# Chapter 13
# Virtual Reality and Metaverse Methods to Supporting the Simulation Training

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## ABSTRACT

*The COVID-19 pandemic has caused a change in educational practices, with most students now attending courses remotely via video conferences. Students are less likely to actively participate in class as a result of this shift. Notably, practical lessons need both empirical and theoretical understanding, which video education falls short of providing. The current distant methods of practical education have their limitations. This research proposes a system that uses metaverse and virtual reality techniques in the classroom to address these issues. The proposed system is used to*

DOI: 10.4018/979-8-3693-6839-8.ch013

*build an aviation repair simulator and test it against video instruction. Knowledge retention and acquisition tests were evaluated, and presence was explored via survey replies, to assess the efficacy of the educational process. The experimental findings indicate that the team using the above-proposed approach achieved superior scores compared to the video instruction control on both knowledge assessments.*

## 1. INTRODUCTION

Virtual learning has replaced traditional classroom instruction as a result of the COVID-19 epidemic. Many forms of electronic communication, such as video conferencing, email, and voicemail, are available online (López-Ojeda & Hurley, 2023). Video conferencing services are widely used for remote training and corporate meetings since they remove the physical barrier. It is anticipated that real-time video communication systems will continue to develop even after the epidemic has ended, to these benefits (Bansal et al., 2022).

Zoom fatigue, which suggests that video instruction and meetings cause a sensation of exhaustion, has arisen, however, in tandem with the proliferation of online education (G. Wang et al., 2022). Zoom fatigue may be caused by a variety of things. One reason for this is because, unlike in-person meetings, everyone's face is visible. Additionally, the participant's ability to roam about is limited by the distance their camera can capture (M. V. S. 2021, December). The mental strain of constantly staring at one's reflection in a meeting's live feed is a third source of exhaustion. In addition, both educators and their pupils have had to adjust to novel approaches to education, for which many were unprepared (Boulos et al., 2007b).

When compared to in-person courses, students' engagement in video education is much lower. Problems with classroom socialization and the absence of non-face-to-face contact with teachers have been reported by certain children (Boulos et al., 2007). The inability to supplement theoretical understanding with hands-on experience is a major drawback of online courses. An educational approach that combines theory with practice, known as a compound technique, is necessary to guarantee meaningful engagement (Park & Kim, 2022).

Dale's Cone organizes the learning process as a progression from lower-level, empirical, detail-based learning to higher-level, language-based, outline-based learning. Dale recommends a real-world classroom setting that strikes a good mix between concrete and conceptual learning. The goal of this proposal is to develop a new approach to education that combines generalizable and domain-specific knowledge by bringing together VR and the metaverse (Patro, P. 2021, December). VR lets users engage in an artificial atmosphere, giving distance learning a new twist. Students may practice safely in potentially dangerous real-world scenarios using