

Moving towards critical AI literacy in LIS education: a scoping review and syllabi analysis

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Abstract

Purpose – The purpose of this study is to investigate generative artificial intelligence (AI) literacy integration within library and information science (LIS) educational programs, examining how academic curricula prepare future professionals to engage critically and competently with AI technologies.

Design/methodology/approach – A dual methodological approach combining a systematic scoping review of AI literature in LIS and a detailed analysis of syllabi from leading international LIS programs is used. The review identifies emerging trends and frameworks, while the syllabi analysis examines practical implementation.

Findings – The investigation reveals significant pedagogical fragmentation and global inequities in the integration of AI literacy in LIS programs, characterized by a lack of consensus around the frameworks used, institutional disparities and false dichotomies between technical and critical pedagogies.

Research limitations/implications – This study highlights the risks of stratification, where some programs offer sophisticated interdisciplinary training, while others provide only technical instruction, potentially fragmenting the global LIS community, at a time when coordinated responses to AI's implications are crucial.

Practical implications – While many programs have implemented basic AI literacy, there is uneven global integration of critical AI literacy, which more closely aligns with the profession's values of social justice and democratic well-being (ALA, 2023; IFLA, 2025).

Social implications – Research addresses the profession's obligation to serve as ethical information stewards in an algorithmic age, emphasizing that graduates must leverage AI capabilities while critically examining implications for information equity, privacy and democratic participation (ALA, 2023; IFLA, 2025).

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Originality/value – This research bridges the gap between conceptual developments in LIS research and practical educational implementation, providing the first comprehensive analysis of AI literacy operationalization across international LIS curricula.

Keywords Information literacy, Ethics, Artificial intelligence, LIS education, Competencies, Curriculum development, AI, Professional competencies, Library and information science education, AI literacy, Critical AI literacy

Paper type Research paper

1. Introduction

Generative artificial intelligence (AI) is rapidly reshaping how information is created, accessed and managed, ultimately transforming the landscape of library and information science (LIS) practices ([Adigun and Igboechesi, 2024](#); [Boateng, 2025](#); [Hersh, 2024](#)). Since the launch of ChatGPT in 2022, AI tools have been integrated into library discovery systems, research platforms and digital services, prompting a fundamental shift in the competencies required of LIS professionals. As AI becomes embedded in the infrastructures that support information work, LIS education must evolve to prepare graduates to not only use these technologies but also critically assess them and their implications.

Before the launch of ChatGPT, interest in machine learning and generative AI was a niche topic in libraries. As evidence of its rapid ascendance, over the past three years, generative AI has become embedded in many tools and platforms used by libraries and information professionals. For example, in 2024 and 2025, several major vendors introduced AI-powered features into their discovery systems, including EBSCO's AI Insights ([EBSCO, 2025](#)), ProQuest's AI Research Assistant for Ebook Central ([ProQuest, 2025](#)) and Clarivate's Web of Science AI Research Assistant ([Clarivate, 2024](#)). In addition, in May 2025, Google replaced its AI Assistant with a new "AI Mode" ([Stein, 2025](#)). These developments represent just a few examples of the broader changes underway in the information landscape.

The growing integration of generative AI into library platforms has significant implications for the education and ongoing development of library and information professionals. As digital infrastructures evolve to incorporate AI capabilities, LIS professionals are increasingly expected to possess both a technical understanding of AI and the ability to critically evaluate the impact on information services. Addressing this need calls for an emphasis on AI literacy within LIS curricula – an approach that combines technical proficiency with ethical insight and critical thinking to ensure the responsible adoption and implementation of AI in professional practice.

AI should not be viewed simply as a neutral technological tool; rather, it operates as a sociotechnical phenomenon shaped by complex cultural, institutional and political forces. Its influence within the LIS profession permeates numerous areas, including information access and retrieval systems, bibliometric analysis, cataloguing processes, service personalization mechanisms, privacy protection protocols and accessibility initiatives. Although the importance of AI in the LIS field is increasingly acknowledged, little is known about how academic programs are equipping future professionals to engage with generative AI.

To help close this knowledge gap, this study uses a dual methodological approach to gain a clear picture of both theoretical frameworks and practical implementation. The first step is a scoping review of the existing literature focused on how AI literacy is conceptualized within the LIS field. The second step examines syllabi from top LIS programs worldwide to understand how generative AI education is incorporated into classroom instruction. This analysis will highlight where scholarly research aligns with teaching practice and where gaps exist between theory and classroom application.

A better understanding of the gaps will allow us to suggest strategies for integrating AI literacy into LIS education. This integration should be pedagogically sound and aligned with the profession's core values, including intellectual freedom, democratic well-being, diversity and inclusion, privacy, equitable access and social responsibility ([International Federation of Library Associations and Institutions \[IFLA\], 2025](#)). This work contributes to the development of necessary AI literacy frameworks that will assist future information professionals in navigating the technological and ethical complexities of AI.

2. Methodology

The methodology used in this study is a dual approach, combining a systematic scoping review with a cross-institutional syllabus content analysis. This approach offers an original methodological contribution to LIS curriculum research, providing a multi-scalar view that bridges conceptual discourse and pedagogical implementation.

