Artificial Intelligence Literacy as a Core Competency for Lifelong Vocational Learning in the Age of Digital Transformation

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Abstract

The rapid expansion of Artificial Intelligence (AI) technologies is transforming contemporary labour markets and redefining the competencies required for professional success. As intelligent systems become increasingly integrated into industrial processes, service delivery, and knowledge-based work, education systems must adapt in order to prepare learners for participation in technology-mediated workplaces. Within this context, Artificial Intelligence literacy has emerged as an essential educational objective that extends beyond traditional digital skills and includes the ability to understand, interpret, and critically engage with intelligent technologies. This study examines the role of AI literacy as a foundational component of lifelong vocational learning. Using an integrative literature review methodology, the research synthesises recent scholarly contributions published between 2019 and 2025 from major academic databases including SCOPUS, Web of Science, and Google Scholar. The review focuses on three interconnected themes: conceptual frameworks of AI literacy, the evolving paradigm of lifelong learning, and the integration of AI technologies within vocational education and training systems across different regions. The analysis identifies three major findings. First, structured exposure to AI tools plays a significant role in demystifying intelligent technologies and enhancing learners' confidence in technology-mediated professional environments. Second, the integration of AI into educational systems generates both opportunities and challenges, creating a need for balanced pedagogical frameworks that encourage responsible technology use. Third, ethical awareness and critical evaluation skills are essential components of AI literacy, particularly in contexts where algorithmic decision-making influences professional practice.

The study concludes by proposing strategic recommendations for vocational institutions, including competence-oriented curriculum design, teacher professional development in AI literacy, and the cultivation of lifelong learning mindsets among students. These measures can help align vocational education with the technological realities of the emerging AI-driven economy.

Keywords

Artificial intelligence literacy, vocational education and training (vet), lifelong learning, digital competence, ai in education, future workforce skills.