Chapter 9
Equipping the Next Generation of Technicians:
Navigating School Infrastructure and Technical Knowledge in the Age of AI Integration

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ABSTRACT

As artificial intelligence (AI) continues to transform the demands of the global workforce, technical education must evolve to meet these emerging challenges. This chapter examines the integration of AI in technical education with an emphasis on the critical need for modern infrastructure and technical expertise. It highlights the importance of investing in facilities such as AI-equipped laboratories, reliable internet, and educator training programs to foster innovation and personalized learning. Collaboration between educational institutions and industry is explored as a means to bridge the gap between academic theory and real-world applications. Additionally, the chapter advocates revising curricula to combine AI literacy with technical skills, alongside critical thinking and adaptability, to meet evolving workforce demands. It concludes with a call for educators, policymakers, and institutions to prioritize inclusive, forward-thinking strategies to modernize technical education and ensure equity in access and opportunities.

DOI: 10.4018/979-8-3373-0122-8.ch009

INTRODUCTION

The rapid integration of artificial intelligence (AI) in various sectors has significantly transformed education, particularly in technical and vocational training programs. AI technologies are now reshaping the landscape of teaching and learning, offering unprecedented opportunities to enhance the skillsets of students (Ciavaldini-Cartaut et al., 2024; Windelband, 2023). As industries increasingly rely on AI-driven tools and systems, the demand for workers proficient in these technologies is rising. This shift necessitates that technical education institutions adapt to these changes by incorporating AI into their curricula to prepare future technicians for a highly digital and automated workforce (Rott et al., 2022). However, achieving this requires a robust framework that emphasizes both the acquisition of technical knowledge and the development of adequate school infrastructure to support AI-driven learning environments.

In technical and vocational education, technical knowledge remains at the heart of the curriculum, equipping students with the practical skills needed to thrive in fields such as engineering, manufacturing, and information technology (Cai & Kosaka, 2024). As industries evolve, the ability of future technicians to work with AI-powered systems, such as automated production lines or machine learning algorithms, becomes essential. The development of these competencies not only enhances their employability but also contributes to the overall competitiveness of the national workforce (McGrath & Yamada, 2023). Therefore, the successful integration of AI into technical education hinges on ensuring that students are equipped with relevant and up-to-date technical knowledge (Acut, Gamusa, et al., 2025; Hasanah et al., 2025). Equally important to technical knowledge is the role of school infrastructure in supporting learning. Educational institutions must provide students with access to state-of-the-art facilities, tools, and technologies to fully harness the potential of AI integration (Walter, 2024). Adequate infrastructure—including access to high-speed internet, AI-enabled labs, and advanced machinery—ensures that students can engage in hands-on, practical experiences that mirror real-world industry applications (Rintala & Nokelainen, 2019). In the absence of such infrastructure, the ability of technical institutions to effectively integrate AI into their curricula may be severely limited, thus impeding students' readiness for the AI-driven workforce.

MAIN FOCUS OF THE CHAPTER

This chapter explores how technical and vocational education can effectively address the challenges posed by AI integration, particularly in preventing skill obsolescence and ensuring infrastructure readiness. As AI transforms industries, technical programs must evolve to equip students with both foundational and emerging technological skills. The focus here is on ensuring that technical education institutions maintain essential, hands-on technical knowledge that prevents over-dependence on AI systems. A key part of this involves examining the role of school infrastructure in facilitating meaningful learning experiences. The chapter emphasizes the critical need for advanced tools, facilities, and AI-enabled environments that enable students to practice real-world applications of AI without undermining their fundamental technical capabilities. This approach helps mitigate one of the main concerns in AI education—the risk of technicians being trained on systems they do not fully understand, potentially leading to skill degradation. The scope of this chapter addresses the broader risks of how inadequate infrastructure and over-reliance on AI can exacerbate inequality in technical education. It explores the potential for AI to contribute to job displacement if educational programs fail to balance AI-centric