2.1 Scoping review

A systematic scoping review was conducted to explore the academic perspective on AI literacy in LIS, applying the SALSA framework ([Codina et al., 2021](#); [Grant and Booth, 2009](#)). This framework encompasses four critical phases: search, appraisal, synthesis and analysis. Web of Science and Scopus were selected as the primary databases because of their recognition as prestigious, high-quality resources for retrieving research documents. The search equation combined “AI literacy” and “artificial intelligence literacy” with LIS terms, providing more precise, rather than generic, AI keywords. No chronological filter was applied because the goal was to retrieve all documents published up to 15 April 2025.

Inclusion criteria required:

- keywords present in document titles;
- documents in English or Spanish; and
- complete accessibility.

One document was excluded because it was unavailable, and a second because it was a poster presentation. A total of seven documents were retrieved ([Ali and Richardson, 2025](#); [Hossain et al., 2025a, 2025b](#); [Lo, 2025, 2024](#); [Ru and Tang, 2025](#); [Vercelli et al., 2024](#)). [Table 1](#) illustrates the application of the SALSA framework.

The following flowchart ([Figure 1](#)) illustrates the scoping review process from beginning to end.

Our next step in the SALSA method was to analyse the articles. In the analysis phase, each article was reviewed and coded in a multi-step process. First, the researcher read the article. Next, a “new project” was created in ChatGPT 4o, and the article was uploaded to the project. The researcher then entered 20 individual predetermined prompts into ChatGPT. Each ChatGPT response was reviewed, and its accuracy was verified against the original journal article. Any inaccuracies were noted, and the responses were edited and refined, as necessary. This process exemplified a human-in-the-loop approach, in which human expertise was integrated at multiple stages to ensure the quality and accuracy of AI-generated results. This human-in-the-loop process is a novel approach within LIS research.

Although rigorous and transparent, the described process was found to be more time-intensive than traditional manual analysis. Significant overhead was added by the need to verify, correct and refine AI-generated responses. Time savings should not be expected by researchers adopting this method.

Table 1. Salsa framework (Codina *et al.*, 2021; Grant and Booth, 2009)

Phase	Criteria	Application of the SALSA framework
Search	<i>Databases:</i> Web of Science and Scopus <i>Search equation:</i> “ai literacy” or “artificial intelligence” AND library OR “information science” <i>Years of publication:</i> No chronological restriction (download date: 15-Apr-2025) <i>Initial number of documents:</i> 9 <i>Final number after applying inclusion/exclusion criteria:</i> 7	
Appraisal	<i>Inclusion/exclusion criteria:</i> • Omission of false positives • Documents must be in English or Spanish and have AI literacy and LIS as the Central focus, requiring the inclusion of the keywords in the title of the documents	
Synthesis Analysis	Through tables and narrative synthesis For the analysis of these documents, a structured and systematic table is proposed to enable a heterogeneous synthesis <i>Components:</i> • Objective of the paper • Type of study • Methodology • Key findings • Geographical context • Definition of AI literacy • Theoretical models and frameworks used • Identified AI literacy competencies • Context of the study • Profile of LIS professionals studied • Prior AI training • Types of AI mentioned • Specific AI tools Use of AI in library services	
Source(s): authors’ own work		

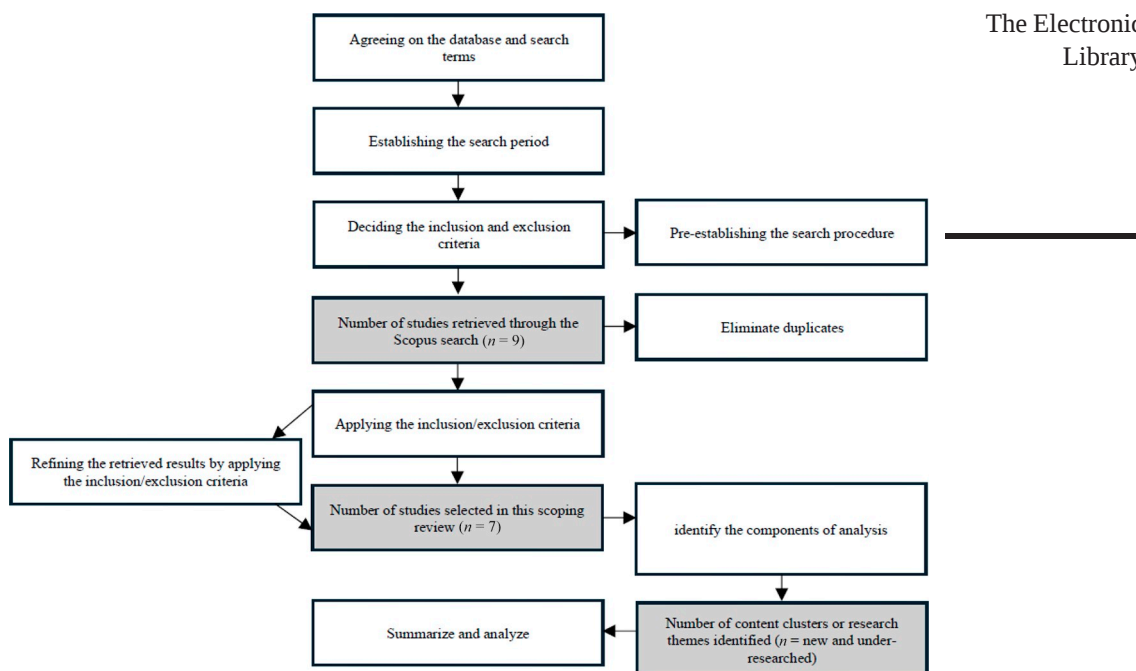


Figure 1. Flowchart illustrating the complete process of the scoping review

Source: authors' own creation

2.2 Syllabus content analysis of library and information science programs

The next step in the research process was a systematic analysis of course syllabi – which are often overlooked in LIS research – to reveal how AI literacy is specifically integrated into curricular structures, moving beyond general program descriptions. Previous research has assessed the prevalence of information literacy instruction in university coursework (Johnston and Webber, 2003). Two such studies used syllabi analysis as a methodological approach (Benallack and Rundels, 2021; Elrod *et al.*, 2012). Our work builds on this foundation by applying similar methods to investigate the emerging domain of AI literacy within LIS curriculum.

