JOURNAL OF EDUCATIONAL RESEARCH & PRACTICE

*Journal of Educational Research & Practice*
2024, Volume 14, Issue 1, Pages 106–118
DOI: 10.5590/JERAP.2024.14.1.07


Academic Essay

WALDEN UNIVERSITY

# Justification and Roadmap for Artificial Intelligence (AI) Literacy Courses in Higher Education

Sunil Hazari, MBA, EdD
*Walden University, Minneapolis, Minnesota, United States*
*University of West Georgia, Carrollton, Georgia, United States*
https://orcid.org/0000-0002-6666-6302

Contact: *sunil.hazari@mail.waldenu.edu*

## Abstract

In this article, I present a justification for implementing AI literacy courses in higher education. I explore the ethical concerns and biases surrounding AI technologies, highlighting the importance of critical analysis and responsible use of AI. I then propose a conceptual framework, focusing on awareness, skill development, and the practical application of AI. This framework aims to foster comprehensive understanding and empower students to leverage AI's potential while mitigating risks. I also provide sample course titles and learning objectives. The suggested course format covers AI concepts, ethical considerations, bias awareness, and practical prompt engineering skills. There is a need to integrate AI literacy courses into higher education curricula, and I offer a roadmap for implementation. By equipping students with AI literacy, colleges can prepare students to navigate an AI-driven world responsibly while nurturing innovation and critical-thinking skills needed for future success.

Keywords: *artificial intelligence (AI) literacy, generative AI, curriculum development, ethics, workforce readiness*

Date Submitted: September 5, 2023 | Date Published: April 29, 2024

Recommended Citation

Hazari, S. (2024). Justification and roadmap for Artificial Intelligence (AI) literacy courses in higher education. *Journal of Educational Research and Practice, 14*(1), 106–118. https://doi.org/10.5590/JERAP.2024.14.1.07

## Introduction

The recent development of Large Language Models and Artificial Intelligence (AI) tools, such as ChatGPT, Google Gemini, and Microsoft Co-pilot, is having a disruptive impact on higher education. The ease of availability of generative AI tools has brought about a new era of learning, enabling students to use sophisticated tools that can simplify their academic tasks, such as writing homework assignments, essays, research papers, and computer code (Haenlein & Kaplan, 2019; Ng et al., 2022). The content generated by AI tools creates grammatically correct sentences, paragraphs, essays, or research articles with high accuracy (Lin & Chang, 2020; Ouyang et al., 2022). AI tools have been trained on many sources, such as books, articles, and website information. The software can determine patterns and relationships between words and sentences to generate the content required for most course assignments. AI models possess the capacity to enhance the

students' learning experience. However, it is crucial to use AI responsibly and with caution. Generative AI can help students build on their existing knowledge and develop critical-thinking skills by providing access to additional resources and explanations.

As AI technology becomes more prevalent in the workforce, it is essential for college students to have a deeper understanding of the applications, advantages, limitations, and issues related to AI. AI literacy refers to the level of knowledge and understanding that individuals have about AI and its applications (Cardona et al., 2023; Trust et al., 2023). It includes the ability for students to understand what AI is, how it works, its limitations, and how it can be best used to create content (Faruqe et al., 2022). In addition to learning about the advantages provided by AI, it is also essential to educate students about AI's ethical and societal implications. This can include topics such as bias and ethics used by AI algorithms to generate content. Engaging in discussions within AI literacy courses can stimulate critical thinking and encourage reflection on AI's role, aiding students in better understanding the significance of AI in education and the workplace (ISTE, 2022). There is a need to provide AI literacy to students in higher education before they graduate. AI-literate college will be better equipped to create new content, products, and services within the ethical framework of AI technology (Aldabe et al., 2023). My aim is to provide information and justification for AI awareness and make a case for including AI literacy courses as an essential component in the higher education curriculum.

While the benefits of using AI tools in education are numerous, many students may not fully understand the broader issues around AI use in education. Without a proper understanding of the implications of AI tools, students may fall prey to potentially unintended outcomes or negative consequences, such as ethical concerns around data use and privacy and overreliance on technology (Lund et al., 2023). Therefore, it is essential to educate students on how to use AI tools effectively. Students need to be informed about the ethical and AI-generated content in the course materials they submit. There are concerns about issues such as academic integrity, misuse of AI tools, the impact on critical-thinking skills, lack of training, as well as issues of bias and accuracy (Hutson, 2021). There is also a need to balance the development of critical-thinking skills by using AI tools to assist learning. Other themes that have emerged in discussions around the rapid evolution of AI tools include the need for equity in assessment, concerns about plagiarism, and a call for students to be knowledgeable about the ethical use of generative AI (Jobin et al., 2019). Additionally, some educators are concerned about the impact of AI on the ability of students to think critically and independently and the potential loss of trust in AI-assisted academic work due to the possibility of inaccuracies and hallucinations produced by AI tools (Bozkurt et al., 2023; Reinhardt, 2022).

