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Article

Study of Augmented Reality Based Applications in Education

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Abstract: A technology known as augmented reality mixes and communicates with both virtual and actual situations. Applications for augmented reality are being used in many industries, but education is the most significant. We can combine actual and virtual information, augmented reality (AR) technology helps kids study while strengthening their connection to their physical surroundings. Virtual reality technology, which is still in development, enables students to learn challenging subjects in a pleasant and simple method. Students can learn more about the objects by interacting with them in virtual environments. We can organise virtual excursions to museums and zoos in a completely different nation and work with teacher as if they were physically present. The use of augmented reality technology in various facets of education was demonstrated in this context. According to the recommendations offered at the end of the research, educators should carefully investigate prepared portions and practise them in their classes.

Keywords: augmented reality research and applications, field of education, pandemic process, digital transformation, virtual environment.

1. Introduction

Today's rapid advancements in science and technology have an impact on and alter people's lifestyles. Along with affecting individuals, this transition will also have an effect on the educational environment and process [1]. It is obvious that there has been a change in educational technology from the past to the present: from chalk and blackboards to computers and the internet, and even to smart technologies with artificial intelligence. It was difficult for education services to be left out given the extensive applications of computer and internet technology in our lives in recent years [2]. The characteristics of today's students, known as the Z generation or digital generation, need teachers to stay current with technological advancements and use the most appropriate technical instruments in learning environments. Applications of augmented reality in education are one of these new technologies. Academics have defined the term "augmented reality" in a variety of ways, according to a review of the literature. Some of the definitions are as follows: "A reality setting in which digital media objects are employed instead of actual world things," according to Milgram and Kishino [3], is what augmented reality is. Azuma [4] claims that augmented reality is a subset of virtual reality. According to this concept, augmented reality refers to virtual worlds that support existing reality. In this setting, users can interact with both virtual and actual items in augmented reality environments. The interactive environment between the virtual and real world is created through augmented reality. This is accomplished through the use of augmented reality [5, 6]. According to the definitions given in the literature, augmented reality is "actual worlds enriched with virtual things." Education, Health, Marketing, Video Games and Games, Tourism, Building, Cinema, Food, Museums and Art, and Automotive are among the

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primary industries where Augmented Reality (AR) Technology is being used. Although there are many industries that use augmented reality applications, education is by far the most important. The new possibilities offered by AR technology for education have started to catch educators' attention over time [7]. When assessing these new opportunities and advantages [8–11], take into account the following: to provide students with more adaptable and engaging learning environments; to captivate them in a way they have never been captivated; to increase their desire to study and their incentive to do so; to help them make active observations as part of their learning processes and formulate hypotheses based on these findings. When compared to the augmented reality technology frequently used in the education sector, wearable technology stands apart. Smart sensors in wearables can monitor bodily motion. These devices frequently make use of Bluetooth, WiFi, or mobile Internet access to sync wirelessly with your smartphone. The user is linked to her wearable device by sensors. The term "wearable technology" refers to a kind of technology that users can carry around at all times and that offers useful services in a number of areas, including entertainment, health, employment, information, education, sociability, and security. The use of wearable technology is growing in the educational sector. the setting for teaching and learning. Modern visualisation techniques enable students to examine existing instructional resources and learn new things [12].

2. Materials and Methods

The field of education is being quietly but progressively revolutionised by augmented reality (AR), which digitises classroom instruction and makes training more interesting and diversified. In this topic, recent literature-based research on the incorporation of augmented reality learning apps is provided. In order to evaluate participants' abilities to express what they read in writing, scoring keys were developed for their responses to the researcher's questions. The study discovered that while stories had no discernible impact on students' interest in or comprehension of what they were reading, they did have a positive impact on their capacity to express what they had read orally and in writing. The student's response to the text actually got better. In a similar study, Baysan and Uluyol [13] investigated the impact of augmented reality books on students' academic progress and attitudes towards the environment. The HITLibHZ-BuildAR program's AR-based materials were used in the lab for an experimental group of 22 participants, and courses were provided by researchers. As a result, according to the students' qualitative feedback, AR seems to be a promising technology. Educational AR apps should be used in subjects that need for 3D spatial visualisation, including geometry and geography, as opposed to technical training. As long as the platform is better developed and has a more polished design, participants are open to employing augmented reality in computer hardware training. (Figure 1).

