Chapter 7
Fostering AI Literacy in TVET and Professional Development Frameworks for Educators in the 21st Century

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ABSTRACT

This article highlights the importance of Technical and Vocational Education and Training (TVET) in preparing students for careers in AI-driven industries by outlining methods to enhance students' Artificial Intelligence (AI) literacy. The article finds major gaps in the current TVET curriculum, which do not adequately address the demands of vocational students by combining AI principles and practical applications. To address this issue, the authors suggest a curriculum design framework that incorporates AI literacy modules linked to employability skills to ensure their relevance and usefulness. To determine the long-term impact of AI literacy programs on job readiness, this chapter suggests looking at how well teacher training programs scale AI literacy projects and how creative AI technologies can improve learning outcomes. This article persuasively advocates for the integration of AI into vocational education, enabling students to acquire the necessary skills in a world where AI is becoming increasingly significant.

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INTRODUCTION

The rapid transformation and digitalization of new technologies are the hallmarks of the 21st century. The increasing use of artificial intelligence (AI) technologies in various fields of business and everyday life has drastically changed our lifestyles and social interactions compared to about ten years ago, in the early 2010. Computer vision, natural language processing, robotics and motion, machine learning, deep learning, and neural networks are just a few examples of the amazing technological advances that have occurred as a result of the widespread use of artificial intelligence (AI) in recent years (Jia et al., 2024; Rashid & Kausik, 2024; Al-Raeei., 2024). Many aspects of our daily lives have incorporated AI applications, such as learning and teaching processes, smart home appliances, smartphones, chatbots, and search engines. In addition, schools and universities are starting to use AI-enabled technologies to simplify administrative tasks for instructors and leverage personalized learning for students to provide a more engaging, practical, and supportive learning environment for students (Muthmainnah et al., 2024). As a result, artificial intelligence in education (AIED) has emerged as a distinct discipline in the past few decades.

In the digital age, Technical and Vocational Education and Training (TVET) is a vital part of any school system that teaches students the theoretical background and practical skills they will need to succeed in a variety of 21st-century jobs. Integrating these technologies into technical and vocational education and training (TVET) programs is becoming increasingly important as industries rapidly adapt to technological advancements, especially in artificial intelligence (AI).AI has the potential to radically transform the 6.0-based education methodology through more personalized learning and more effective teaching methods. By looking at its uses, advantages, disadvantages, and potential, this article seeks to investigate the incorporation of AI into TVET. The classroom is one setting where artificial intelligence (AI) is in use (Omeh, et al., 2024).

AI is defined as the capacity of machines to mimic intelligent human behavior. Leveraging AI in TVET can lead to personalized and meaningful learning experiences, automated practical routine tasks, and improved decision-making through precise data analysis. The demand for workers skilled in artificial intelligence and related technologies is increasing as businesses, including education, adopt modern technologies. As a result, it is imperative for TVET to incorporate and adopt AI, as it is not only beneficial but also necessary (Hashim, 2024). New AI tools and applications have the potential to improve the quality of education in technical and vocational training programs. For example, according to Alawneh et al. (2024), adaptive learning platforms and Intelligent Tutoring Systems (ITS) use AI to modify educational content based on the needs and success of each learner as needed. This creates a more effective, personalized learning environment. Importantly, for vocational education, AI-based simulations and VR provide immersive, hands-on teaching experiences that mimic real-world situations.

Students are better prepared to meet the needs of the 21st-century workforce thanks to these AI advancements, which also improve the quality of education. Incorporating AI into TVET presents both opportunities and barriers. Reluctance to change technology, inadequate infrastructure, and high implementation costs are major barriers to AI development in developing countries like Indonesia. Equal access to AI-enhanced learning opportunities also requires addressing ethical issues around data privacy and algorithmic bias (Lim and Lee, 2024). This study aims to gain a comprehensive understanding of the uses, benefits, issues, and future possibilities of AI in TVET. There has been much talk lately about how to incorporate AI into TVET, or technical and vocational education and training. By providing data-driven insights, automating administrative tasks, and delivering modern, personalized education,