

Building an AI Literacy Framework: Perspectives from Instruction Librarians and Current Information Literacy Tools



A Choice White Paper
by Sandy Hervieux and Amanda Wheatley



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Executive Summary

With growing discussions around generative AI tools such as ChatGPT, librarians are now confronted with accessible AI technology that students are using to offset their research and writing tasks. Information literacy frameworks and standards have traditionally helped librarians plan their instruction sessions; however, these structures do not address AI. Many librarian-led workshops have started to appear to help students create chat prompts, verify the information provided by ChatGPT, and use AI tools critically. While some discussion has started around the ACRL *Framework for Information Literacy* and the place of AI within it, we propose that a new framework is needed to address all the complexities of artificial intelligence. This white paper aims to report on interviews with instruction librarians about AI literacy. From the analysis of the interviews, we will identify the main themes and concerns related to AI and develop a robust framework for AI literacy. Readers of the white paper should gain a better understanding of the place of AI literacy in information literacy instruction and be able to use a rigorous structure to plan their own interventions.

Key Insights

- Determine the perspectives of instruction librarians on AI literacy
- Evaluate current literacy frameworks for their ability to adapt to the landscape of artificial intelligence
- Create a robust AI literacy framework

Findings

Following 15 interviews with librarians from Canada and the United States, the authors determined that while 67 percent of librarians have taught AI content in the past year, most of them did not rely on the ACRL *Framework for Information Literacy in Higher Education* to build their instructional sessions. The authors also identified several emerging skills that other information literacy frameworks do not represent in detail, such as:

- Prompt engineering, one among a host of different skills required to use AI tools
- Critical evaluation that goes beyond authority and looks at the ethics and bias
- An understanding of ethical implications, such as for labor and the environment
- New ways to attribute the creation/editing of content

The proposed AI framework will focus on the following:

- 1 Knowing the basic principles of AI
- 2 Understanding the fundamental differences of AI types
- 3 Experimenting with AI tools
- 4 Reviewing the outputs and outcomes of AI tools
- 5 Evaluating the impact of AI on a societal scale
- 6 Engaging with AI discourse

Introduction

As higher education responds to the heavy onslaught of generative AI tools like ChatGPT, it has become increasingly important for university libraries to educate and perform outreach on these topics. Until recently, it was completely normal for most public services librarians to have only a vague understanding of AI and relegate this topic to technical and digital departments, which were more likely to be engaging with this issue already.

Generative AI tools have become more accessible than ever, and academia is facing a widespread crisis regarding student use of these tools in the classroom context. Universities are struggling to determine if and how these tools might play a role in an educational setting and what impacts these tools will have on academic integrity. Meanwhile, there is a gap in public outreach on campuses for those looking to learn basic AI literacy skills. Libraries are perfectly positioned to provide this literacy training, much like librarians provide information, data, and digital literacy instruction.

For decades, librarians have been involved in information literacy teaching and learning. In 1989, the American Library Association defined, in their Presidential Committee report, an information literate person as someone who “must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” This solid foundation of literacy skills led to the eventual creation of the *Framework for Information Literacy for Higher Education (Framework)* by the Association of College and Research Libraries (ACRL). The Framework has become an integral part of the librarian's toolkit for instruction because it allows for the promotion and teaching of information literacy concepts. It stands to reason that a framework for artificial intelligence literacy would begin with information literacy. (Ed. Note: ACRL's board has created an AI Competencies for Library Workers Task Force, which convened in July 2024. Competencies are expected to be completed by ACRL's 2025 Conference.) This paper will explore the definition of AI literacy and propose a framework for librarians to use going forward.

Defining AI Literacy

Over the past few years, AI literacy discussions among academics have emerged, and the topic is showing up increasingly in scholarly literature. The term AI literacy is mentioned in educational literature as far back as 2015–16; however, one of the most substantial definitions came out of the 2020 conference presentation by Long and Magerko, in which they proposed AI literacy “as a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace.”