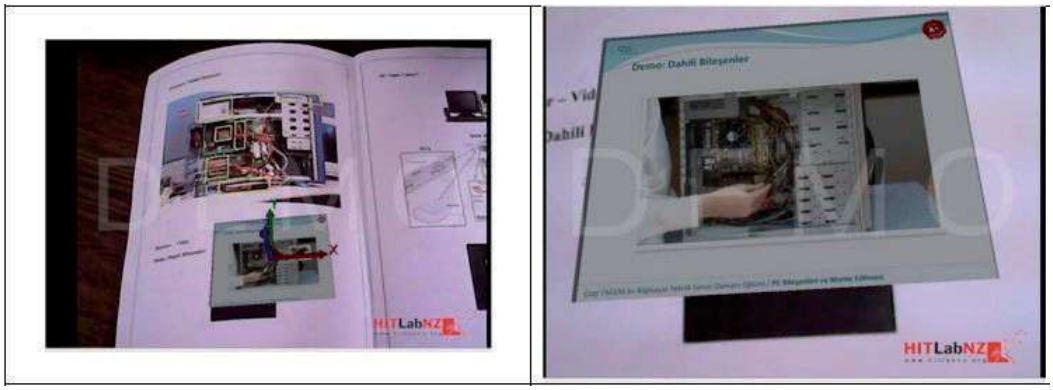


Figure 1. Augmented reality application book sample.

In their study, Almusawi et al. [14] examined innovation in physical education: instructors' perceptions on wearable technology integration readiness. The study is a case

study with 38 public school physical education teachers participating in semi-structured interviews. In the study, the following scheme was used: (Figure 2).

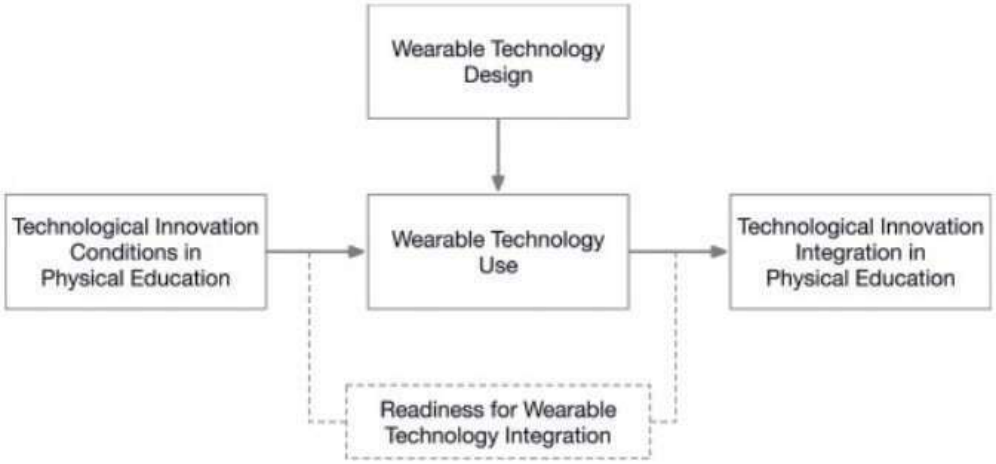


Figure 2. Augmented reality application book sample.

According to studies, wearable technology design aspects including material composition and gadget compatibility for physical activity are of interest to PE teachers. Using wearable technology that provides comfort, wearability enhancement, and injury avoidance, supportive, competitive, and evidence-based learning can address these issues in physical education. It is suggested to develop a cutting-edge learning environment where experience shapes technology. The volume of research in the literature suggests that augmented reality applications in medical education have become increasingly common recently. a review of all pertinent literature studies (Figure 3).

