Chapter 8
The Revolution in Integrating Virtual Reality in E–Learning

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ABSTRACT

The virtual reality (VR) concept has been in existence for more than half-a-century. This technology's growth has been predominant recently because of the availability of plenty of technological solutions that support VR content. Coronavirus (COVID-19), a virus outbreak, has taken the whole world to an unexpected critical phase where social distancing is an inevitable part of life. Notably, the education sector faces a huge challenge, and VR technology has become the need of the hour during this pandemic as most learning takes place in virtual mode. VR equipment and software applications were highly priced at one point. Still, the present scenario is entirely different, with plenty of hardware and software resources available at affordable pricing. This study aims to identify the benefits, needs, and opportunities open for virtual reality-enabled e-learning and offer a generic methodological framework for efficiently implementing VR in e-learning. Analysis of this study indicates that VR technologies have rebooted their presence in the education.

1. INTRODUCTION

Virtual reality is a scenario where the simulation is very close enough to the real-world situation, which suspends the users' beliefs by immersing them in the simulated environment. This technology's vast applications include games, education, construction/architectural visualizations, military training, medical training, etc. This COVID-19 pandemic has pushed the world to adopt computer-based communication tools to help learners continue their studies wherever they are. Despite engaging the students with multimedia tools like PowerPoint presentations, videos, graphics content, games for learning, etc., students still get less time or almost no time to interact with the teachers remotely through the learning manage-

ment systems. Recent studies show that the use of VR in education has shown increased effectiveness in the teaching-learning process.

Virtual reality concepts and applications can help support online education, like how it supports brick-and-mortar education. The concepts of VR discussed in this paper will effectively help overcome the online teaching-learning process. For this purpose, the researchers have worked together to identify and propose a new architecture for e-learning with VR by modifying the existing generic architecture for e-learning. Figure 1 shows the most straightforward architecture widely followed for remote teaching-learning. Not all e-learning courses are the same; they differ based on the syllabus and learner cohort. Corresponding to the course's weightage, content depth, and delivery styles, e-learning architecture is categorized as receptive, directive, and guided discovery (Clark, 2005).

Figure 1. E-learning Architecture
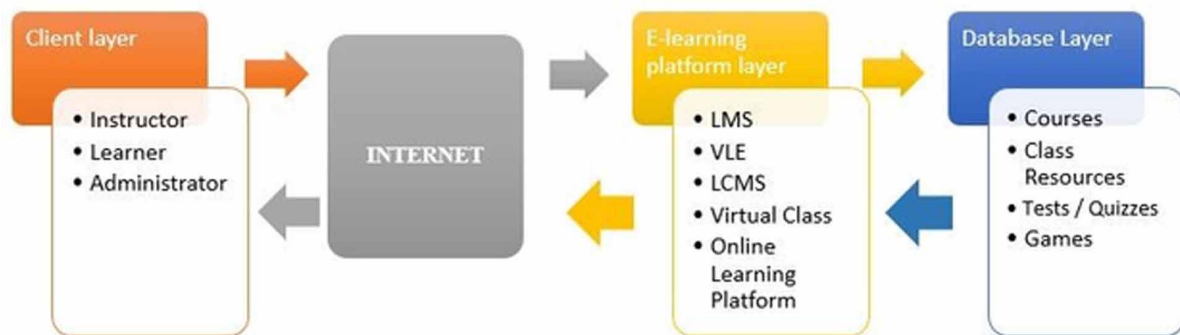
There is a significant increase in learning digitally through online mode, which is different from the usual learning methods that mostly use text alone (Parong & Mayer, 2018). Especially during the pandemic times, online education is the only alternative to regular studies. As juxtaposed in Table 1, a total of 1,091,439,976 learners were affected by COVID-19 school closure, which is 62.3% of the total enrolled users from 123 countries.

The projected data clearly shows a definite need for online education with a more robust capacity that would not be lower than regular instruction standards. Figure 2 highlights this alarming issue's importance, as the global pandemic has been widespread for about four months.

It is vital to understand that preparing ourselves for a virtual learning space opens international doors for teaching and learning. This new normal of education is a big challenge for all educational institutions across the globe as it forces them to shift from offline to online mode (Dhawan, 2020). VR offers a wide range of benefits when used offline or online; understanding VR's benefits is the first step in using this technology in a virtual classroom.

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