


Chapter 3

Challenges and Limitations of Implementing AI in Schools:

Barriers to Equitable and Effective Integration in K–12 Education

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ABSTRACT

This chapter addresses the challenging issues concerning implementation of artificial intelligence (AI) in K-12 education, investigates five areas of significant barriers to AI use: infrastructure, pedagogy, teacher readiness, ethics, and policy; identifies the digital divide, rigidity of the curricular, inadequacies of teacher training, attacks on data privacy and data biases, and insufficiencies in leadership; uses both global studies and real-life case illustration to problematize systemic barriers and offer opportunities to make them better. The chapter shows that in order to realize equitable access to AI, adequate professional development, ethical codes of conduct, and a relevant policy change, there needs to be a system wide impact and support to understand the capabilities of AI and radically change how AI could reshape education as we know it, while still keeping in mind the essence of education as a human process.

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INTRODUCTION & BACKGROUND

The advent of artificial intelligence (AI) in education signals a pivotal moment in the evolution of teaching and learning. Across the globe, K–12 institutions are increasingly adopting AI tools to enhance instruction, streamline administrative tasks, and tailor educational experiences to individual learners. The current trajectory of AI development in schools suggests not a passing trend, but a fundamental transformation one that is reshaping how knowledge is delivered, assessed, and internalized (Draissi et al., 2025). Recent studies highlight a surge in the deployment of AI-powered systems designed to support personalized learning, adapt to student behavior, and automate feedback (Javed et al., 2024; Kalim et al., 2025). These tools are capable of analyzing learner data in real time, enabling more informed pedagogical decisions and allowing educators to respond to diverse learning needs with greater precision. For example, adaptive learning platforms offer differentiated instruction by modifying content based on ongoing assessments of students' strengths and weaknesses (Chouhan & Shilpi, 2023; Luo & Hsiao-Chin, 2023; Malik et al., 2025). Such capabilities not only improve academic outcomes but also promote higher levels of student motivation and engagement.

In the context of primary and secondary education, AI applications extend beyond content delivery. A growing body of research identifies their utility in classroom management, formative and summative assessments, and even collaborative learning (Kotsis, 2025; Maqbool, 2025; Wang et al., 2021). AI-driven systems now support educators in identifying struggling students early, tracking behavior patterns, and administering real-time interventions. In doing so, they help educators shift from reactive teaching to proactive instructional design. Importantly, AI's impact is not confined to the student experience alone. Teachers, too, are being affected by this digital transformation. AI tools can reduce administrative burdens, assist in instructional planning, and provide actionable insights based on student performance data. However, this potential is heavily dependent on teachers' attitudes toward AI and their capacity to integrate these technologies into existing pedagogical frameworks (Maqbool et al., 2024; Rehman et al., 2024; Sarwar et al., 2021). Studies emphasize that when teachers are equipped with AI literacy and feel confident in the use of AI tools, the adoption process becomes significantly smoother and more impactful (Black et al., 2024; Woodruff et al., 2023; Zafeer et al., 2023). Despite these advances, the implementation of AI in schools remains uneven and fraught with challenges. While some institutions are pioneering the use of AI to foster collaborative, inclusive, and data-informed learning environments, others are hindered by structural, technical, and pedagogical constraints. These disparities reflect a larger issue: the readiness and capacity of educational systems to support the responsible integration of AI (Zmir et al., 2021).

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