AI tools offer advanced features that can transform business, education, and society. As AI models and natural language-processing capabilities become increasingly sophisticated, there are new opportunities for growth and development across a wide range of fields. AI technology has permeated higher education and is having a wide range of impacts on teaching, learning, and assessment (Cope et al., 2021; Marron, 2023). AI development has brought attention to developing innovative instructional strategies to integrate AI tools in the higher education classroom. The extent to which educators accept and use AI technology can significantly impact an institution's ability to provide an AI-literate workforce. Educators have mixed feelings about using AI tools for teaching for various reasons, including a limited understanding of the technology, pedagogical gaps in AI learning design, lack of guidance from administrators, ethical concerns, and implementation challenges (Ghallab, 2019; Mollick, 2023).

## Justification for AI Literacy Competencies

Students must be educated to focus on the process and the product of generating content with AI tools. AI literacy could include a set of competencies that enable an individual to articulate the terminology related to AI technology. For AI literacy, students should also be aware of the ethical implications of AI, including issues

related to privacy, bias, and accountability (Jones et al., 2022). Overall, AI literacy would provide students with the necessary knowledge and skills to navigate and engage with the rapidly evolving world of AI technology. The pedagogy of AI literacy courses can vary widely, with some lecture-based instruction and other courses taking a more hands-on approach. Irrespective of the teaching style, the goal should be to provide students with a foundation in understanding the capabilities of AI and its applications. The purpose of any AI literacy course should be to help students develop competencies to critically evaluate AI technologies by communicating and collaborating effectively with AI tools. Students should also be able to recognize the strengths and limitations of AI tools.

## ChatGPT

Since its introduction in November 2022, ChatGPT has become the most well-known AI chatbot in education (Mollick, 2023; Shidiq, 2023). It has the potential to revolutionize the way students approach learning. By providing free and quick access to information, ChatGPT can help students build on their existing knowledge by providing additional resources and explanations (Cardona et al., 2023). However, students must be aware that ChatGPT is not infallible and should use it cautiously. While ChatGPT can provide students with quick answers, it may not always be accurate or offer the necessary context for understanding a topic fully (Celik et al., 2022). Therefore, educating students on cross-checking information and verifying it using other credible sources is essential.

For students, ChatGPT is a tool that can be used in courses to provide resources to solve complex problems, troubleshoot errors, and learn new programming languages. It can also help summarize, brainstorm, and refine their ideas. Ouyang et al. (2022) reported that AI tools perform best on tasks such as idea generation and brainstorming, knowledge seeking, conversation, rewriting, summarizing and extraction, and classification. These are basic tasks performed by most students when it comes to writing an outline for a research paper topic or searching for the terminology of unfamiliar terms to be used in their paper. Students can also have ChatGPT serve as a sounding board or a personal tutor by asking it to reply to questions to help with the development of ideas for the paper, rewriting or rephrasing text from research articles, or having the model condense or summarize long text into paragraphs (Dergaa et al., 2023; Dwivedi et al., 2023). One of the main benefits of AI is that it can provide personalized learning. AI algorithms can analyze a student's learning style, pace, and preferences and create a customized learning path (Kasneci et al., 2023). This can help students learn more efficiently and effectively. AI can also provide immediate feedback and adaptive assessments, allowing students to identify their strengths and weaknesses and focus on areas that need improvement (Limna et al., 2023). Overall, generative AI models can potentially transform students' learning by providing personalized, adaptive, and engaging learning experiences.

As students increasingly rely on technology to enhance their learning experience, ChatGPT has become a helpful tool. However, the increasing use of ChatGPT raises ethical questions about the acceptable use of technology in the classroom (Sullivan et al., 2023). While ChatGPT can be a valuable learning assistant, it may give students a false sense of what they have learned or the skills they have built. For instance, if students use ChatGPT to complete assignments without developing critical-thinking skills, they may not be adequately prepared for the workforce. Students also need to understand the expectations surrounding the acceptable uses of ChatGPT. While it can help summarize, refine, and generate new ideas, it is important to know when technology provides an unfair advantage (Cotton et al., 2023). Access to ChatGPT will be available in the workforce, so developing critical-thinking skills should be the focus rather than relying solely on AI to provide answers to problems.