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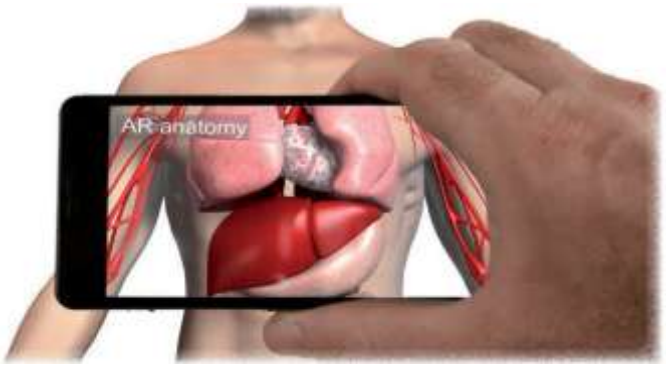


Figure 3.Use of augmented reality technologies in medical education

3. Results

Users of Augment can examine 3D models in Augmented Reality in real time, in their actual size and context, thanks to mobile applications built on the AR Core platform. They investigated how this application will impact technical drawing instruction in their study. In the technical drawing course from 2015 to 2016, the data gathered as a consequence of the use of augmented reality technology was assessed. Pre- and post-tests utilised in the survey revealed that students understand and embrace augmented reality technology, which is a contemporary instructional tool and increases their interest in the course. (Figure 4).

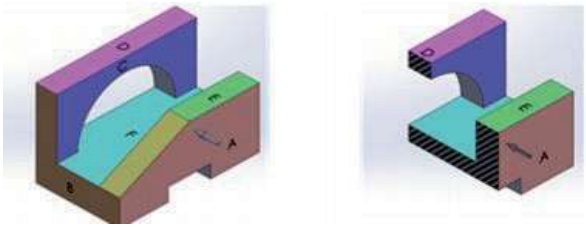


Figure 4. Technical drawing with 3D modeling with AR technologies.

The Google Translate app presently provides text translations in 103 languages, offline translations in 52 languages, and augmented reality translations in 30 languages, according to Google. Google Instant camera translation aims to make users' lives easier with its smart phone translation software; it now supports a total of 88 languages, with the addition of 60 additional languages such as Arabic, Hindi, Malaysian, Thai, and Vietnamese (Figure 5).



Figure 5. Augmented reality-based Google translate app.

Sketch AR, an application that mixes augmented reality with drawing, has recently become one of the most popular among artists. SketchAR, which is essentially a drawing app for artists, certifies that digital works generated by artists are unique and original, allowing them to be acknowledged as NFT (data unit). SketchAR, a Lithuanian project created in 2017 by Aleksandr Danilin, Alexander Danilin, and Andrey,



Figure 6. Drawing courses with SketchAR

Drobitko, provides a unique sketching experience to its customers by merging augmented reality technology with drawing, as well as artificial intelligence help (Figure 6).

4. Discussion

As part of the digitalization process, this research takes a close look at augmented reality settings and apps that are often employed in building learning and instructional environments in the education sector. The introduction of technology into the educational

environment has led to the adoption of a number of tools and resources into pedagogies as a result of study findings. In connection with this, we discover that using mobile tools and applications in the learning environment has increased recently. New, more interactive media environments are broadening the range of services available to users as a result of the rapid growth of mobile technology. Technologies that provide "Augmented Reality (AR)" are one of the places where this interaction is offered, allowing you to connect things in your virtual environment with things in reality. These techniques can be used to place virtual objects in real-world photographs. AR equipment includes cameras, computer infrastructure, markers, and physical objects.

5. Conclusion

One of the most significant industries where augmented reality technology is used is education. Applications for augmented reality facilitate student understanding of abstract ideas throughout the teaching and learning process and offer a setting in which students can exchange knowledge with one another. Also, a review of the research reveals that these settings greatly enhance student learning. Also, it was underlined that augmented reality helps students transfer knowledge and skills obtained in virtual environments to real-world scenarios in addition to increasing their interest, motivation, and experience in the field of education. The study's main recommendation in this regard is to use augmented reality settings and application learning environments more frequently. The usefulness of their use in education is determined to this extent at different levels and course topics.

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