Chapter 10
AI and AR:
A Copacetic Approach in the New Educational Environment

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ABSTRACT

This chapter presents some of the possibilities and approaches that are used in the application of AI (artificial intelligence) and AR (augmented reality) in the new learning environments. AI will add another dimension to distance learning or eLearning that in some cases already includes AR (augmented reality) virtual learning environments. Because of this advent in available technology and the impact it will have on learning, assessment of newly structured parameters and their impact on student outcomes is crucial when measuring student learning. For some of us there might be a concern about the domination of AI as seen in the movie The Terminator, but we can take ease in the notion that it is not only AI versus humans. A new version of human augmented intelligence (HI) is being developed as we speak.

INTRODUCTION

Rensselaer Polytechnic Institute (RPI) introduced Virtual Reality (VR) that uses a 360-degree virtual environment to teach Chinese to its students. Partnering with IBM Research, two RPI faculty members initiated the project to replicate the benefits of language immersion in social interactions and role-playing games, maximizing language retention. During the pilot program in 2017, researchers noted a significant qualitative improvement in engagement, and these improvements helped students master Chinese (Hao, 2019). Beyond language learning, immersive virtual experience has the ability to link students to hyper-realistic events in history. As Artificial Intelligence (AI) simulations improve in quality, based on the responses by user inputs from a variety of sensors such as microphones and cameras, *learning by doing*

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will become an educational norm through personalized AI output and VR immersion. With professional skill sets, language eloquence, and engineering competency, learning will be available to all students, and their learning will be tailored to their educational objectives (Diamandis, 2019; Hao, 2019).

As the Internet grew exponentially from 40 million users in 1996 to more than 300 million users by 2000, it has now reached a staggering number of 4,536,258,808 users (internetworldstats). Internet usage is soaring exponentially, and the use of eLearning parallels this rise as well. eSchool News cited that the use of AI in education will grow by 47.5% through 2021 as the world becomes more interconnected (Ascione, 2017).

Briefly, Augmented Reality (AR) enhances the learning experiences of students by using 3D synthetic objects for them to interact. That is, AR enables students to use 3D synthetic objects to augment the visual perception of some target. Augmented Reality has exceeded over 2,000 AR apps on a staggering number of more than 1.4 billion active iOS devices. Whether we choose to embrace it or not, the fact is that this technology is now penetrating our lives. The International Data Corporation (IDC) forecasts that over the next four years, AR headset production will rise 141% each year, reaching 32 million units by 2023 (Diamandis, 2019). Also, the AR market had record growth in 2018, and the Augmented Reality market is expected to earn $61.39 billion by 2023 according to research firm Markets and Markets (Diamandis, 2019). Moreover, AR is continuing to be one of the technological trends to watch for in the next decade. AR is here to stay and take over all industries, which includes use in education and training.

We can imagine the impact this technology may have in our education settings and some of the seemingly obvious benefits. Assistance for students with disabilities is one of those areas. We have approximately 3.5 million visually impaired individuals living in the United States alone (Varma et al., 2016). Developments in AI integrated smart glasses show that associated limitations could soon be reduced in severity. New ideas such as NavCog, AIServe, and MyEye, along with Microsoft's development of a Seeing AI app, which translates surroundings into audio descriptions for the blind through the lens of a smartphone's camera, will change our society. As technology evolves, AI will become more sophisticated, and advances in AI will have an impact on the US economy. Frey and Osborne (2017) examined automation via AI and identified the effects of automation of jobs. From their analysis, 47% of current US jobs are at high-risk of being replaced by machines. As indicated by Autor and Dorn (2013), the impact of automation harms middle-income jobs because these jobs are reflective of the tasks that are susceptible to automation.

More importantly, learning via AR often includes real-time feedback and provides verbal as well as nonverbal cues to foster students' sense of learning by being present, immediacy, and immersion (Kotranza et al., 2009). We must keep in mind that using AR does not replace actual learning, but it supplements students' learning. The main advantage for using AR systems in education could help students develop skills and knowledge more effectively (El Sayed et al., 2011). Because the AR tools present lessons in a 3D format, students can manipulate a variety of learning objects and handle the information in an interactive way that improves their learning. AR has an advantage to personalize the learning for each student and appeals to a multitude of learning styles that helps students improve their learning experiences. In addition to improved student outcomes, earlier research has concluded that AR has promising effects to enable AR to be blended with content to improve learning outcomes. Students who participate in kinesthetically-enhanced learning activities in AR have shown higher levels of student engagement (Anastopoulou et al., 2011; Dunleavy et al., 2009). From these studies, students provided their perceptions and attitudes towards this enhanced learning via the use of surveys. From these responses, embodied interaction via AR may improve student motivation in learning and improved outcomes.