2.2.1 Program selection. Our study focused on the top 25 universities with LIS programs internationally, as identified by the SCImago Institutions Rankings (Table 2). The SCImago rankings were used because they provide a comprehensive assessment of 651 institutions based on a wide range of quality indicators.

In line with the American Library Association's definitions and accreditation standards for LIS education (ALA, 1992, 2025), we excluded several high-ranking US institutions from our analysis because their programs diverged from the core LIS domain and were not accredited by the ALA. In addition, we excluded universities in other countries that only offered programs emphasizing adjacent fields, such as computer science and information technology. The absence of LIS-specific programs or the structural integration of LIS content within broader, non-LIS departments rendered them incompatible with the disciplinary focus of our study. Based on these criteria, we excluded 158 programs from 12 different

Table 2. Top 25 library and information science universities by [SCImago ranking \(2025\)](#), availability of course information and inclusion in the curriculum analysis (shaded rows indicate included universities)

World rank	University	Country	Complete course syllabi	Course titles and descriptions only	Course titles only	Excluded because no LIS focus
1	Wuhan University	China			523	
2	Massachusetts Institute of Technology	The USA				2
3	Tsinghua University	China				
4	University of Oxford	Great Britain				4
5	Peking University	China			190	
6	University of Cambridge	Great Britain				6
7	Nanyang Technological University	Singapore				
8	Zhejiang University	China				8
9	University of Illinois at Urbana-Champaign	The USA		298		
10	Harvard University	The USA				10
11	University of Toronto	Canada	93			
12	Nanjing University	China			351	
13	Sun Yat-Sen University	Taiwan			42	
14	Swansea University	Great Britain				14
15	University of Chinese Academy of Sciences	China				15
16	University of Southern California	The USA		12		
17	Leiden University	The Netherlands				17
18	University of Amsterdam	The Netherlands	32			
19	The University of Hong Kong	Hong Kong				19
20	Stanford University	The USA				20
21	Shanghai Jiao Tong University	China				21
22	Carnegie Mellon University	The USA				22
23	University of Washington	The USA		148		
24	Universitat de Barcelona	Spain	107			
25	McGill University	Canada	29			
Source(s): authors' own work						

universities from the USA, the UK, the Netherlands and China (see [Table 2](#), “excluded” column).

While we acknowledge that syllabi may not fully capture all aspects of classroom teaching or informal learning activities, they remain a key formal artefact through which curricular goals, learning outcomes and institutional priorities are expressed. Syllabi offer a consistent, comparable and widely accessible source of data for identifying patterns in course content and pedagogical framing. In this context, syllabi serve as a valid proxy for examining how AI literacy is currently being articulated and operationalized across various programs. Our analysis does not claim to provide an exhaustive or definitive account of global AI literacy education but rather to map curricular tendencies within a strategically selected group of influential LIS institutions.

2.2.2 Syllabi availability. The final sample comprised 13 universities. In all, four universities provided complete course syllabi for 261 courses across bachelor’s, master’s and doctoral-level programs. Of all, seven universities offered only course titles and occasional descriptions for 1,564 courses (the sample is indicated by shaded rows in [Table 2](#)).

2.2.3 Identification and extraction of the syllabi. A systematic approach was used to identify and extract information from courses manually. The process began by identifying the university’s website, followed by any program website(s) within the university’s website. Next, courses were identified, and syllabi were downloaded, if available. In cases where complete syllabi were unavailable, efforts were made to obtain the course titles and/or descriptions.

2.2.4 Analytical procedure. Syllabi containing AI content were analysed using a structured taxonomy of variables that enabled systematic cross-program comparison. Each syllabi underwent content analysis informed by AI literacy frameworks identified in the scoping review: the EDUCAUSE AI Literacy Framework, the AI Citizenship Framework and ethical principles promoted by IFLA and UNESCO ([Ali and Richardson, 2025](#); [Ru and Tang, 2025](#)).

The following variables were pulled from each syllabus:

- AI or related terms (e.g. machine learning, data mining and algorithmic systems) that appeared in course titles or descriptions;
- learning objectives or competencies related to AI;
- information about how AI was framed including technology and ethics; and
- the academic level and curricular status of the course (core or elective).

Particular attention was paid to the presence of social or normative dimensions, such as privacy, bias, equity or the ethical use of AI. This analytical approach enabled systematic, cross-program comparisons and ensured that coding decisions were aligned with established theoretical frameworks in the literature.

3. Results

3.1 Scoping review: Findings

The scoping review aimed to identify key trends and gaps in AI literacy efforts within the field of LIS. Although the document base was limited to seven (the topic of AI literacy is new and under-researched), it is apparent that library professionals are beginning to identify themselves as educators of AI literacy. For example, the Association of College and Research Libraries’ current president suggests that librarians will lead the preparation of academic communities in facing the challenges of AI ([Lo, 2025](#)). Similarly, [Ru and Tang \(2025\)](#)

analysed 70 generative AI LibGuides and found that their creators – usually librarians – promoted AI literacy.