The widespread availability of ChatGPT means that employees in the workforce will inevitably have access to AI technology. Therefore, educators must not only teach students how to use AI technology but also to focus on developing critical-thinking skills while using AI. Both technology proficiency and critical thinking are

essential in the learning process as they can work together to empower students to leverage the capabilities of AI tools. Rather than relying solely on ChatGPT for cognitive offloading, students should learn how to analyze problems, think creatively, and make informed decisions (Perkins, 2023). This approach ensures that students are not just using ChatGPT as a shortcut to complete assignments but are given the opportunity by educators to develop the necessary skills to succeed in the workforce (Smith & Robinson, 2020). While using ChatGPT as a learning tool is acceptable, using it to cheat undermines the learning process (Hisan & Amri, 2023). Educators must ensure that students are using ChatGPT responsibly, and students must understand the importance of using ChatGPT as a means of enhancing their learning experience.

As educators and students navigate the changing landscape of education, the focus should be on using ChatGPT as a learning assistant rather than a shortcut. Finally, while the efficiency provided by ChatGPT is undoubtedly useful, students should be aware of the efficiency vs. quality trade-off conundrum (Kumar, 2023). It is crucial to evaluate the quality of the output provided by the AI tool and ensure it aligns with the goals of the assignment or project. Overall, ChatGPT can be a beneficial tool for students, but it is essential to use it thoughtfully and to critically evaluate the information it provides. Content in AI literacy courses can help students understand the limitations and biases of Generative AI and ensure that their use of the tool aligns with the expectations and goals of their learning experience.

## Prompt Engineering

Similar to writing code for computer programs, AI uses “prompts” as natural language input into large language models, such as ChatGPT. These natural language conversational prompts are processed by transformers in the generative AI model. The output is text returned to the user by the chatbot (Dalalah & Dalalah, 2023). Prompts can range from a few words in a simple sentence to more complex compositions that include variables similar to those used in computer code. The ability to compose, tweak, and follow up with responses to achieve the necessary output provides several advantages. In the Natural Language Processing context, “prompt engineering” is the process of discovering inputs that yield the most accurate and contextual output (Giray, 2023). By using prompts efficiently, users can get the output quickly and accurately. Skills in learning about composing prompts and adapting the responses as follow-ups to different scenarios can make the output more flexible and versatile. User experience is improved if the AI model can provide a more personalized and tailored response to queries (Kozachek, 2023).

To use chatbots effectively and efficiently, students must be able to demonstrate competencies in several components of prompt framing, which can include items such as persona setting, task description, context description, verbiage alteration, audience identification, structural referencing, goal setting, citing sources, writing style, tone, style, voice inflections, and output formatting (Lo, 2023). A well-crafted prompt can identify the purpose of the query using specific and relevant language based on which initial output is generated. Since AI models can continue the conversation, revised prompting (also called prompt optimization) can help the AI model remove ambiguities and regenerate responses based on additional information (Zamfirescu-Pereira et al., 2023). Best practices for composing prompts in AI models should focus on optimizing the output with trustworthy and credible responses. The best prompts set clear objectives, provide specific contextual information, use task-specific language, maintain a consistent tone, and enable the AI model to assume a persona. By following these practices, students can enhance the effectiveness, reliability, and coherence of the generative text produced by AI models.

## AI Ethics and Bias Concerns

While AI has the potential to enhance and improve educational experiences, it also poses significant ethical challenges that need to be addressed. There are several ethical considerations surrounding AI in education. One perspective is that AI has the potential to democratize education and make it more accessible to underserved populations (Hassani & Silva, 2023). For example, AI-powered tutoring systems can provide

personalized learning experiences to students who may not have access to traditional classroom instruction (Hew et al., 2023). However, if AI systems are only available to students with access to the latest technology, it could further marginalize students from low-income backgrounds (Laird et al., 2022). AI algorithms can also identify students at risk of dropping out, allowing educators to intervene early and provide additional support. Another ethical consideration of AI in education is the issue of bias. AI algorithms are only as unbiased as the datasets they are trained on; if those datasets contain biases, they can be reinforced by the algorithm (Martin, 2019). For example, if an AI algorithm is trained on a dataset that is biased against a particular group of people, it may perpetuate that bias by making recommendations that are unfair or discriminatory.

An additional concern of AI use in education is the issue of privacy. With AI systems collecting and processing vast amounts of data about students, there is a risk that this data could be misused intentionally or unintentionally (Halaweh, 2023). For example, if an AI algorithm is used to predict a student's academic performance based on their personal data (Tsiakmaki et al., 2021), such as their gender, race, or socioeconomic status, it could potentially be used to discriminate against them. To address this issue, it is essential to understand the need for privacy policies that regulate the use and sharing of student data. There are concerns that AI in education could perpetuate existing inequalities and exacerbate the digital divide. In addition to concerns regarding accuracy and bias, there are also more general concerns about the ethics and privacy implications of using tools such as ChatGPT in educational contexts and what policies and regulations need to be in place to ensure that the technology is used securely, ethically, and responsibly (Irons & Crick, 2022).

