

Chapter 13

Integrating Effect of AR and VR in Sustained Learning Outcomes in Self-Directed Learning Environments

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ABSTRACT

Education 5.0 emphasises not only the integration of technology in education but also a humanitarian approach by incorporating artificial intelligence. This approach focuses on the emotional, social, and intellectual growth of students, aiming to enhance their overall learning experience and foster sustainable learning outcomes for holistic societal development. AR and VR play a crucial role in this transformation,

DOI: 10.4018/979-8-3693-8191-5.ch013

offering immersive and interactive learning environments. Despite their significant benefits, AR and VR technologies are still evolving, presenting new challenges for educators and students as they advance. This chapter explores the transformative potential of AR and VR in enhancing learning outcomes within self-directed learning programs. It examines how these immersive technologies can create interactive and engaging experiences that promote better retention and application of knowledge. This chapter bridges theory and practice, providing educators, designers, and policymakers with better insights on using AR and VR to enhance self-directed learning.

1. INTRODUCTION

Education 5.0 has brought a paradigm shift in the landscape of the teaching and learning profession by incorporating Augmented Reality (AR) and Virtual Reality (VR) technology in education. Such technology-enhanced learning practice is far beyond the conventional mode of teaching and results in better interactive learning experiences (Tan et al., 2022). Furthermore, such technology intervention in teaching and learning practices helps the students to understand and grasp complex topics in a simplified manner. The use of AR & VR technology in education provides a unique immersive experience by simplifying complex content into customised content as per the requirement and learning ability of the student (Childs et al., 2021). The website report of Maunder (2018) projects that by 2023, the VR and AR applications in the education industry will have grown to a value of 19.6 billion with an annual growth rate of 16.2%.

1.1 Evolution from Education 1.0 to Education 5.0

The evolution toward Education 5.0 reflects a transformative integration of technology and pedagogy, aligned with society's changing needs. This progression starts with Education 1.0, which is teacher-centred, focused on memorization, and dominated by lecture-based instruction, where the teacher holds full authority. Education 2.0 shifts to a more progressive, student-centred model that emphasizes critical thinking and problem-solving skills. Education 3.0 introduces digital tools, integrating computers and multimedia to enhance student engagement and active learning. Education 4.0 is characterized by customized, blended learning, incorporating AI and machine learning to tailor educational content, fostering critical thinking and creativity (Ahmad et al., 2023). Finally, Education 5.0 adopts a human-centred approach, utilizing augmented reality (AR) and virtual reality (VR) to provide interactive and experiential learning, enhancing learning outcomes.

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