Although library professionals are emerging as AI literacy educators, two regional studies, focused on South Asia and the Middle East, found gaps in knowledge among LIS students. [Hossain et al. \(2025a\)](#) investigated LIS students in Bangladesh, India, Pakistan, Jordan, Lebanon and Saudi Arabia. They found that the highest levels of self-reported AI literacy were among Bangladeshi and Saudi Arabian students, while Jordanian and Pakistani students reported lower levels. A second article by [Hossain et al. \(2025b\)](#) further analysed self-reported AI literacy in Bangladesh, India and Pakistan. This research revealed gender gaps and a high dependence on self-learning.

Several studies advocated for the use of theoretical frameworks. In fact, there is a growing use of references to such frameworks, including the EDUCAUSE AI Literacy Framework and the AI Citizenship Framework, and ethical principles from organizations, such as UNESCO and IFLA. In addition, there has been an effort to reconsider the EDUCAUSE framework and make it more applicable to the library context ([Ru and Tang, 2025](#)). Meanwhile, others highlight the limited institutional adoption of clear AI policies despite the global recognition of their importance ([Ali and Richardson, 2025](#)).

The studies retrieved in the scoping review included descriptive and exploratory approaches that addressed general and sometimes cross-cutting pedagogical aspects; however, many research gaps remain. The most significant gap is the absence of longitudinal studies or experimental methodologies that would allow for measuring the impact of educational interventions in AI within LIS. The second identified gap is the lack of regional case studies that would enable a more global understanding of AI literacy education in LIS. Although some works focus on Asia and the Middle East, it would be beneficial to develop research focused on countries or regions in Africa, Latin America and Europe. Additionally, there were no LIS studies examining timely topics, such as AI and environmental sustainability, job market impact or algorithmic surveillance. While the analysed studies emphasized the importance of academic integrity, transparency and privacy, it is important to consider how these concerns can be translated into concrete actions within libraries ([Ru and Tang, 2025](#)). Finally, there is a lack of clear consensus on the basic AI literacy level needed for information professionals and on the most effective methods for reaching that level.

The emerging research topics discussed here, along with the identified gaps, highlight the need to develop LIS AI literacy studies from diverse perspectives and using various methodologies. Advancing AI literacy within LIS will require efforts spanning undergraduate and graduate curricula. One way to better understand the current educational landscape is to analyse available course syllabi, which is the next step in our methodology.

3.2 Syllabi analysis: Curricular approaches to artificial intelligence

The analysis of syllabi revealed that AI is being introduced in LIS education through a variety of curricular approaches, ranging from critical theoretical engagement to applied technical training. We identified three overarching patterns, categorizing them as critical and cultural approaches, technical and instrumental approaches and hybrid and reflexive approaches. Syllabi from countries in Asia were analysed separately, because of language barriers (the researchers are native speakers of Catalan, English, and Spanish). That information is detailed in Section 3.2.3.

3.2.1 Critical and cultural approaches. Some courses, like those in the Master of Information with a concentration in Culture and Technology at the University of Toronto (UofT), adopted a critical and interdisciplinary approach to AI. For example, the course *Introduction to Culture and Technology (INF1501H)* dedicated an entire week to AI under

the theme, “What is intelligent about artificial intelligence?” In this course, students engage with interdisciplinary readings, such as the articles “Captivating Algorithms” (Seaver, 2019) and “The TESCREAL Bundle” (Gebru and Torres, 2024). Similarly, *The Future of the Book* (INF2331H) includes a full week on “Artificial Intelligence and the Future of Authorship”, with core readings that challenge students to interrogate the evolving relationships between human and machine reading, cognitive assemblages and authorship in the age of generative AI (Cordell, 2023; Hayles, 2018).

In both cases, students are expected to critically engage with dominant narratives and myths surrounding AI, analysing how such narratives shape societal perceptions and expectations of the technology. The courses examine AI’s deep entanglement with systems of power and inequality, particularly in relation to race, gender, labour and access to information. Through theoretical frameworks drawn from feminist technoscience, science and technology studies (STSs) and critical media studies, students are equipped to deconstruct the cultural, political and epistemological dimensions of AI. These pedagogical choices foster what can be described as critical AI literacy, empowering students to interrogate not only the functionality of AI systems but also their implications for social justice, institutional practices and the future of information work.

At the doctoral level, the PhD in Information at the UofT extends and deepens this critical engagement. Courses such as *Power, Media and Technology* (INF3010H) place AI and machine learning at the centre of broader inquiries into capitalism, race, labour and algorithmic governance in their assigned readings (Bender *et al.*, 2021; Benjamin, 2019; Dyer-Witheford *et al.*, 2019). These courses are grounded in a robust and interdisciplinary set of theoretical and methodological frameworks that inform their critical treatment of AI. Among these are Marxist and post-Marxist theories, as articulated by scholars, such as Dyer-Witheford (1999) and Mezzadra (2018), which provide tools for analysing AI within the broader context of capitalism, labour and technological production. Critical race theory, drawing on the work of thinkers like Benjamin (2019) and Noble (2018), offers insights into how algorithmic systems reproduce racial hierarchies and structural inequalities. Feminist technoscience, through authors, such as Hamraie (2017) and Russell (2020), contributes a perspective attentive to embodiment, marginalization and the politics of technological design. Finally, the courses engage with platform and algorithm studies, enabling students to critically examine the infrastructures and logics that underpin digital platforms and AI-driven systems.