Even before the launch of ChatGPT, AI literacy and its counterpart, algorithmic literacy, were quickly becoming part of library and education conversations. The last few years have seen a radical increase in the conceptualization of the term as researchers in multiple fields work to define what should encompass AI literacy. For the purposes of this paper, the authors propose that AI literacy is the conscious choice to partake in discourse surrounding AI; it is learning about AI and using technology to better understand its presence in everyday life. Table 1 explores other notable definitions of AI literacy as they appear in the literature.

Libraries are perfectly positioned to provide this literacy training, much like librarians provide information, data, and digital literacy instruction.

Table 1. Definitions of AI literacy

Author(s)	Definition
Long and Magerko (2020)	"A set of competencies that enables individuals to critically evaluate AI technologies; communication and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace" (p. 2).
Lee et al. (2021)	AI literacy is achieved "through an integration of AI concepts, ethical and societal implications of AI, and the adoption of AI in future jobs" (p. 196).
Mikalef and Gupta (2021)	"An AI capability is the ability of a firm to select, orchestrate, and leverage its AI-specific resources" (p. 2).
Hermann (2022)	"We conceptualize individuals' basic understanding of (a) how and which data are gathered; (b) the way data are combined or compared to draw inferences, create, and disseminate content; (c) the own capacity to decide, act, and object; (d) AI's susceptibility to biases and selectivity; and (e) AI's potential impact in the aggregate" (p. 1270).
Dai et al. (2020)	"Considering the increasing importance of AI, we refer to a student's ability to access and use AI-related knowledge and skills as AI literacy" (p. 3).
Kong et al. (2021)	"AI literacy includes three components: AI concepts, using AI concepts for evaluation, and using AI concepts for understanding the real world through problem solving" (p. 2).

Conceptualizing AI Literacy

AI literacy as a concept is not enough to fully educate the public, and it requires a grounded framework of competencies and capabilities to function as a learning model. Most of these models are built of three or four conceptualizations. Cetindamar et al. (2024) suggest that AI literacy is a bundle of four core capabilities: technology-related, work-related, human-machine-related, and learning-related. The course structure put forth by Kong et al. (2021) includes four areas of study: artificial intelligences (discussions of weak and narrow AI), machine learning (steps to apply machine learning to problem-solving), supervised learning (regression and classification concepts), and unsupervised learning (as a concept and through case studies). Hibbert et al. (2024) suggest four frames of AI literacy, including understanding AI, using and applying AI, analyzing and evaluating AI, and creating AI. And Ng et al. (2021) propose four aspects of AI literacy, which include knowing and understanding AI, applying AI, evaluating and creating AI, and AI ethics.

The three-concept models include work by Mikalef and Gupta (2021), who suggest that AI capabilities are the dimensions of tangible, human, and intangible resources. Sanusi et al. (2022) developed a three-competency model of AI literacy for K–12 education, which includes basic knowledge of AI, team and cooperative engagement, and learning through exploration and practice. Kim et al. (2021) also have a three-competency model based on knowledge (definitions and types of AI), skill (using AI tools), and attitude (social impact of AI). And Liu and Xie (2021) propose an AI quality cultivation that includes the following literacy steps: digital literacy, computational thinking, and programming ability.

Despite being a relatively new subject area, there have been many systematic and scoping reviews on the topic (Ng et al. 2021; Laupichler et al. 2022; Pinski and Benlian 2024; Almatrafi et al. 2024). Pinski and Benlian suggest that AI literacy is needed as more and more ethical issues arise. They have also put forward five proficiency dimensions of AI literacy, including knowledge, awareness, skills, competencies, and experience. In their systematic review, Almatrafi et al. found that there were six key constructs of AI literacy: recognize, know and understand, use and apply, evaluate, create, and navigate ethically.

While AI literacy is quickly becoming a trending topic in education, there is not much in the librarianship literature on this topic. The authors believe that this paper will help to bridge this gap and give librarians a solid framework for AI literacy going forward.

Interviews

Methodology

The authors conducted 15 semi-structured interviews with librarians from Canada and the United States in February 2024. They received Research Ethics Board approval from McGill University to conduct this study. The interviews were held over Microsoft Teams and captured for analysis using Microsoft Word's transcription feature. The interviews lasted an average of 30 minutes and included questions about teaching AI literacy and information literacy to users. The interview guide can be found in Appendix A.