Preparing students for an ethically challenged world requires the effective integration of ethics education into the learning environment of the classroom (Hishiyama & Shao, 2022; Sabzalieva & Valentini, 2023). A key focus of any AI literacy course should be on teaching ethical principles when using AI. Students should not only come away from the course with an understanding of what AI is and how it works, but they should also be able to evaluate the ethical implications of AI and its impact on society. Along with ethics, topics on related issues such as bias, privacy, and accountability should also be covered.

### AI and Writing

For course assignments that involve writing and research, it is possible for students to use AI tools to generate content by providing prompts to the AI model, which will help develop short or long essays or research papers. The latest versions of AI models can also include references to support research and opinion. AI-generated text can be rephrased several times, so detection software may not detect the use of AI. Educators can attempt to design prompts that AI generators are unable to complete; however, the rate of sophistication that is being included in each iteration of the tools being released at regular intervals makes it challenging for educators to come up with new prompts that will make it difficult for AI models to generate text in response to the prompts (Mollick, 2023).

The goal of any academic program should be to support students and provide a culture of integrity to help reinforce quality teaching and learning. As generative AI gets more powerful with each new version, administrators and faculty members will continue to grapple with finding effective methods for integrating AI tools into courses. With proper training and education on technology and pedagogy, issues that emerge due to AI use can be effectively addressed within academic programs. AI ethics education is a critical component that must be integrated into AI literacy courses to increase the possibility that students will exhibit ethical behaviors consistent with policies in place in the workforce (Javed et al., 2022).

## Conceptual Framework

As colleges and universities realize the need to provide AI literacy for students, a conceptual framework is needed to provide a structured approach to develop courses that can address different facets of AI literacy. A

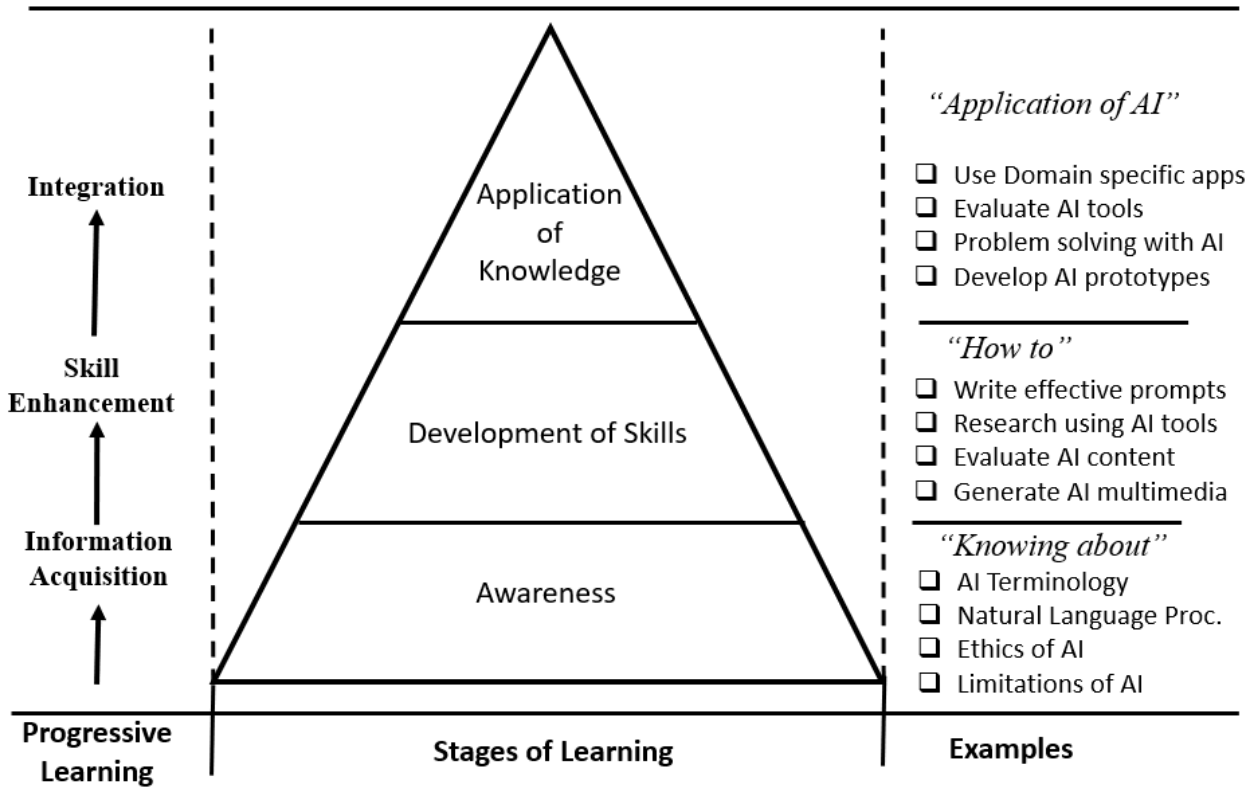
framework can provide a clear direction to articulate the goals and learning outcomes of courses as well as the methods to achieve the outcomes. With the rapidly evolving field of AI, the framework can provide a roadmap to ensure that the content and pedagogy are relevant. A well-designed AI course should be inclusive and accessible to a diverse range of learners, and students should be made aware of the strengths and limitations of AI tools and domains (Faruqe et al., 2022; Ng et al., 2023).