The doctoral-level curriculum is explicitly designed to cultivate high-level analytical and political competencies related to AI. The development of students’ analytical capacities in these doctoral-level courses is closely tied to a curated set of readings (Bender *et al.*, 2021; Benjamin, 2019; Cheney-Lippold, 2017; Couldry and Mejias, 2019; Miceli and Posada, 2022). Through this material, students are trained to critically assess the political economy of AI, understanding how AI is embedded within capitalist modes of production and global labour structures. They are also encouraged to grasp the social implications of large language models, particularly in relation to issues of scale, ethical risk and opacity.

A key dimension of the curriculum involves learning to recognize the racialized logics that underpin algorithmic systems, engaging with scholarship that foregrounds how technologies can perpetuate historical and structural forms of discrimination. Students also analyse the hidden labour behind AI systems, especially data annotation and training work often carried out under precarious conditions in global contexts.

Further, the courses provide opportunities to examine the role of AI in gig economies and logistics platforms, using case studies, such as Uber and Amazon, to explore how algorithmic control reshapes labour relations. This is complemented by a critical engagement

with literature that links AI development to processes of global extractivism and data colonialism, highlighting how AI relies on exploitative flows of data and labour across geopolitical boundaries. Finally, students learn to articulate how AI contributes to the shaping of algorithmic identities, interrogating how personal and group identities are constructed, managed and categorized through data-driven systems.

Together, these bachelor's-, master's- and doctoral-level courses reflect a strong critical and cultural commitment to AI within the UofT's LIS curriculum. They frame AI as a not merely technological tool but also cultural artefact embedded in broader systems of power, inequality and epistemology – thus offering students a foundation for navigating the ethical and political challenges of contemporary information environments.

3.2.2 Technical and instrumental approaches. In contrast to critically oriented curricula, other LIS programs prioritize the development of technical and analytical competencies through coursework grounded in data science and applied machine learning. A notable example of this approach is the course *Data Mining (INFS 630)* offered as part of the Master of Information Studies at McGill University. While the syllabus does not explicitly reference the terms “artificial intelligence” or “AI”, many of the topics covered are foundational subfields within AI and machine learning. Among the topics addressed in the course are classification techniques, including decision trees, support vector machines and Bayesian classifiers, which enable students to model and categorize data with increasing precision. The course also explores ensemble methods, which combine multiple algorithms to enhance predictive accuracy and reduce model variance. Additionally, students are introduced to deep learning architectures, which allow for more sophisticated representations of complex data through layered neural networks. Finally, the syllabus includes clustering algorithms, such as k-means and DBScan, which are used to identify patterns and groupings within unstructured data sets.

The course places particular emphasis on hands-on practice with real-world data sets, using industry-standard tools, such as RapidMiner, to support experiential learning. Although programming is not required, students are expected to construct and interpret complex data workflows for pattern recognition and predictive analytics. Throughout the course, students are guided to develop a core set of AI/data-driven competencies, many of which are directly transferable to professional contexts involving AI systems. These competencies are not always framed within the vocabulary of “AI literacy”, but they closely align with the applied dimensions of AI practice in LIS and related fields. These competencies are developed through a combination of hands-on assignments, project-based learning, in-depth lectures and guided software tutorials, culminating in a final project that does not require programming skills. This pedagogical approach ensures that students gain practical experience in applying AI-related techniques while maintaining accessibility for those without a technical background.

Similarly, several courses from the bachelor's in Digital Information Management and the master's in Digital Content Management programs at the University of Barcelona offer practical, application-oriented training in the use of AI in digital information environments. These courses integrate AI both as a subject of theoretical understanding and as a set of tools for real-world information tasks.

One example is the course *Online Communication* [original title: *Comunicació a la Xarxa* (365925)], which introduces AI as a digital resource in the context of online content creation. In the detailed syllabus, there is a thematic section on “AI-assisted content creation” [translated] which explicitly incorporates AI as part of the broader landscape of digital communication platforms and tools. Students are expected to develop several competencies related to AI, including understanding its role in digital content creation, critically analysing

automated communication technologies and adapting to evolving digital environments. The course also emphasizes the ethical and responsible use of digital platforms and AI tools.

In *Digital Information Management Systems I* [original title *Sistemes de Gestió Digital de la Informació I* (365923)], students receive practical training in the configuration and application of AI-based tools for information retrieval and indexing. The learning objectives explicitly state the need to “know the applications of artificial intelligence for search” [translated], as well as to “configure software for indexing systems, discovery tools, and AI-powered search applications” [translated]. Practical components of the course include working with indexing technologies and analysing the market of algorithmic tools. Key competencies developed include understanding how AI operates in search environments, applying technical criteria to select and evaluate digital systems and mastering emerging technologies relevant to professional LIS contexts.

Another technically oriented course is *Semantic Web* [original title *Web Semàntic* (364938)], where AI is addressed through the lens of knowledge graphs and semantic data enrichment. There is a section on knowledge graphs and AI, and students are expected to explore the role of AI in structuring, curating and reasoning with linked data. The course covers key competencies, such as using semantic Web languages (e.g. RDF and SPARQL), building and validating ontologies and applying standards like OWL and SKOS. Through practical activities, students learn to develop structured knowledge graphs and integrate semantic reasoning processes – some of which involve AI-based tools and inference mechanisms. These activities are linked to learning goals centred on data modelling, interoperability and advanced information retrieval.

