The Role of Artificial Intelligence in Higher Education:
Literacy, Applications, and Ethical Considerations

Betul Lus
http://orcid.org/0009-0001-0311-0016
SUNY Empire State University, USA

Ruifang Hope Sun
http://orcid.org/0009-0009-9252-0567
SUNY Empire State University, USA

Thomas Louis Wiese
http://orcid.org/0000-0002-0233-5029
SUNY Empire State University, USA

Ye Chen
http://orcid.org/0000-0002-7406-2795
SUNY Empire State University, USA

ABSTRACT

Artificial intelligence (AI) is transforming various industries, including education, through the rapid advancement of generative AI tools such as ChatGPT, Microsoft Copilot, Google Gemini, and DALL-E. These tools offer groundbreaking capabilities in generating original text, code, images, audio, video, and other media forms, thereby creating opportunities to enhance productivity, performance, and innovation. This article emphasizes the importance of promoting AI literacy in higher education and introduces a six-phase framework, the 6-I Model, for the effective integration of generative AI in teaching and learning. Ethical considerations are also addressed to empower educators and students to engage with these technologies critically and responsibly. Practical applications demonstrate how generative AI can enrich the learning experience and foster a more engaging educational environment. The article concludes with insights into future trends and innovations, offering a forward-looking perspective on AI's transformative impact in higher education.

DOI: 10.4018/407455

INTRODUCTION

Artificial intelligence (AI) is a widely recognized and rapidly advancing technology that is fundamentally transforming various industries, including education. A groundbreaking innovation within this field is generative AI, a specific type of AI designed to create new content such as text, code, images, audio, video, or other forms of media. Generative AI tools, such as ChatGPT, have demonstrated transformative and innovative capabilities in processing and analyzing data, recognizing patterns, and creating content, even though they do not engage in genuine thinking and creativity (TalentSprint, 2025). The expanding capabilities of generative AI present an opportunity to harness its potential for enhancing productivity and performance (Bick et al., 2024; Chui et al., 2023).

As generative AI tools continue to evolve, their integration into higher education can significantly transform teaching and learning through innovative pedagogical approaches, including personalized learning, interactive learning, AI-powered intelligent tutoring, and enhanced support for collaborative learning (Rawas, 2024). These tools can significantly improve student learning outcomes and performance, enabling educators to plan and deliver their courses more effectively and efficiently. However, the effective engagement of both educators and students with these tools necessitates a robust understanding of generative AI literacy and associated ethical considerations, enabling them to critically evaluate generative AI tools and participate safely and ethically in an increasingly digital world.

This chapter begins by defining generative AI literacy and outlining key competencies, followed by a discussion on promoting generative AI literacy in higher education. It then introduces the 6-I model as a strategic approach to integrating generative AI in educational settings. The chapter highlights approaches for utilizing generative AI in education, presents examples of practical applications to enhance educational experience, explores associated opportunities and challenges, and addresses ethical considerations surrounding its use. It concludes with a discussion of future trends and innovations in generative AI within higher education, offering a forward-looking perspective on its evolving role.

GENERATIVE AI LITERACY: DEFINITIONS AND KEY COMPETENCIES

Generative AI refers to AI systems that are trained on large amounts of data to learn patterns and structures in data. This enables them to produce original, creative content such as text, code, images, audio, video, or other forms of media, in response to user prompts. These systems do not think or understand the world in the ways humans do; however, they are capable of simulating creativity by producing coherent and contextually appropriate content that resembles human-like reasoning. Some prominent generative AI tools that are widely used include ChatGPT, Microsoft Copilot, and Google Gemini, which generate human-like responses to a wide range of user prompts; GitHub Copilot, which assists with computer programming by suggesting code; and Dall-E, which creates realistic images based on text descriptions.

The development of generative AI represents a significant evolution from traditional AI models. Historically, AI development has focused heavily on discriminative AI, which is designed to classify or make predictions about data, such as identifying objects in an image or flagging spam emails (Kaddour et al., 2023). These systems learn to differentiate between categories based on labeled examples. Generative AI, in contrast, builds upon decades of research in neural networks and machine learning but takes a different approach by learning the underlying patterns of data to create new, original content that mirrors the data it was trained on (He et al., 2025). The key distinction lies in their function: discriminative AI labels existing data,