The goal of the interviews was to determine which competencies and skills should be included in a framework for artificial intelligence literacy. It was important for the authors to hear firsthand from practicing librarians who have either engaged with AI or were considering it, to learn more about the opportunities, challenges, and concerns around AI literacy.

Participants were recruited using librarian-specific email listservs, and the authors also recruited librarians who had previously presented on artificial intelligence instruction at conferences. These participants were identified from information gathered on library websites and public conference presentations. Participants received no incentive to participate in the interviews.

The authors used the Microsoft Word's transcription feature of the interviews to analyze the results. They transferred the participants answers into Excel, where each author manually coded the responses using emerging themes. The authors then went over their answers to determine what the final code should be and recoded the data to produce accurate results. The codebook can be found in Appendix B. Given the semi-structured nature of the interviews, the authors decided that some answers may require more than one code to fully represent the participants' answers.

Results

Information Literacy Instruction in the Library

The majority of participants (86.7 percent) mentioned offering information literacy workshops in the library that are not tied to specific courses. The audience for these sessions is mainly undergraduate and graduate students, with a small percentage of faculty. The topics covered range from citation management (8 responses), basic information literacy skills such as creating search strategies (5 responses), advanced searching (5 responses), topics related to digital scholarship and data literacy (5 responses), and knowledge syntheses (4 responses). Three participants mentioned that artificial intelligence and related topics, such as ChatGPT, were included in library instruction.

Artificial Intelligence Instruction

Two-thirds of interview participants mentioned that their libraries offer instruction on AI where AI is the primary topic covered. Of the participants who responded that their libraries do not offer such content, 60 percent mentioned that exploratory work is currently underway to develop content related to ChatGPT and generative AI tools. When AI instruction is provided, the most popular topics are ChatGPT and generative AI, staff training, ethics, and copyright and intellectual property; some sessions focus on machine learning, prompt engineering, and algorithmic bias. Figure 1 illustrates the AI topics covered in library instruction.

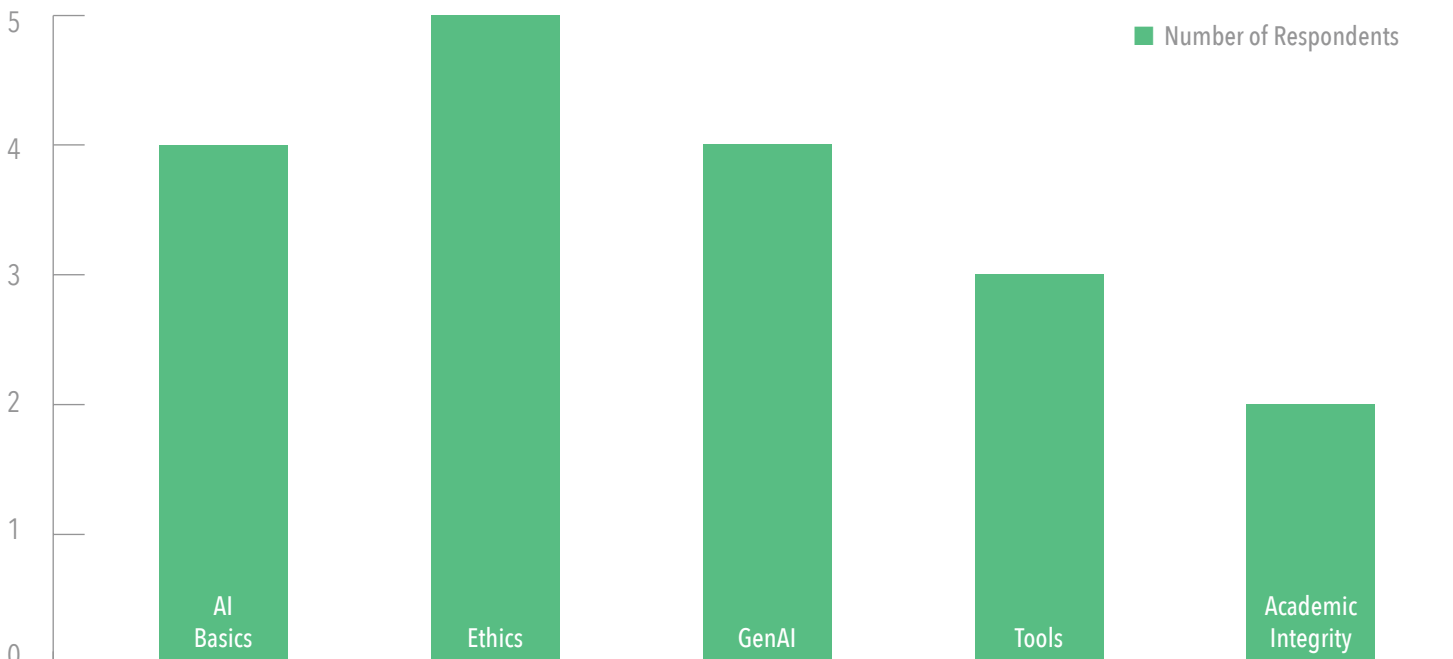
Figure 1. AI Topics Covered in Instruction