In the Master’s in Digital Content Management, the course *Information Architecture* [original title *Arquitectura de la Informació* (573489)] addresses AI from the perspective of knowledge representation and intelligent systems design. AI is framed as a foundational element for building classification systems, search functionalities and navigational structures. Students are expected to understand the role of AI in conceptual modelling and to apply decision-support technologies and intelligent navigation systems based on user models or semantic frameworks. The course promotes the integration of AI into the conceptual and architectural design of digital services, emphasizing its value as a cross-cutting resource in user-centred information environments.

Finally, the course *Content Creation and Search Engine Optimization* [original title *Creació de Continguts i SEO* (573793)] reflects the growing attention to generative AI in content production. In one section of the course, the students are introduced to tools for generating text, images or voice-based content. The course links AI applications to algorithmic logic in search engine optimization (SEO), teaching students how to analyse search trends, adapt content for algorithmic visibility and understand the legal and ethical implications of automated content creation. Competencies include the ability to generate AI-assisted content, interpret algorithmic behaviour and address the challenges of working with automated media systems.

Together, these courses demonstrate a strong orientation toward applied AI literacy, particularly in various areas, such as digital content creation, search technologies, semantic structuring and algorithmic visibility. The training is grounded in hands-on activities, tool configuration and project-based learning, equipping students with both the technical knowledge and the critical perspective needed to work with AI in complex digital information environments.

While the technical and instrumental approaches equip students with valuable operational skills, they often do so without embedding these competencies within broader sociotechnical or ethical frameworks. This narrow focus risks framing AI as a neutral tool, abstracted from

its social, political and cultural consequences. In contrast to the critical and hybrid approaches outlined earlier, which encourage reflection on social issues, such as bias, surveillance and equity, technically oriented courses tend to overlook the normative implications of AI deployment. As a result, graduates trained primarily through instrumental curricula may lack the critical capacity to interrogate how AI systems shape, and are shaped by, power relations within information environments. This gap raises important concerns about professional readiness and the extent to which LIS education prepares students to not only use AI effectively but also engage with it responsibly.

3.2.3 Hybrid and creative-reflexive approaches. One example of an integrative approach to AI literacy can be found in the Archival and Information Studies program at the University of Amsterdam, situated within the broader topic of media studies. The course *AI and the New Conditions of Creativity* explores AI through both theoretical inquiry and experimental practice, blending cultural critique with hands-on engagement with generative AI tools.

The course is structured around weekly themes that address a wide range of intersections between AI and creativity, including AI aesthetics, deepfakes, prompting and automation as art. The course description explicitly frames AI as not only a technological system but also a cultural construct with implications for authorship, perception and the material conditions of creative work.

Students are expected to critically reflect on how AI reconfigures creative processes across various domains, while also developing the ability to apply cultural and philosophical frameworks – drawn from media theory, STS and aesthetics – to real-world AI applications. Topics range from the ideological shaping of AI systems to the material labour behind prompt engineering and visual misinformation.

The course unfolds through a series of thematic sessions that build a layered and critical understanding of AI in relation to creativity and cultural production. It opens with a conceptual interrogation of the very notion of AI, exploring its shifting definitions and the cultural imaginaries that sustain them. From there, students examine the relationship between automation and artistic practice, considering how AI both continues and transforms longstanding debates around creative labour.

Subsequent topics delve into the use of generative models, prompting students to reflect on the ethical and political implications of automated content creation, particularly in terms of authorship, intellectual property and artistic agency. The course also addresses the mechanics and semiotics of prompting interfaces, analysing how user inputs shape algorithmic outputs and influence creative control.

The aesthetic dimensions of AI-generated content are given dedicated attention, as students explore the distinctive forms, styles and experiential qualities that emerge from machine-mediated creativity. Alongside this, the course engages with the production and circulation of disinformation and deepfakes, prompting critical reflection on trust, authenticity and manipulation in digital media environments.

Finally, students are introduced to artistic practices of resistance and critique, exploring how artists and designers respond to, subvert or refuse the normative logics of AI technologies. Across these themes, the course fosters an interdisciplinary engagement with AI as both a technical system and a cultural construct, shaping how creativity, labour and authorship are understood and practiced in the contemporary media landscape.

The course exemplifies a hybrid model of AI literacy, where technical awareness is seamlessly integrated with critical reflection. It aligns closely with emerging definitions of AI literacy in LIS and media studies, which advocate for an understanding of AI as simultaneously computational and ideological.

Beyond critical reflection, the course encourages active experimentation with AI tools. Through a final project, students apply what they have learned by working directly with generative technologies, situating their use within a conceptual and reflective framework. They are also asked to trace the historical and political genealogies of AI imaginaries, analysing how dominant discourses around AI have evolved and been contested over time.

The theoretical and methodological foundations of the course are notably interdisciplinary. Students draw from STSs, posthumanism, media archaeology and the political economy of AI, as well as feminist and decolonial critiques and critical art and media theory. This broad intellectual grounding enables them to examine AI through multiple lenses, connecting abstract concepts to practical, creative and ethical concerns.

Altogether, the course offers a critically attuned pedagogical model that prepares students to interrogate the cultural dimensions of AI. It demonstrates how AI literacy can be cultivated through not only technical competence but also reflective and ethically conscious practices that foreground issues of power and social responsibility.

