

## Chapter 5

# Modern Online Learning Tools Over the Platform of Virtual/Augmented Reality

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### ABSTRACT

*In this chapter, we are to develop the idea of using online virtual reality (OVR) or online augmented reality (OAR) concepts for redesigning academic laboratory equipment or any kind of virtual classes to enhance the efficiency of learning process. One of the main advantages of OVR is the interactions of students with each other from different locations. In the framework of the OVR lab, students are beyond the physical limitations. In virtual classroom environments similar to the real classrooms, one can walk in and see auxiliary objects made by the teacher to improve the learning efficiency. The VR setup provides the opportunity for surgeons to have a realistic picture of post-operation. In the subject of interior design, students can easily change and select various elements including the texture, color levels, the context, lights, shadows, and location of various apparatus. A questionnaire was set to get feedbacks from the students with very much positive result. The virtual world can get more and more similar to the reality.*

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## **INTRODUCTION**

The rapid growth of virtual reality (VR) technology helps researchers and teachers to invent and discover many new horizons for this concept, (Burdea and Coiffet, 2003). Some well-known applications of VR are in biological treatment (Opdyke et al., 1995), game industry (Zyda, 2005), and simulators for skill training (Grantcharov, 2004).

The application of virtual reality for engineering undergraduate and postgraduate teaching, learning and training was studied in (Abulrub et al., 2011). In this study, it is demonstrated that virtual reality technology can improve the productivity of teaching and training by permitting engineers to apply theoretical knowledge to real industrial problem. Furthermore, it even can increase creativity and problem solving skills in engineers. The Technology of the Augmented Reality (AR) is introduced by (Kesim and Ozarslan, 2012) and its great potential for educational points are also explained. They illustrated the seamless interaction between real and virtual world, which can really be useful for educational purposes.

A review on immersive virtual reality in education was done by (Freina and Ott, 2015). Authors concentrated on papers which had been established during the years 2013-2014. They found that most of the papers refer to the university and pre-university learning courses, especially for teaching scientific subjects such as physics, chemistry, and astronomy. Furthermore, Virtual Reality (VR) and Augmented Reality (AR) have been used for training adults in some subjects e.g. the possibility to move safely around dangerous places. Most investigations report experiments in high schools or adults training and very little has been reported on younger children and in the field of disability.

Virtual reality also can be used for psychological intention e.g. with the purpose of helping Autism, one can use Virtual Reality for simulating a real world based on computer graphic which can allow instructors and therapists to offer a safe, repeatable and diversifiable environment during learning (Bellani et al., 2011). In the research (Cheng et al., 2015), virtual environment was utilized for increasing social understanding and skills of children with autism spectrum disorders (ASDs). It was found that using virtual reality is very applicable for teaching methods of communication to children with ASD in safe and convenient environment without any stress.

Moreover, there are a lot of researches over Application of Virtual Reality for helping people who are suffering ASD but recently a case study was performed that investigated the acceptance, presence and even negative effect of Virtual Reality to support people with ASD which gave very useful statistical information (Newbutt et al. 2016).

Virtual reality also can help second language learners, in the research (Cheng et al. 2012), the application of Virtual Reality for instructing second language is presented. The authors have simulated a graphical environment which students are able to travel virtually to China on a class field trip. They can learn new language in this artificial environment.

Moreover, an intelligent architecture in virtual environment was made in order to help new language learners (Hassani et al., 2013). In this program authors try to teach learners how to communicate in public places such as airports and TV stores. In this regards, one can find additional researches and experimental results which try to teach new language in innovative method using virtual reality technology (Comas-Quinn et al., 2012), (Ernest et al., 2013), (Berns et al., 2013) and (Si, 2015).

Within education, concepts such as distance learning and open universities are now becoming more widely used for teaching and learning. On the other hand this concepts need availability to laboratories which are capable to be used on-line. Therefore, using virtual laboratories can help to develop educa-

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