In terms of the method of delivery of the instructional sessions, about half of participants (6 responses) offer the sessions in general library workshops and a smaller number (3 responses) offer them in course-integrated instruction. One participant mentioned the presence of a year-long course on AI, while another discussed online modules on the topic.

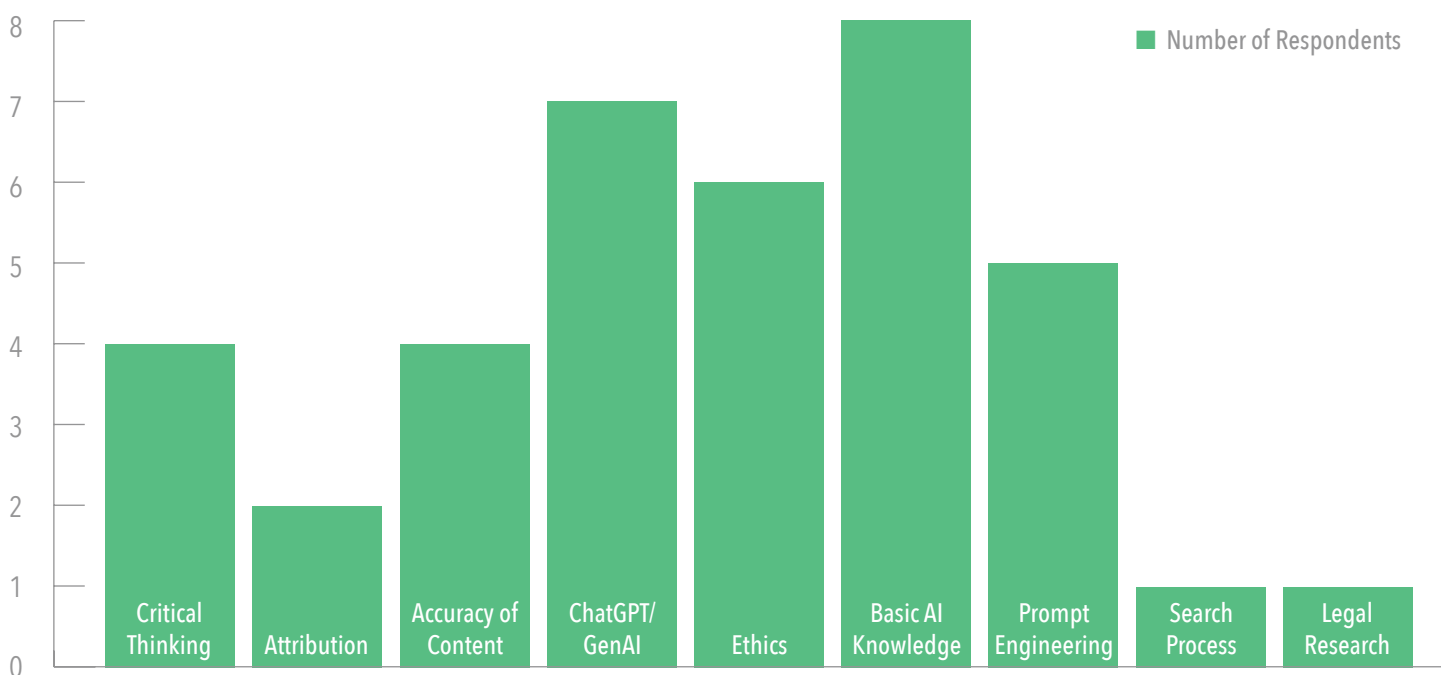
For in-class instruction, 80 percent of participants agreed that they offer artificial intelligence instruction in in-class sessions. Figure 2 highlights the most common topics covered in these instructional sessions: AI basics, ethics, generative AI, how to use specific tools, and academic integrity.