There can be different approaches to AI literacy based on expected learning outcomes. Courses can range from raising awareness of AI to technical courses that teach students how to write AI programs for customized applications. The conceptual model I propose was adapted from a computer literacy model (Hazari, 1991), which included awareness, development of technology skills, and application of knowledge by having students progress from information acquisition to skill enhancement and integration. The conceptual framework of the computer literacy model is relevant to AI literacy due to the underlying principles it represents. While AI's specific content and technicalities may differ from traditional computer literacy, the foundational concepts of awareness, skill development, and knowledge application remain crucial. In the rapidly evolving field of AI, the proposed model can provide institutions with a roadmap to develop AI literacy courses to help students use AI technologies effectively. By understanding the underlying principles of AI, educators and students can become more aware of its capabilities and limitations. This awareness allows them to make informed decisions and judgments when interacting with AI systems.

Furthermore, the model emphasizes the importance of skill development in AI literacy. Just as computer literacy requires individuals to acquire skills in operating systems, software applications, and basic programming (Hickman & Corritore, 1995), AI literacy demands proficiency in areas such as natural language processing, writing, research, and ethical considerations. By actively developing these skills, students can harness the potential of AI tools. The proposed framework also highlights the application of knowledge in AI literacy. It will prepare students to acquire conceptual knowledge and apply it in real-world scenarios. The practical application can make students aware of the practical implications of AI and its potential applications in various domains. The AI literacy model can serve as a guiding framework to help students progress in understanding and utilization of AI technologies. It can provide a structured approach that helps students stay relevant and adaptable in a rapidly evolving technological landscape.

The proposed AI literacy course conceptual model is shown in Figure 1.

Figure 1. *AI literacy course conceptual model*




## Recommendations

The AI literacy course can be taught by using a combination of lectures, discussions, and/or hands-on projects. Faculty members can also integrate individual components of the AI literacy model to foster AI literacy in existing courses. Emphasizing the interconnection between AI concepts in various disciplines can help students understand and apply AI in different subject areas. Using AI applications in existing courses can help faculty members integrate AI discussions organically into their discipline-specific courses. By incorporating AI literacy in disciplinary contexts, the framework facilitates a cohesive and interconnected educational experience for students, ensuring that the knowledge gained about AI aligns across courses. Although the exact nature of an AI literacy course could be tailored to specific program needs, competencies, and goals to be achieved, the following list of course components should provide a roadmap for designing and customizing a course to meet programmatic or institutional needs.

The following are sample course titles that can be used to give students an idea of course content:

- Introduction to AI
- AI Literacy for the Workforce
- Leveraging AI for Effective Learning
- Using AI as a Writing & Research Assistant
- Essentials of AI for <domain> (e.g., Essentials of AI for Business)
- Applications of AI in <domain> (e.g., Applications of AI in Healthcare)

## Sample Course Descriptions

Table 1 shows two sample course descriptions that can be adjusted based on learning outcomes for the AI course.

Table 1. *Sample AI literacy course descriptions*

| |
|---|
| ** This course is designed to inform students about the role of Artificial Intelligence (AI) in educational settings. With the increasing amount of AI tools being developed, AI can be a powerful medium for students to enhance their learning experiences, gain deeper insights, and develop critical-thinking skills. In this course, students will learn how to use AI models, such as ChatGPT, to generate natural language responses using relevant prompts.*<br><br>The course will start with an introduction to AI and its applications in academic research and practice. Students will be taught about various AI tools and specific terminology, such as machine learning and natural language processing. The course topics will include assessing the efficacy of AI models, detecting any probable biases, and incorporating ethical principles while utilizing AI, enabling the students to understand and address the ethical implications and limitations associated with AI technology.<br><br>** The course will cover various AI tools and platforms for specific applications. Students will be taught to use AI tools to analyze data, extract insights, and generate new knowledge. They will also learn how to integrate AI with existing research methods and how to choose the right AI tool for their specific research needs. Students will actively participate in hands-on exercises and use their knowledge and skills in real-world research scenarios. Students will work on individual and group projects to conduct academic writing and research using AI. By the end of the course, students will have a strong understanding of how to use AI to conduct research and be able to apply these skills to their future projects in the workplace.* |

