Chapter 8
Artificial Intelligence Shaping the Future of Vocational Education and Training:
Roles, Impacts, and Insights

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ABSTRACT

This chapter analyzes the artificial intelligence (AI)'s role in vocational education and training (VET). First, the chapter reviews existing literature on AI's role and effects in VET, synthesizing findings to offer a comprehensive overview. Second, gathering insights from experts, lecturers, and commercial apprentices. This approach provides practical perspectives on AI's use in VET settings and its impact on educational practices and industry needs. A research framework is developed that identifies key areas for development and proposes research questions for future exploration. The final section provides practical recommendations to mitigate the negative impacts of AI in VET, including strategies for bridging user gaps, overcoming AI's limitations, and ensuring AI tools contribute positively to VET goals.

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INTRODUCTION

This book chapter addresses a gap in current literature by focusing on the applications and effects of Artificial Intelligence (AI) in Vocational Education and Training (VET), which has been underexplored compared to K-12 and tertiary education. The chapter provides a detailed analysis of how AI technologies can enhance VET by bridging the gap between theoretical research and practical application. Rosyadi et al. (2023) conducted a systematic literature review on AI in vocational education, revealing a lack of studies on AI's impact on VET's future, highlighting the need for further research.

The chapter will draw on insights from experts, lecturers, and apprentices at the Swiss Federal University for Vocational Education and Training (SFUVET) and review existing literature to offer a comprehensive overview of AI's role and effects in VET. It will explore AI applications such as personalized learning, adaptive assessments, and AI-driven career guidance, assessing both positive impacts and challenges like equity, data privacy, and job displacement. A research framework will be developed to outline effective strategies for AI integration in VET, providing practical recommendations to mitigate negative impacts and ensure AI tools enhance training outcomes.

Ultimately, this chapter aims to be a valuable resource for educators, policymakers, industry leaders, and researchers by offering an in-depth exploration of AI's potential in advancing VET. It will provide insights into forming effective partnerships between educational institutions and industries, creating robust internship programs, and aligning graduates with modern workplace demands, contributing to the ongoing discussion about the future of VET in a digital world.

BACKGROUND

Foundation Models of AI

Foundation models are large-scale AI systems pre-trained on extensive datasets that can be fine-tuned for specific applications, facilitating the rapid development of innovative AI products across various industries (Teubner et al., 2023). These models exhibit remarkable capabilities in generating and adapting content across diverse fields such as creative work (Chen et al., 2023), software debugging (Sobania et al., 2023), and text-to-image generation (Ramesh et al., 2021, July). As these models scale, foundation models expand their applicability to tasks beyond their initial training without needing additional data (Brown et al., 2020), and their performance can be further refined with cost-effective fine-tuning and prompt