

Chapter 5

Application of Augmented Reality and Virtual Reality in Education

Dharmpal Singh

JIS College of Engineering, India

Abhishek Banerjee

Pailan College of Management and Technology, India

Ira Nath

 <https://orcid.org/0000-0001-9648-0819>

JIS College of Engineering, India

ABSTRACT

Augmented reality (AR) and virtual reality (VR) play an important role in today's world. Due to COVID-19, we all are doing many things by online mode. In this virtual place, the importance of AR and VR increases tremendously. With AR and VR tools, students have an inimitable chance to explore historic destinations while remaining in the classroom. Moreover, AR and VR tools provide students the ability to gain deeper understandings of abstract or complex subjects and phenomena that are relatively difficult to understand only by two-dimensional text, pictures, and video. This chapter discusses the similarities and differences of AR and VR and the evaluation of the application of AR and VR into educational programs.

INTRODUCTION

Augmented Reality (AR) and Virtual Reality (VR) play an important role in today's world. Due to COVID-19, we all are doing many things by online mode. In this virtual place, the importance of AR and VR increases tremendously. With AR and VR tools, students have an inimitable chance to explore historic destinations while remaining in the classroom. Moreover, AR and VR tools provide students the

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ability to gain deeper understandings of abstract or complex subjects and phenomena that are relatively difficult to understand only by two-dimensional text, pictures, and video.

Today students are familiar with all forms of technology and use these at school as well as at home. They have grown up with technology from a very early age and they do not have any fear or hesitation about using it. At this time, we live in a technological society. So, it is important to implement VR and AR as one of several forms of technology to educate tomorrow's citizens. Education has moved on from books, pencils, and pens to the use of interactive technologies to help impart knowledge and understanding. Computers have become an important part of everyday life that it can be difficult to remember a time when they did not exist. It has been used since the abacus approximately 5000 years ago. Computer technology in the classroom can improve teaching and learning and boost up student achievement, compared to teaching without such aids.

BACKGROUND

VR is a combination of different types of technologies that are used to visualize and provide communication with a virtual environment that belongs to 3D Space. It may be realistic, imaginary, macroscopic, or microscopic (Christou, 2010). VR may be used to make it broadly applicable to many areas in education. A key feature of VR is that it allows multi-sensory interaction with the space visualized.

VR is a realistic, collaborating 3D computer-generated environment in which we can experience our existence and interact. VR is the utilization of computer technology to develop a virtual platform. VR creates feelings or realization inside the users. VR creates an environment through which we can visualize, understand, realize, and interact with each other to explore one matter virtually (Woodford, 2020). VR is used in various fields to visualize data in the development of drugs, and in the training of pilots and the military.

AR enables the connection of the digital and physical domains. It is one of the new technologies applied to education. It has already begun to show promise in helping students learn more effectively and increase knowledge retention, relative to traditional 2D desktop interfaces. It supports the understanding of complex phenomena by providing unique visual and interactive experiences that combine real and virtual information and help communicate abstract problems to learners. AR can support knowledge of a real-world environment where the objects that exist in the real world are improved by computer-generated perceptual information, sometimes across multiple sensory modalities.

AR is when the user's physical world is added to, or augmented, with computer-generated input such as sound, video, graphics, GPS, and more. It can be defined as a system that fulfills three basic features including a combination of real and virtual worlds, real-time interactions, and accurate 3D representation of virtual and real objects. It is used to enhance natural environments or situations. In comparison to VR, AR does not create the whole artificial environment to replace real with a virtual one.

AR is connected to the interactive concept with the growth of the Internet and smartphones. It is directly projected 3D models onto physical things or focused together in real-time. AR apps typically connect digital animation to a special 'marker', or with the help of GPS in phones pinpoint the location. This technology expands our physical world, adding layers of digital information onto it. AR is view of an existing environment with sounds, videos, and graphics added to it. AR integrates digital information with real environments where everything is processed and produced in real-time.

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