


## Chapter 6

# Implementing Augmented Reality Into Immersive Virtual Learning Environments: Implementation of Augmented Reality Technologies in Immersive Education Programs

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### ABSTRACT

*Technology is ever-changing and ever-growing. One of the newest developing technologies is augmented reality (AR), which can be applied to many different existing technologies, such as computers, tablets, and smartphones. This chapter discusses the immersive learning process and the usage of AR into a simulated or in an artificial environment. Discussed is the background information on how the AR use in educational industries and the design process of AR immersive learning environment. The chapter also evaluates the benefits if immersive learning and AR.*

### INTRODUCTION

In today's global economy, technology has become a central and important part of our lives. It has modified how we think and apply knowledge. One of the latest developing technologies is Augmented reality (AR), which can be used with computers, tablets, and smartphones. AR affords the capability to overlay images, audio, video, and text components onto images or real-world spaces. AR is the latest in immersive learning experiences and the most immersive of new technologies because AR involves learners visually, aurally, and physically in a way that no other immersive learning technique can. In the

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future, there is the potential of creating entire virtual worlds where learners can train for various tasks in myriad educational areas.

This chapter aims to explore and examine the implementation of AR using immersive learning in an educational environment. The outcome of this examination and implementation process could be set as a baseline for further enhancement, development, or innovation. The objectiveS of this chapter is as follows:

1. To discussed immersive learning encourages the student to learn easily.
2. As discussed the background information about the AR, how it is using in the educational atmosphere and industries environment.
3. To discuss the design and implementation of AR using immersive learning education.
4. To identify the problem of AR during the implementation.

## **BACKGROUND**

In immersive learning environments, learners receive new knowledge and skills in an environment rich in sensations, perceptions, and emotions. The major benefits of AR are the interactions between the learning context and content, physical objects, and virtual objects. AR technology has obtained a following in the different educational areas for its capability to bridge gaps and bring a more tangible technique to learning. The ultimate aim focuses on the enhancement of student results throughout the educational process.

Immersive learning adds digital experiences to education that addresses the problem in education of the lack of student excitement, attention, and engagement. Virtual learning uses simulated or artificial surroundings to create unusual learning experiences for students. Immersive learning, as the name implies, empowers students to immerse themselves in interactive digital settings. AR uses sounds, images, and other sensations to provide students a full sensory activity, causing them to develop a “feel” for the virtual space. Immersive learning techniques encourage students to experience, examine, and navigate real-world subjects otherwise not possible in traditional classrooms.

Research has shown that AR can be implemented in various fields and be useful (Wu et al., 2013). More industries are using AR technology as an innovative way of increasing productivity (Kim & Rhee, 2011; Koo & Shon, 2010; Woods et al., 2004). Research has shown that the intergration of content-based AR can enrich knowledge content and stimulate learners’ motivation to learn (Li et al., 2016). Students can experience immersive virtual learning by integrating interactive AR-enriched learning content and curricula. Immersive AR learning in the classroom assures active student responses in the learning process. There are various kinds of AR structured to various models (Kiryakova, 2020). These include:

- Stationary AR systems are equipped with powerful cameras and can present an accurate perception of objects and scenes of reality. Examples of stationary systems are the virtual fitting places designed in real stores.
- Spatial AR systems are known as video mapping or projection mapping. Spatial systems project virtual content in the original dimension and proportions right onto real-world objects. Many companies from the automotive industry adopt such systems to introduce their new designs. On the other side, video mapping presentation programs are getting great concentration from consumers.

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