3.2.4 Syllabi analysis: Curricular approaches to artificial intelligence in programs in Asia. The process of extracting detailed syllabus information from the universities in Asia posed challenges because of language barriers and limited availability of open documentation. However, one exception was Nanyang Technological University in Singapore, where course titles and descriptions were in English and included information about courses that focused on natural language processing, generative AI, knowledge graphs, Python, Neo4j and Web deployment.

With some translation assistance from an international graduate student from China, we were able to do some basic analysis of the syllabi from China and Taiwan. The analysis of universities in China and Taiwan reveal that AI content has been integrated into programs related to Information Management, Information Science and Library Science. This incorporation appears at both undergraduate and graduate levels and reflects a commitment to training professionals capable of mastering emerging AI techniques and applications within the information field. At Sun Yat-sen University, within the Information Management program, the course *AI Algorithms and Applications* [translated] is offered, focusing on the development and application of AI algorithms.

Wuhan University (WHU) in China demonstrates a transversal approach to AI integration across multiple undergraduate programs. In both Archival Science and Library Science, the course *AI* [translated] introduces students to AI fundamentals and techniques, providing a strong technical foundation. At the graduate level, WHU's Information Science program offers the course *Intelligent Information Systems* [translated], which delves into the design and development of intelligent agents, further deepening technical capacities.

Similarly, Nanjing University in China incorporates AI-related training into its Information Management and Information Systems undergraduate program, offering courses such as *The Introduction to AI* [translated] and *Natural Language Processing* [translated]. These courses provide a broad foundation to AI and natural language processing. At the graduate level, within Library Science, the course *Natural Language Processing and Text Mining* [translated] advances these competencies by addressing text analysis through AI techniques.

When positioning these findings alongside previous findings in syllabi from Europe and Canada, it becomes evident that the approach taken by universities in Asia aligns with technical and instrumental approaches as described in Section 3.2. The emphasis in these programs is on technical knowledge acquisition, algorithm design, intelligent system development and specific AI applications, with little evidence of broader critical, ethical or

cultural reflection typically associated with critical and cultural approaches described in Section 3.3.

In summary, while the commitment to equipping students with strong technical AI competencies is evident and commendable, these programs would benefit from incorporating more critical and reflexive perspectives in AI literacy.

4. Discussion

This dual-method investigation reveals a complex landscape of AI integration within LIS education that demands urgent attention from LIS instructors, professors, administrators and other stakeholders. The convergence of evidence from our scoping review and syllabi analysis illuminates both promising developments and concerning disparities with significant implications for the profession's future.

4.1 *The absence of pedagogical consensus*

Our analysis reveals a troubling lack of consensus regarding AI literacy's fundamental components. The scoping review identified several frameworks, including proposals from [Ru and Tang \(2025\)](#) and EDUCAUSE (cited in [Ru and Tang, 2025](#)), yet none have achieved widespread adoption within LIS education. This absence of shared standards is evident in curricula that range from tool-focused training to abstract theoretical discussions, with little coherence between approaches. Our syllabi analysis confirms this conceptual confusion – AI appears across diverse course contexts but often without clear learning objectives or assessment criteria. Many programs treat AI literacy as auxiliary rather than as a core competency, relegating it to electives or brief modules. This fragmented approach fails to prepare students for a profession increasingly shaped by algorithmic systems ([Ali and Richardson, 2025](#); [Hossain et al., 2025a](#)).

More concerning is the tendency to present AI as technologically neutral, divorced from social, political and economic contexts. Such decontextualized treatment contradicts LIS's commitment to critical information literacy and social justice, potentially producing graduates ill-equipped to address AI's equity implications ([Broussard, 2018](#); [Lo, 2025](#)).

4.2 *Towards critical artificial intelligence literacy*

As generative AI becomes more integrated into LIS curricula, educators must move beyond a basic model of AI literacy. Many current approaches assume ethical awareness but, in practice, often focus on functional and technical skills; a shift toward critical AI literacy is needed, one that highlights the economic, social, ethical and political dimensions of AI systems. Courses such as *AI and the New Conditions of Creativity* at the University of Amsterdam exemplify how computational thinking can be meaningfully integrated with cultural critique, while doctoral seminars at the University of Toronto incorporate feminist technoscience and STS perspectives to bridge theoretical depth and socio-technical analysis.

A shared definition of critical AI literacy does not exist ([Baer, 2025](#)). However, critical AI literacy draws from various sources including the seminal work of [Freire \(2014\)](#), who argued that education is not neutral and should aim for the emancipation of the learner ([Leal de Araujo and Feldman Schneider, 2025](#)). In librarianship, critical information literacy has contributed to the profession's emerging articulation of critical AI literacy which challenges the neutrality of information systems; [Drabinski and Tewell \(2019\)](#) framed critical information literacy as, "A theory and practice that considers the sociopolitical dimensions of information and production of knowledge, and critiques the ways in which systems of power shape the creation, distribution, and reception of information". While AI literacy

equips students to understand how AI works, critical AI literacy asks: Who benefits? Who is harmed? Whose knowledge is encoded? Whose knowledge is excluded?