Based on the previous discussion, an AI literacy course for college students would help students meet the following goals:

- Understand the basics of AI terminology
- Compose prompts to generate output based on user expectations
- Adjust prompts to fine-tune the generated output
- Debate the ethical implications of AI and how it can impact society
- Recognize the limitations of AI systems and their potential biases
- Understand the applications of AI in various industries
- Learn about the potential implications of AI for the future

The topics covered in an AI literacy course and the learning objectives are shown in Table 2.

Table 2. *Learning objectives for AI literacy courses*

| Topic | Learning Objectives |
|---|---|
| | *Upon completion of this course, students will be able to….* |
| AI Terminology | Demonstrate a comprehensive understanding of key AI terminology and concepts |
| Prompt Engineering | Design and implement prompt engineering techniques to enhance the output quality of AI language models |
| Prompt 1 (Beginner) | Write effective prompts to generate output from AI language models |
| Prompt 2 (Advanced) | Fine-tune complex prompts for better performance and reliability of output from AI language models |
| Prompt Optimization | Develop templates to be used as templates for complex tasks |
| Creative Writing With AI | Write AI prompts for creative writing projects, such as poetry, short stories, and screenplays |
| Academic Writing With AI | Use AI prompts for academic writing projects, such as research papers, essays, and dissertations |
| Business Writing With AI | Use AI prompts for business writing projects, such as emails, cover letters, résumés, reports, marketing documents, and proposals |
| Researching With AI | Demonstrate the ability to use AI tools for data collection, analysis, and presentation |
| Bias | Critically identify and assess bias considerations associated with the output of AI technologies |
| Ethics | Discuss the ethical implications and societal impact of AI technologies, including privacy, transparency, and accountability |

## Conclusion

As AI continues to shape our world and becomes prevalent in all industries, employers will increasingly seek AI-savvy candidates. College students must have the skills and knowledge to navigate the complexities associated with AI adoption. The challenge in teaching AI courses will be to set expectations that AI tools can support students' learning and reinforce the importance of thinking, reflection, and originality of thoughts (Weinberger, 2018). By offering AI literacy courses, higher education institutions can ensure that their students are competitive in the job market and have the skills necessary to succeed in the 21st-century economy. The importance of *ethical* AI literacy remains crucial and cannot be overstated when it comes to preparing students to work in a technology-enhanced workplace. As technology innovation becomes part of our daily lives, integrating AI literacy courses into the curriculum can provide students with an opportunity to develop relevant skills and become informed and responsible citizens who can make meaningful contributions to society.

## References


Aldabe, I., Farwell, A., Rigau, G., Rehm, G., & Way, A. (2023). Strategic plans and projects in language technology and artificial intelligence. In *European language equality: A strategic agenda for digital language equality* (pp. 361–386). Springer, Cham. https://doi.org/10.1007/978-3-031-28819-7_44

Bozkurt, A., Xiao, J., Lambert, S., Pazurek, A., & Crompton, H. (2023). Speculative futures on ChatGPT and generative artificial intelligence (AI): A collective reflection from the educational landscape. *Asian Journal of Distance Education*, *18*(1).

Cardona, M. A., Rodríguez, R. J., & Ishmael, K. (2023). *Artificial intelligence and the future of teaching and learning: Insights and recommendations.* https://tech.ed.gov/ai-future-of-teaching-and-learning/

Celik, I., Dindar, M., Muukkonen, H., & Järvelä, S. (2022). The promises and challenges of artificial intelligence for teachers: A systematic review of research. *TechTrends, 66,* 616–630. https://doi.org/10.1007/s11528-022-00715-y

Cope, B., Kalantzis, M., & Searsmith, D. (2021). Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. *Educational Philosophy and Theory, 53*(12), 1229–1245. https://doi.org/10.1080/00131857.2020.1728732

Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International,* 1–12. https://doi.org/10.1080/14703297.2023.2190148

Dalalah, D., & Dalalah, O. M. (2023). The false positives and false negatives of generative AI detection tools in education and academic research: The case of ChatGPT. *The International Journal of Management Education, 21*(2), 100822. https://doi.org/10.1016/j.ijme.2023.100822

Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023). From human writing to artificial intelligence generated text: Examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport, 40*(2), 615–622. https://doi.org/10.5114/biolsport.2023.125623