Figure 2. AI Topics Covered in Class Instruction



In addition to the popular topics covered in their instruction, respondents described which skills are centered in their learning objectives related to artificial intelligence. A basic knowledge of artificial intelligence and related terminology and familiarity with ChatGPT and other generative AI tools were the most important AI-related skills that librarians mentioned. They also expressed the importance of being aware of the ethical considerations of using AI tools and how to create effective prompts, apply critical thinking skills, and verify the accuracy of AI-produced content. A small percentage of participants also spoke about the search process overall and AI in the legal research process. Figure 3 shows the distribution of the skills related to AI highlighted by the interview participants.

Figure 3. AI-Related Skills Used to Create Learning Objectives

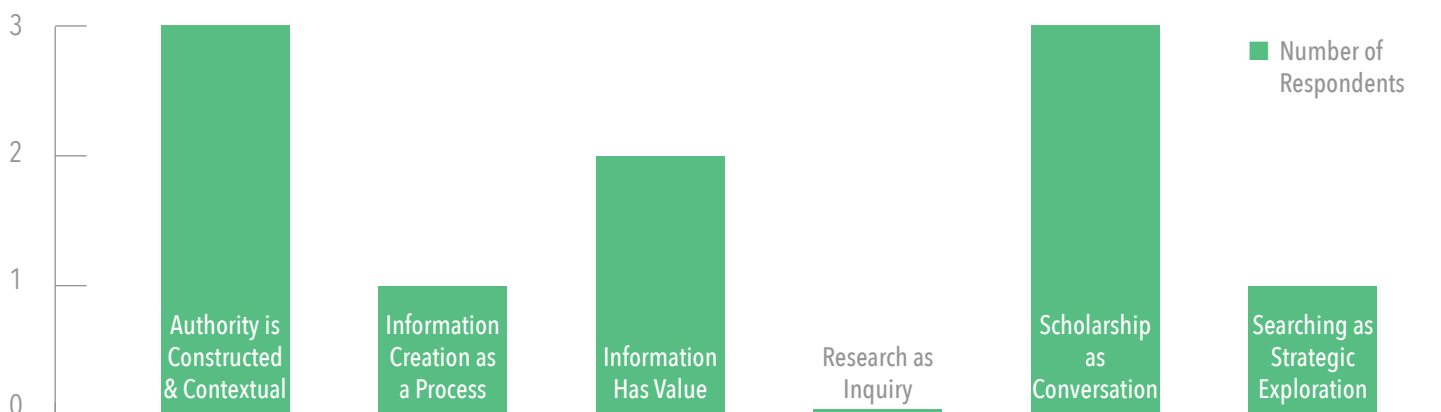


Along with in-library and in-class instruction sessions on artificial intelligence, the interviewees also discussed other AI-related service offerings at their institutions. Fifty-three percent of participants said that their libraries offer programming related to AI, such as digital scholarship support (2 participants), seminars and panel discussions on the topics (6 participants), specific tools (2 participants), and support with large language models (2 participants).

Use of Information Literacy Frameworks

While a large number of librarians provide AI instruction, few use a formal information literacy framework to help them shape their instruction. Only 40 percent of participants mentioned either the ACRL *Framework for Information Literacy for Higher Education* or other domain-specific frameworks. When asked which frames from the ACRL *Framework* they were most likely to use in AI instruction, participants highlighted the importance of addressing “Authority Is Constructed and Contextual” and “Scholarship as Conversation.” “Information Has Value” and “Information Creation as a Process” were also mentioned when discussing creating instructional sessions on AI. Figure 4 shows which frames were named as important for creating AI instructional content.

