshops on the responsible use of AI, incorporate modules on the evaluation of AI into research training, and come up with institutional guidelines.

Libraries can be a neutral place for critical dialogue on AI ethics, thereby fostering interdisciplinary collaboration. Through their digital reference and user education programs, libraries can integrate AI literacy and thereby identify themselves as the carriers of ethical scholarship.

10.0 Challenges in Institutionalizing AI Literacy

There are a number of structural and pedagogical constraints that limit the institutionalization of AI literacy within academic and digital library ecosystems.

Firstly, the problem of concept ambiguity continues to be a major obstacle. AI literacy is sometimes considered to be an extension of digital literacy, information literacy, or algorithmic literacy, which leads to an inhomogeneity of curriculum designs and assessments. Due to the lack of a standard competency framework, it is a challenge to carry out systematic implementation.

Secondly, the fast progress of AI technologies makes it hard for the curriculum to remain stable. ChatGPT, Google Gemini, and other such tools are continuously being updated, thus training based on individual tools becomes obsolete very quickly. The institutions have to focus on students' understanding of the basic principles rather than on their getting instructions that are platform, dependency.

Thirdly, the degree of preparedness of faculty and librarians differs greatly. Most teachers do not have the necessary knowledge about AI concepts, ethical issues, and algorithmic evaluation since they have not been trained formally. This situation results in teachers following different ways of instructing students, some depend on excessively on AI tools, while some are completely against it. As the result the structured literacy development is obstructed.

Fourth, the development of policy and governance frameworks frequently does not keep pace with the

introduction of new technology. Institutions may not adopt a set of clearly defined rules in areas such as AI, assisted writing, authorship disclosure, data privacy, or intellectual property. In the absence of unified regulatory mechanisms that are in accordance with the normative ethical principles advocated by organizations like UNESCO, the realization of ethical considerations will be disjointed.

To conclude there are differences in infrastructure and equity issues pose a limitation to the uniform adoption of AI technology. Unequal access to AI tools and digital resources might increase the gap between institutions and social classes. It is crucial to integrate AI literacy thoroughly in academic curricula and the library instruction so that students become aware of the responsible use of AI and develop critical faculties for understanding AI-driven knowledge systems.

11.0 Conclusion

AI literacy is an essential skill that cannot be ignored in today's digital library environments. Since AI tools help discover, write and analyze scholarly work, the users of the digital libraries should gain in, depth understanding, critical evaluation skills, ethical awareness, and governance knowledge related to AI. AI literacy must be recognized at the same level as information literacy and be regarded as one of the foundational academic competencies. Academic libraries have the unique opportunity to be at the forefront of this change by integrating comprehensive AI literacy frameworks within their user education programs. It is of great importance that AI is used in a responsible, equitable, and critically informed manner for the preservation of academic integrity and scholarly autonomy in the era of intelligent systems.

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