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., Carter, L., & Wright, R. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management, 71,* 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Faruqe, F., Watkins, R., & Medsker, L. (2022). Competency model approach to AI literacy: Research-based path from initial framework to model. *Advances in Artificial Intelligence and Machine Learning, 2*(4), 580–587. https://doi.org/10.54364/AAIML.2022.1140

Ghallab, M. (2019). Responsible AI: Requirements and challenges. *AI Perspectives, 1*(1), 1–7. https://doi.org/10.1186/s42467-019-0003-z

Giray, L. (2023). Prompt engineering with ChatGPT: A guide for academic writers. *Annals of Biomedical Engineering,* 1–5. https://doi.org/10.1007/s10439-023-03272-4

Haenlein, M., & Kaplan, A. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence. *California Management Review, 61*(4), 5–14. https://doi.org/10.1177/0008125619864925

Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology, 15*(2), ep421. https://doi.org/10.30935/cedtech/13036

Hassani, H., & Silva, E. S. (2023). The role of ChatGPT in data science: How AI-assisted conversational interfaces are revolutionizing the field. *Big Data and Cognitive Computing, 7*(2), 62. https://doi.org/10.3390/bdcc7020062

Hazari, S. (1991). Microcomputer training for higher education faculty. *Educational Technology, 31*(10), 48–50. https://doi.org/10.1016/0360-1315(91)90094-8

Hew, K. F., Huang, W., Du, J., & Jia, C. (2023). Using chatbots to support student goal setting and social presence in fully online activities: Learner engagement and perceptions. *Journal of Computing in Higher Education, 35*(1), 40–68. https://doi.org/10.1007/s12528-022-09338-x

Hickman, B. L., & Corritore, C. L. (1995). Computer literacy: The next generation. *Computer Science Education, 6*(1), 49–66. https://doi.org/10.1080/0899340950060104

Hisan, U. K., & Amri, M. M. (2023). ChatGPT and medical education: A double-edged sword. *Journal of Pedagogy and Education Science, 2*(1), 71–89. https://doi.org/10.56741/jpes.v2i01.302

Hishiyama, R., & Shao, T. (2022). Educational effects of the case method in teaching AI ethics. In A. Rocha, H. Adeli, G. Dzemyda, & F. Moreira (Eds.). *Information Systems and Technologies. Lecture Notes in Networks and Systems* (pp. 226–236). Springer, Cham. https://doi.org/10.1007/978-3-031-04826-5_22

Hutson, M. (2021). Robo-writers: The rise and risks of language-generating AI. *Nature, 591*(7848), 22–25. https://doi.org/10.1038/d41586-021-00530-0

Irons, A., & Crick, T. (2022). Cybersecurity in the digital classroom: Implications for emerging policy, pedagogy and practice. In The *Emerald Handbook of Higher Education in a Post-COVID World: New Approaches and Technologies for Teaching and Learning* (pp. 231–244). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-193-120221011

ISTE. (2022). *Artificial intelligence in education. Putting educators and students in the driver's seat.* https://www.iste.org/areas-of-focus/AI-in-education

Javed, R. T., Nasir, O., Borit, M., Vanhée, L., Zea, E., Gupta, S., Vinuesa, R., & Qadir, J. (2022). Get out of the BAG! Silos in AI ethics education: Unsupervised topic modeling analysis of global AI curricula. *Journal of Artificial Intelligence Research, 73,* 933–965. https://doi.org/10.1613/jair.1.13550

Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence, 1,* 389–399. https://doi.org/10.1038/s42256-019-0088-2

Jones, K. M., VanScoy, A., Bright, K., Harding, A., & Vedak, S. (2022). A measurement of faculty views on the meaning and value of student privacy. *Journal of Computing in Higher Education, 34*(3), 769–789. https://doi.org/10.1007/s12528-022-09320-7

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., Stadler, M., & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences, 103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kozachek, D. (2023). Investigating the perception of the future in GPT-3, -3.5 and GPT-4. *In Proceedings of the 15th Conference on Creativity and Cognition* (pp. 282–287). Association for Computing Machinery, pp. 282–287. https://doi.org/10.1145/3591196.3596827

Kumar, R. (2023). Faculty members' use of artificial intelligence to grade student papers: A case of implications. *International Journal for Educational Integrity, 19*(1), 1–10. https://doi.org/10.1007/s40979-023-00130-7

Laird, E., Grant-Chapman, H., Venzke, C., & Quay-de la Vallee, H. (2022). *Hidden harms: The misleading promise of monitoring students online.* Center for Democracy & Technology. https://cdt.org/insights/reporthidden-harms-the-misleading-promise-of-monitoring-students-online/

Limna, P., Kraiwanit, T., Jangjarat, K., Klayklung, P., & Chocksathaporn, P. (2023). The use of ChatGPT in the digital era: Perspectives on chatbot implementation. *Journal of Applied Learning and Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.32

Lin, M. P. C., & Chang, D. (2020). Enhancing post-secondary writers' writing skills with a chat-bot. *Journal of Educational Technology & Society, 23*(1), 78–92.