Figure 4. Frames Relevant for AI Literacy



Artificial Intelligence Policies

When asked if their libraries have a policy or guidelines related to providing AI instruction, 100 percent of the participants responded that there is no official edict on how to use AI in instruction. Some participants did mention that their libraries followed university-wide policies or guidelines in place. In terms of university-wide policies, 46 percent of interview participants mentioned that their institutions have official policies in place, while a small number of interviewees whose institutions did not have policies (5 participants) discussed the presence of departmental guidelines. The official policies focus on the use of AI in teaching and learning, including wording for syllabi, the use of ChatGPT, academic integrity, and the use of AI in grading assignments.

When asked if their libraries have a policy or guidelines related to providing AI instruction, 100 percent of the participants responded that there is no official edict on how to use AI in instruction.

Professional Development Related to AI

All respondents to the interviews had access to professional development opportunities to learn about artificial intelligence. A mix of formal and informal training seems to be the most common approach, with librarians highlighting webinars, conference presentations, and formal workshops as well as brown bag events, the sharing of teaching materials, and discussion groups. Four participants also discussed having a dedicated librarian or working group responsible for artificial intelligence at their institution.

Main Takeaways

A robust AI framework needs to address the main concerns that librarians have expressed regarding AI during the interview process. In terms of skills and topics to be covered, librarians highlighted that understanding how AI works is as important as using generative AI tools and creating prompts. Furthermore, they were deeply concerned with users' ability to critically evaluate AI-created content and its ethical implications. While certain frames from the ACRL *Framework* were deemed useful by librarians—specifically, “Authority Is Constructed and Contextual,” “Scholarship as Conversation,” and “Information Has Value”—a new framework is needed to fully address the needs for basic knowledge about AI and full user engagement with it.

Theorizing the Building Blocks for AI Literacy

Given the high number of librarians either engaging in AI instruction or contemplating it, it is more important now than ever to have a literacy framework that can help instructors shape their interventions into AI. While the ACRL Framework can offer a general template for building instructional interventions, its overly general nature makes it challenging to extend to certain aspects of artificial intelligence that are not encountered in other information sources.

A 2021 exploratory review by Ng et al. proposed that an AI literacy model would be well served by incorporating Bloom's taxonomy. Bloom's taxonomy is a widely recognized learning model in education and refers to a hierarchy of learning domains an individual needs to achieve to become literate in a subject (Anderson and Krathwohl 2001). This hierarchy was updated in 2001 and currently consists of the following steps:

- Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create

These six principles represent the cognitive hierarchy of Bloom's taxonomy and are highly reminiscent of the six frames included in the ACRL *Framework for Information Literacy*:

- Information Creation as a Process
- Research as Inquiry
- Searching as Strategic Exploration
- Information Has Value
- Authority Is Constructed and Contextual
- Scholarship as Conversation

The ACRL *Framework* is modular, and learners can approach the steps in any order. The design of the frames incorporates threshold concepts, which are "core foundational concepts that, once grasped by the learner, create new perspectives and ways of understanding a discipline or challenging knowledge domain" (Association of College and Research Libraries 2015). While threshold concepts are similar to the hierarchy of Bloom's taxonomy, they do not imply sequential learning, and no single frame relies on another for the learner to grasp the concepts in the given frame.

The same approach is not as easily applied to AI literacy. Although threshold concepts are certainly a core aspect, most learners need a solid foundation for understanding AI before they can apply other literacy frames to the knowledge sets. For this reason, this paper proposes a hierarchical framework with six principles and related competencies in Table 2. Each frame and competency is accompanied by a set of learning objectives that prompt the user to create activities surrounding the frames.

Although threshold concepts are certainly a core aspect, most learners need a solid foundation for understanding AI before they can apply other literacy frames to the knowledge sets.

Table 2. AI literacy frames, competencies, and a map to learning objectives.

