

Associated Advantages and Challenges of Augmented Reality in Educational Settings: A Systematic Review

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Abstract

As a novel technology, Augmented Reality (AR) has gained a lot of attention in the education sector. Augmented reality in the education field offers new ways of learning and teaching. Augmented reality eliminates the gap between the real world and the virtual world. Regardless of the increasing number of studies in the augmented reality area, there is still a lack of studies that integrate and synthesize this body of knowledge. Therefore, this study aimed to conduct a systematic literature review to gain insights into existing empirical studies of AR and understanding the current state of research regarding AR in education. From the review of the studies, we recognized 40 primary studies focusing on AR in the education field. The results of this study disclose a growth in the number of augmented reality studies during the last three years. Moreover, several challenges and numerous advantages of using augmented reality technology in the educational setting were extracted and discussed. The results of this study can help scholars by providing a roadmap of augmented reality technology and highlighting guidelines for the successful implementation of the augmented reality systems in educational settings.

Keywords: Systematic Literature Review, Augmented Reality, Advantages, Challenges, Education, Learning, and Teaching

1. Introduction

Augmented Reality (AR) is considered as one of the furthestmost influential technologies which have attracted researchers in the education field (Akçayır and Akçayır, 2017). AR is defined “as a technology which overlays virtual objects (augmented components) into the real world” (Abad-Segura et al., 2020; Azuma et al., 2001). Nowadays, AR technology is extensively employed in the educational environment. One of the main and important reasons for the widespread usage of this technology is that it does not require costly hardware and complex equipment. This technology uses mobile or computer

devices. Hence, the use of this technology is not complicated and can be utilized in each level of the education process, from higher education to the university level. Several studies revealed that AR technology offers numerous opportunities when applied in educational systems (Cheng and Tsai, 2013). For example, Billingham and Duenser (2012) indicated that AR technology in a learning environment can influence the procedure of teaching and learning conventions. Also, Akçayır, et al. (2016) researched AR in science laboratories and revealed that AR technology can make improvements on learners’ laboratory skills as well as assist them to develop positive attitudes regarding laboratory work.