Chapter 8
Challenges of Integrating AI in Education

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ABSTRACT

Sociology and education have been left behind by advancements in artificial intelligence (AI). The fields of science, engineering, technology, and mathematics (STEM), as well as human-facing disciplines, have undergone profound shifts due to the integration of AI. Yet, unprecedented challenges remain, such as the obsolescence of competencies, intentionally or unintentionally programmed biases, misuse of AI tools, and other educational AI-enabled technologies. This can harm the integrity of education and fuel the stagnation of innovative development in education. The discussion steers toward significant implications AI integration brings with it for educators, learners, and policymakers. AI has become a tool for tangible innovation in transforming teaching and educating learners, but controlling its misuse needs a commensurate policy risk strategy. The chapter presents approaches to mitigate risks that encourage the ethical use of AI foster the so-called human component-led growth in system design.

INTRODUCTION

Artificial Intelligence (AI) is transforming education at an unprecedented pace, fundamentally reshaping how educators teach, how students learn, and how institutions assess knowledge (Luckin et al., 2016; Holmes et al., 2022). With its capacity to personalize learning, automate administrative and instructional tasks, and improve efficiency, AI presents immense transformative potential across educational systems

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(Woolf, 2010; Zawacki-Richter et al., 2019). However, this potential is accompanied by profound ethical, pedagogical, and social challenges. This chapter addresses three critical concerns that emerge from the integration of AI in education: skill obsolescence, technological misuse, and algorithmic bias. These interconnected issues, if not addressed, pose significant risks to the quality, inclusivity, and human-centered mission of education (Selwyn, 2019; Floridi & Cowls, 2019).

The most visible applications of AI in education include intelligent tutoring systems, predictive analytics, and automated assessments. AI-driven platforms now adapt content delivery based on individual learning profiles, monitor student engagement, and even forecast academic performance using data-driven insights (Zawacki-Richter et al., 2019; Holmes et al., 2019). Tools such as ChatGPT, Grammarly, and AI-enhanced learning management systems are increasingly utilized in both traditional classrooms and online environments to deliver instruction, reduce teacher workload, and provide real-time feedback (Cotton et al., 2023; Luckin, 2018). While these innovations offer clear benefits, they also raise unresolved dilemmas related to data privacy, academic integrity, equity, and the future role of educators—issues that demand a critical, interdisciplinary response (Williamson & Eynon, 2020).

This chapter seeks to explore the broader impact of AI on core educational values and learner competencies, with a particular focus on both STEM (Science, Technology, Engineering, and Mathematics) fields and human-centered disciplines such as the humanities, arts, and social sciences. STEM fields, often early adopters of emerging technologies, grapple with the dual imperative of maintaining technical efficiency while upholding ethical responsibility (Benjamin, 2019). Conversely, human-centered disciplines—rooted in empathy, critical inquiry, and social engagement—must adapt to AI tools in ways that preserve the interpersonal and ethical foundations of their pedagogical missions (Selwyn, 2019; Markoff, 2020). By examining these dynamics, this chapter aims to contribute a balanced, values-driven framework for integrating AI into education responsibly and equitably.

Three key research questions guide this inquiry:

1. How does AI integration contribute to or mitigate skill obsolescence in educational contexts?
2. In what ways is AI misused in educational environments, and what ethical frameworks can guide responsible use?
3. What are the manifestations and consequences of algorithmic bias in education, and how can they be addressed?

The significance of these questions is underscored by the evolving role of education in preparing learners not only for employment in a digitally dominated economy but

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