Chapter 1
A Systematic Literature Review of Serious Games for Physical Education:
Technologies, Implementations, and Evaluations

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ABSTRACT

This chapter examines the potential of serious games in physical education, focusing on technology integration, implementation, and evaluation. It explores how serious games enhance learning outcomes, curriculum integration, and user engagement by

merging AI technologies with learning theories. Aimed at educators, researchers, and developers, the chapter uses a systematic literature review and case studies to illustrate practical applications. It highlights various technologies like exergaming, game-based learning models, and computer-aided tools, showing their impact on student motivation and engagement. Despite challenges like cost and training needs, the chapter underscores the promise of AR, VR, MR, and immersive tools in revolutionizing physical education. Through adaptive programs, culturally responsive pedagogies, and diverse evaluation methods, the chapter demonstrates the effectiveness of serious games in creating inclusive and engaging physical education programs while addressing the need for cost-effective solutions and comprehensive training for educators.

INTRODUCTION

In modern education, serious games have revolutionized our perspective and approach to physical education by integrating the interactive allure of gaming with clear learning structures and objectives. Serious games, by their design, surpass traditional educational methods, offering an interactive platform that simulates real-world challenges and rewards learning within an engaging game-based environment (Miller et al., 2016). In physical education, these games not only motivate learners but also serve as a dynamic medium to impart knowledge about physical health, fitness strategies, and the significance of regular physical activity, harnessing technology to create an immersive learning experience (Soltani & Vilas-Boas, 2019). Studies have indicated that integrating serious games into curricula can enhance students' understanding of health and fitness concepts and boost their participation in physical activities (Cocca et al., 2020). The incorporation of innovative technologies such as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and motion capture into serious games has revolutionized physical education (Devrilmez et al., 2019; Mishra et al., 2024; Petil et al., 2024; Pradana et al., 2022). These technologies provide immersive experiences that can mimic physical activities and sports in a controlled setting, as well as immediate feedback and personalized training regimens, thereby elevating the learning curve and deepening comprehension of physical education concepts (Azlan et al., 2020). Recent research shows that utilizing these technologies not only increases student engagement and motivation but also assists in developing better motor skills and a more robust health knowledge base.

Assessing the effectiveness of serious games in physical education poses unique challenges, requiring a combination of qualitative and quantitative research methods to assess learning outcomes, levels of engagement, and behavior change. This chapter is a systematic literature review that draws from a variety of sources, such

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