Frame	Competencies	Learning Objectives (LO)
Know the basic principles of AI	Establish a base knowledge for artificial intelligence; learn the difference between narrow and general AI	LO1, LO2
Understand the fundamental differences of AI types	Understand the different types of AI; understand how technologies branch into subcategories	LO3, LO4
Experiment with AI tools	Undertake elective experiences; develop your own AI	LO5, LO6
Review the outputs and outcomes of AI tools	Analyze and critique on a micro-level	LO7, LO8
Evaluate the impact of AI on a societal scale	Discuss issues on a macro-level; evaluate societal impact; engage in ethical considerations of AI	LO9, LO10
Engage with AI discourse	Engage in AI discourse; stay involved in the conversation	LO11, LO12

Six Frames for AI Literacy

Frame 1: Know the basic principles of AI

The first step in AI literacy is to *establish a base knowledge* of artificial intelligence. This includes *reviewing definitions* of AI, machine learning, deep learning, robotics, neural networks, and other key terminology that will help people progress in their literacy skills. This also includes *learning the difference between narrow AI*, a type of technology, which includes generative AI, that can follow predefined tasks, and *general AI*, a theoretical AI technology that is self-aware and does not rely on humans to complete tasks. This foundational knowledge is a cornerstone of all future conversations about and learning for artificial intelligence.

Examples of learning objectives:

- LO1: Recall the definitions of artificial intelligence, machine learning, and generative AI.
- LO2: Recognize the difference between narrow and general AI and how much human intervention each requires.

Frame 2: Understand the fundamental differences of AI types

Once a base knowledge of AI is established, the next step toward literacy is *understanding the differences in the types of AI*. Different types of AI can first be acknowledged broadly by the categories defined in Frame 1: narrow and general. Many consider them to be the umbrella of AI. From there, a person literate in AI would *understand how the technologies branch into subcategories*. Further, they would understand what tools might result from the application of those AI types. As opposed to Frame 1, which is understanding the terminology, Frame 2 helps build context to better understand artificial intelligence.

Examples of learning objectives:

- LO3: Express how artificial intelligence includes many subcategories and how they relate to each other.
- LO4: Summarize which subtypes of AI are used in certain tools.

Frame 3: Experiment with AI tools

Since AI has become an integrated part of technology, it has become nearly impossible for librarians to avoid, meaning that, on some level, everyone is experimenting with AI tools. An important part of being AI literate is intention, and so having *elective experiences*, where users choose to experiment with AI from a learner standpoint, helps to change their perspective on how they engage with the tools. Learners may also wish to *develop their own AI tools* or modify existing ones.

Examples of learning objectives:

- LO5: Experiment with different available AI tools.
- LO6: Implement effective strategies for creating prompts for generative AI tools.

Frame 4: Review the outputs and outcomes of AI tools

Once a person has knowledge and understanding of basic AI principles and has consciously begun experimenting with AI, they are better suited to review the outputs of the tools. This next step in the AI literacy journey allows learners to *analyze and critique* the products of their AI tools and determine the worth of these results. This step is done on a *micro-level*, meaning that it is unique to the personal experience of the learner and the tool they are using.

Examples of learning objectives:

- LO7: Appraise the quality of the output created by an AI tool and question if it is appropriate for the user's purposes.
- LO8: Distinguish content created by humans and artificial intelligence.

Frame 5: Evaluate the impact of AI on a societal scale

A *macro-level* evaluation is the next progression in AI literacy. Once a learner has a base understanding of AI and has had purposeful interactions with the tools, they are better able to participate in *large-level discussion* surrounding AI's impact on society. Evaluation of societal impact is also possible without AI literacy, but the ability to participate in these discussions is greatly increased when the learner has progressed fully through the previous four frames. This *evaluation of societal impact* includes key discussions on the *ethical considerations of AI*, including bias, environmental impacts, and unethical use of labor to create AI tools.

Examples of learning objectives:

- LO9: Comment on the impact that AI can have on the environment.
- LO10: Critique the bias that can be present in artificial intelligence and algorithms.

