

Game-Based Proactive Learning with Augmented Reality(AR)

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ABSTRACT

In this digital period in which we currently live, technology plays a vital role. With each passing day, new software or gadgets are being introduced in the tech market that improves our lives in one way or another and makes it much more comfortable. The mode of education was never the same, and it has changed continuously, today we have technology as our new mode of learning. Technology in education has the potential to drive pupils to learn more actively, resulting in a more effective learning process. Introducing enjoyable and interactive learning could capture the attention of young learners, hence improving teaching and learning. It improves one's ability to take in and grasp things. The application of Augmented Reality (AR) in the classroom has the potential to improve on traditional doctrine. This advanced technology enables users to interact with virtual environments and immerses them in realistic experiences. This application aims at teaching words by providing models of objects and tests the progress, resulting in a better learning experience for the user. This system increases the user's degree of freedom by connecting with mobile devices because of the interface's usability, portability and general convenience.

Keywords: Augmented Reality, virtual, realistic.

I. INTRODUCTION

Augmented Reality uses current reality and bodily objects to trigger simulated enhancements over the top of authenticity, in real-time.

Fundamentally, AR is a skill that lays computer generated images over an operator's view of the real world. By improving what we see, hear, feel, and smell, it blurs the boundaries between virtual and real-time surroundings. Augmented reality enhances

the real-world environment with text, sound effects, graphics, and multimedia. In other words, AR brings us an enriched version of our immediate surroundings by layering digital content on top of the graphic representation of the real world. AR can be conceptualized from diverse angles of characteristics including 3D visualization of objects. Several display devices: head-mounted display, desktop, handheld devices and overhead projector are used as display metaphors for AR modelling [5]. One of the design

requirements of AR is in choosing appropriate devices for the display.

One area which might significantly benefit in the future from this technology is the education process. AR tools could guide students through the learning process in an enhanced way, as AR can upgrade traditional books with a digital layer. AR will improve both teaching and learning experience, and bring interactive dimension into the whole picture. It is also predicted that this new layer will encompass several senses which could speed up the memorization process. As technology continues to advance, educators are constantly developing new and creative ways to teach their students. From the chalkboard and the projector to smart boards and tablets, the tools being utilized in education have rapidly changed within the last decade. In more recent years, educators have begun to add augmented

reality (AR) to their ever-developing range of educational tools. Augmented Reality has the potential to carry learning out of the classrooms into the spaces by combining technology that students are familiar with and locations that they see as their own. Encouragement of easily available informal learning may be particularly successful in engaging students, extending learning to settings that may help them make connections with content, the places that offer context for it, and the peers with whom they share it.

Learning should not be boring, and it should not be limited to rote memory, in which pupils learn and grasp concepts by repetition or cramming. Teachers can use the enthusiasm and imaginative thinking that comes with using technology in the classroom to help students perform better. Games can be used as a supplement to traditional teaching approaches to help students learn more effectively. Digital games that are played in a real world setting with a virtual layer on top of it are known as augmented reality (AR) games.

Players can engage with objects in the virtual world as well as people in the real world, preventing social isolation. An increasing number of studies An increasing number of studies concentrating on AR games for learning have arisen in recent years, owing to the benefits and good effects of AR technology and serious games in the educational sphere. Its purpose is to raise students' motivation and engagement, improve their visual skills, improve their interaction and collaboration abilities with their peers but it may be perceived as a distraction from learning. Students can better understand abstract subjects by combining AR technology with a game based learning strategy, which allows them to be in places where they would be difficult or impossible to be in real life and gain first-hand experience.

II. LITERATURE REVIEW

A. Learning using AR

In general, we can differentiate 3 types of learning[1]. Visual (spatial) learners use pictures, images and spatial understanding, with as many colours and other visual media as possible.

Verbal (linguistic) learners prefer the use of words, both in speech and writing. So, techniques involving speaking and writing such as word-based techniques of assertions and scripting help a lot this kind of learners.