Implementing this shift in LIS education will require faculty development. As [Ru and Tang \(2025\)](#) and [Pinto et al. \(2024\)](#) noted, many educators lack the technical expertise and critical pedagogical training necessary to teach generative AI in ways that are both technically sound and socially reflective. Addressing this gap is essential in LIS programs that prepare future librarians to not only use AI tools but also influence the development and deployment of generative AI in ethically responsible ways. [Pho and Tranfield \(2024\)](#) suggested integrating critical AI literacy in graduate LIS education is necessary because it will impact students' future careers. [Teixeira Sousa \(2025\)](#) noted, "Academic libraries face an urgent imperative: to move from being mere information intermediaries to becoming critical mediators of artificial intelligence (AI) literacy".

4.3 Global inequities and professional stratification

In the syllabi analysis, access to AI literacy education in LIS programs varied widely. For example, in Canadian and European institutions, students had access to AI literacy courses that centred critiques of AI power structures. But, in Asian countries, no similar courses were found, and instead coursework focused on technical skills or basic awareness (Section 3.2.3). We should note our analysis was limited to the top 25 universities with LIS programs in the SCImago Institutional Rankings.

However, based on our findings, this gap may have profound implications for professional equity and knowledge production. [Pinto et al. \(2024\)](#) warned that uneven AI literacy distribution risks reinforcing global hierarchies. If AI literacy becomes prerequisite for advanced roles, then unequal access could exacerbate institutional and regional inequalities. The concentration of critical AI literacy education in high-ranking universities located in the Western hemisphere may perpetuate colonial knowledge production patterns ([Ali and Richardson, 2025](#)).

The rapid pace of AI development compounds these challenges, potentially outstripping institutions' capacity to update curricula and train faculty. [Ru and Tang \(2025\)](#) identified this as a core tension in AI literacy planning. Without coordinated international resource sharing, disparities will likely intensify, fragmenting the global LIS community along technological lines.

4.4 Methodological limitations and future directions

This study's reliance on publicly available syllabi limits assessment of actual pedagogical practices or learning outcomes, as syllabus content may not reflect classroom reality (Section 3.1). [Hossain et al. \(2025a\)](#) noted the lack of observational and qualitative studies in AI education research, underscoring needs for ethnographic and participatory approaches. AI's rapidly evolving nature presents ongoing methodological challenges, as curriculum analysis provides only snapshots of dynamic processes that quickly become outdated ([Ru and Tang, 2025](#)).

4.5 Implications and recommendations

The findings of this research point the way for LIS educators and other stakeholders as they plan for the future of LIS education. Moving beyond basic AI literacy and integrating critical AI literacy is imperative – occasional or superficial approaches will not suffice. To successfully implement this new path, substantial investments will be necessary, in not only faculty development but also infrastructure and innovative pedagogy ([Ali and Richardson, 2025](#)). In addition, professional organizations should promote consensual standards that include adaptable resources for diverse contexts, balancing the teaching of technical skills with critical thinking and ethical reflection ([Lo, 2025](#); [Ru and Tang, 2025](#)).

At the individual level, the results suggest that teaching teams will face the challenge of developing their own critical AI literacy while simultaneously preparing students for technological futures that remain somewhat uncertain. Therefore, the findings align with the proposal of [Hossain et al. \(2025a\)](#), who advocated for continuous training and a willingness to engage in pedagogical experimentation. The stakes extend beyond individual preparation to encompass the profession's capacity to serve diverse communities effectively while upholding core values of equity, access and social justice in an increasingly AI-mediated information landscape.

Furthermore, moving toward critical AI literacy requires practical, specific and coordinated actions at different educational levels. In this regard, one option would be for institutions to integrate critical AI literacy as a transversal competence in core subjects, using active methodologies and real-world contexts. However, as faculty preparation remains limited in both technical and critical aspects, it is essential to promote continuous training programs and interdisciplinary collaboration. An alternative could be to encourage the creation and dissemination of open educational resources – syllabi, bibliographies and practical exercises – especially useful in low-resource contexts, ideally coordinated by international organizations, such as IFLA or UNESCO, among others.

Finally, this research has confirmed the need to revise institutional policies with the dual aim of defining clear criteria for the responsible use of generative AI ([Ali and Richardson, 2025](#)) and reinforcing the role of LIS professionals as ethical mediators and agents of transformation in the algorithmic age ([Lo, 2025](#); [Ru and Tang, 2025](#)). To this end, some ideas could include promoting diverse AI-based projects, such as citizen workshops, inclusive services and more.

5. Conclusion

This study identifies three key challenges in integrating AI literacy into LIS education: the absence of consensus around AI literacy frameworks, uneven curricular implementation across institutions and regions and the divide between technical and critical pedagogies. Our dual-method approach, scoping review and syllabi analysis, confirms that AI literacy is inconsistently defined and often treated as peripheral, with limited integration of ethical and sociotechnical perspectives.

Despite these challenges, this study highlights promising hybrid models, such as those at the University of Amsterdam and the University of Toronto, which successfully combine technical competencies with critical analysis. These examples demonstrate that ethical and computational dimensions of AI literacy, which moves beyond many basic frameworks of AI literacy toward critical AI literacy. The findings underscore the urgent need for curricular strategies that reflect LIS's commitments to equity, access and democratic engagement. To move forward, LIS programs must treat critical AI literacy as a core competency, supported by faculty development, international collaboration and standards supported by professional organizations. Without such coordinated efforts, disparities in AI education may deepen, undermining the profession's ability to serve as ethical stewards in an algorithmic age.

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creation and interpretation of our work and accountable for its accuracy, integrity, and validity as per the journal's author responsibility guidelines.

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