Lo, L. S. (2023). The CLEAR path: A framework for enhancing information literacy through prompt engineering. *The Journal of Academic Librarianship, 49(*4), 102720. https://doi.org/10.1016/j.acalib.2023.102720

Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence written research papers and the ethics of the large language models in scholarly publishing. *Journal of the Association for Information Science and Technology, 74*(5), 570–581. https://doi.org/10.1002/asi.24750

Marron, L. (2023). Exploring the potential of ChatGPT 3.5 in higher education: Benefits, limitations, and academic integrity. In *Handbook of Research on Redesigning Teaching, Learning, and Assessment in the Digital Era* (pp. 326–349). IGI Global. https://doi.org/10.4018/978-1-6684-8292-6.ch017

Martin, K. (2019). Ethical implications and accountability of algorithms. *Journal of Business Ethics, 160*(4), 835–850. https://doi.org/10.1007/s10551-018-3921-3

Mollick, E. (2023). ChatGPT as a tipping point for AI. *Harvard Business Review (online).* https://hbr.org/2022/12/chatgpt-is-a-tipping-point-for-ai

Ng, D. T. K., Leung, J. K. L., Su, M. J., Yim, I. H. Y., Qiao, M. S., & Chu, S. K. W. (2022). *AI literacy in K–16 classrooms,* 9–19. Springer, AG. https://doi.org/10.1007/978-3-031-18880-0_2

Ouyang, L., Wu, J., & Jiang, X. (2022). *Training language models to follow instructions with human feedback.* arXiv. https://arxiv.org/pdf/2203.02155.pdf

Perkins, M. (2023). Academic integrity considerations of AI large language models in the post-pandemic era: ChatGPT and beyond*. Journal of University Teaching & Learning Practice, 20*(2), 07. https://doi.org/10.53761/1.20.02.07

Reinhardt, K. (2022). Trust and trustworthiness in AI ethics. *AI and Ethics,* 1–10. https://doi.org/10.1007/s43681-022-00200-5

Sabzalieva, E., & Valentini, A. (2023). *ChatGPT and artificial intelligence in higher education: Quick start guide*. EDUQ.info. https://eduq.info/xmlui/handle/11515/38828

Shidiq, M. (2023, May). The use of artificial intelligence-based Chat-GPT and its challenges for the world of education; from the viewpoint of the development of creative writing skills. In *Proceeding of International Conference on Education, Society and Humanity, 1*(1), 353–357.

Smith, O. L., & Robinson, R. (2020). Teacher perceptions and implementation of a content-area literacy professional development program. *Journal of Educational Research and Practice, 10*, 55–69. https://doi.org/10.5590/JERAP.2020.10.1.04

Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching, 6*(1). https://doi.org/10.37074/jalt.2023.6.1.17

Trust, T., Whalen, J., & Mouza, C. (2023). Editorial: ChatGPT: Challenges, opportunities, and implications for teacher education. *Contemporary Issues in Technology and Teacher Education, 23*(1), 1–23.

Tsiakmaki, M., Kostopoulos, G., Kotsiantis, S., & Ragos, O. (2021). Fuzzy-based active learning for predicting student academic performance using autoML: A step-wise approach. *Journal of Computing in Higher Education, 33*(3), 635–667. https://doi.org/10.1007/s12528-021-09279-x

Weinberger, Y. (2018). Two birds, one stone: Integrating communication proficiency development into existing academic courses. *Journal of Educational Research and Practice, 8*(1), 9. https://doi.org/10.5590/JERAP.2018.08.1.09

Zamfirescu-Pereira, J. D., Wong, R. Y., Hartmann, B., & Yang, Q. (2023, April). Why Johnny can't prompt: How non-AI experts try (and fail) to design LLM prompts. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1–21). https://doi.org/10.1145/3544548.3581388

The *Journal of Educational Research and Practice* is a peer-reviewed journal that provides a forum for studies and dialogue about developments and change in the field of education and learning. The journal includes research and related content that examine current relevant educational issues and processes. The aim is to provide readers with knowledge and with strategies to use that knowledge in educational or learning environments. *JERAP* focuses on education at all levels and in any setting, and includes peer-reviewed research reports, commentaries, book reviews, interviews of prominent individuals, and reports about educational practice. The journal is sponsored by The Richard W. Riley College of Education and Human Sciences at Walden University, and publication in *JERAP* is always free to authors and readers.