Frame 6: Engage with AI discourse

In most existing models of AI literacy, there is no concept of engaging with communities beyond the evaluation stage. Drawing from ACRL's "Scholarship as Conversation" frame for information literacy, learners are recommended to become *engaged in AI discourse* at various levels. Because technology is progressing so rapidly, it is easy for information to become outdated and irrelevant as new products are released and change how users interact with AI tools. To become AI literate, a learner must *stay involved in the conversation* by engaging with literature, discussion groups, or any other materials that allow them to keep informed on the topic. This final frame is an essential part of digital scholarship.

Examples of learning objectives:

- LO11: Plan ways to stay active in conversations about artificial intelligence.
- LO12: Collaborate with other learners to keep up to date on AI developments.

Conclusion

As generative AI tools become ubiquitous in everyday life, they underline the importance of not only knowing how to use these tools but also how to be AI literate. While librarians have been involved in information literacy instruction for decades, most are new to artificial intelligence. Yet, they have quickly understood the importance of the topic of AI and are exploring how to best include it in their instructional practices.

Interview respondents expressed concern about teaching both basic AI literacy and core concepts such as critical thinking, evaluation of the output of AI tools, academic integrity, and broader ethical concerns. While the *ACRL Framework for Information Literacy in Higher Education* is a good starting point for planning all information literacy interactions, a new framework is necessary to capture the nuance required to teach AI literacy concepts.

This white paper proposed a hierarchical, six-tier approach to achieving AI literacy. Starting with a basic understanding of AI terminology, progressing to experimenting with tools, and finally becoming an active participant in artificial intelligence discourse, this framework aims to help librarians build instruction sessions tailored to their needs and the needs of their learners. Whether it be for one-shot library instruction sessions or semester-long courses, librarians can use this framework to create meaningful learning objectives and instructional activities for their learners.

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Appendix A – Interview Questions

- 1 Does your library provide information literacy instruction outside of course-affiliated teaching? If so, describe what sessions are offered and how frequently they reoccur.
- 2 Does your library provide instruction on the topic of artificial intelligence where AI is the primary topic covered?
- 3 Please describe how artificial intelligence is addressed in your instruction. List the learning objectives provided to participants, if applicable.
- 4 Does your library incorporate any existing literacy frameworks, such as the *ACRL Framework for Information Literacy*, into its instruction on artificial intelligence?
- 5 Does your library provide any services or programs on the topic of artificial intelligence where AI is the primary focus?
- 6 Does your library have a policy or guidelines for librarians providing instruction on artificial intelligence?
- 7 Do you or your colleagues include artificial intelligence as part of in-class instruction? Has it come up as a discussion topic?
- 8 Does your institution have a policy or guidelines for faculty and staff including artificial intelligence in their teaching?
- 9 Does your library provide training or professional development opportunities for those interested in learning more about artificial intelligence?

Appendix B – Codebook

Q1:

Timing

- One-shot in class instruction
- Workshops offered in the library

Audience

- Undergraduate students
- Graduate students
- Faculty members

Type:

- Basic information literacy skills
- Advanced searching
- Knowledge synthesis
- Digital scholarship or data literacy
- Citation management
- AI or ChatGPT workshops

Q2:

No

- Exploratory work in progress

Yes

- ChatGPT and generative AI
- Machine learning
- Prompt engineering
- Ethics
- Copyright and intellectual property
- Algorithmic bias
- Staff training

Delivery method

- One-shot instruction in class
- Year-long course
- Instructional modules
- In-library workshops

Q3:

- Critical thinking
- Attribution
- Accuracy of content
- ChatGPT/Generative AI
- Ethics
- Basic AI knowledge
- Prompt engineering
- Search process
- Legal research

Q4:

ACRL Framework

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration

Other frameworks

No

Q5:

No

Yes

- Digital scholarship
- Seminars, discussions and panels
- Generative AI tools
- Other AI tools
- Large language models

Q6:

- Yes
- No

Q7:

No

Yes

- AI basics
- Ethics
- Generative AI
- AI tools
- Academic integrity

Q8:

No

Yes

- Teaching and learning guidelines and syllabus wording
- ChatGPT
- Departmental guidelines
- Academic integrity and use for grading

Q9:

No

Yes

- Formal training such as workshops and webinars
- Professional development funds available
- Informal training such as brown bags and discussion groups
- Dedicated librarian or working group for AI