Physical (kinesthetic) learners use body, hands and sense of touch as a medium of learning. Even use of physical objects helps this type of learning.

E-learning[2], when combined with various methods of communicating with others, can provide the child with a variety of communication options, which aids in his or her social development. It's also a way to encourage self-learning and the development of the child's senses and skills. E- learning in kindergarten

employs a variety of techniques to aid in the development of knowledge and skills.

With the help of AR, the information about the surroundings real world becomes interactive for the user and artificial information about the environment and its objects can be overlaid on the real world[1]. AR brings many advantages for teachers, as well, as it helps analyse the learning process of students and identify the elements that could be improved. As AR offers human and content interaction, students could stay more active during their learning process and could improve in the memorization of the content.

B. Constructivism Learning Theory[3]

According to [18], social constructivism not only recognizes the learner's uniqueness and complexity, but also fosters, construct, employs, and celebrates this vital component of the learning process for gaining knowledge. This study uses constructivist learning, which is self-directed, creative, and imaginative, to demonstrate the effectiveness of AR technology. It aligns with the study's goal of making teaching and learning more relaxed, creative, and inventive in order to develop new knowledge. Preschool students could build confidence and motivation by completing the assignment in an innovative and interesting learning environment. The researchers in this study use augmented reality (AR) technology to build meanings and improve preschool children's knowledge while they respond and provide positive feedback. Learning can take place in a virtual setting, according to research [19].

C. Vygotsky's Social Cultural Theory[3]

According to [17], when children, particularly preschoolers, are trying to understand something, they frequently speak to themselves. This self-talk aids individuals in figuring things out in their heads.

When preschool children learn in 3D, they frequently repeat the name of the particular animal, according to this study. [17] believes that as people become older, their "private communication" becomes less and less until it vanishes completely. Vygotsky believes that the learning curve begins at birth and continues throughout one's life. The "zone of proximal development," defined by Vygotsky, is one of the most essential ways that development progresses (ZPD). [17] The "zone of proximal development" argues that learners are pushed at a level just above, but not quite at, their current level of development. The pre-schoolers in this study acquire confidence and motivation by completing the activities. Scaffolding is frequently used in the classroom by teachers and other educators who want to take advantage of the benefits of ZPD.

D.. Game-Based Learning [6]

Several theories have been developed to overcome the monotony of traditional education. Educational games according to [15] are —software that enables students to learn the course contents or develop their problem-solving skills by using the game format. In the learning process, games can be used in various ways. Greenfield (1996), in his study examining the effect of digital computer games on socialization and cognitive development, found that children playing digital computer games showed the development of adults for a long time, their thinking and decision-making skills in games in a shorter period of time[16]. Today, there are many applications used educationally using augmented reality and virtual reality.

E. Gamification [6]

The use of game elements in the design of nongame processes or contents is called gamification

[13] defines the concept of gamification as —a discipline in which game related designs and game

mechanics are added into nongame environment. Participants concentrate on the activities they need to do within the game dynamics with higher motivation in the player role.[11] state that digital natives have high learning potential in online applications and game environments.

III. CONCLUSION

The line between the physical and digital worlds may blur in the future, as modern technologies enable personalized reality. Technology, which is always connected to the global grid, provides quick access to any type of information, regardless of the user's device. AR technology is a useful tool for combining the real world of learning with the virtual world created by computer software. When compared to the traditional technique of learning in the classroom, preschool children can gain a lot more information and experience in learning by using technology in the classroom. According to the findings, the AR technology created an entertaining and engaging atmosphere. As a result, using AR technology as an instructional tool is a solid foundation. Because the benefits and useful uses of AR features can engage students in learning processes and help them enhance their visualisation skills, this is the case. The features can also assist teachers in providing clear explanations and ensuring that students grasp what they are being taught.

The challenge now for educators and researchers is to create a more effective and better AR technology combo, as well as to make better use of AR technology in early childhood education.

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