

Lecture 11

Virtual Reality (VR) and Augmented Reality (AR) in Education

A. Introduction



Image 1: HOW MOBILE GAMES AFFECT STUDENTS (Source: Dimagiba, 2022: Online)

In our past lecture, Edgar Dale's Cone of Experience emphasized the importance of contrived encounters as essential teaching tools that connect abstract and concrete learning. He highlights the importance of their function in offering practical, experiential learning in a regulated setting, which improves understanding and memory. Through the simulation of authentic events, these experiences enhance learning effectiveness and provide learners with the necessary skills for real-life application (Bilbao et al., 2019).

Artificial experiences replicate authentic situations, offering practical and immersive education without the potential hazards or expenses of real-life errors. These learning activities, such as simulations or role-playing, allow learners to practice and apply skills in a controlled and realistic setting. Stimulating sensory modalities and eliciting emotions augment comprehension and long-term memory, creating an immersive learning experience. This approach serves as a means to connect theoretical concepts with practical applications, effectively and safely equipping learners to handle real-life circumstances.

Virtual reality is categorized as a contrived educational encounter due to its ability to replicate real-life surroundings, enabling users to engage in immersive, interactive training inside a secure and regulated environment improving learning and memory retention.

This lecture will help you explore the potential of using virtual and augmented reality as contrived teaching and learning technology.

Lecture 10 Conclusion

Gamification is crucial in education since it amplifies engagement, motivation, and learning results using interactive experiences. It cultivates the development of critical thinking, problem-solving, and collaborative abilities, equipping pupils for triumph in a rapidly changing and technology-centered society.

B. Lecture Objectives

After this lecture, you are expected to:

1. Differentiate Virtual Reality (VR) and Augmented Reality (AR) in the context of technology for teaching and learning; and,
2. Determine the learning essentials when using VR and AR in teaching.

C. Lecture Content

1. Contrived Learning Experiences through Virtual and Augmented Realities

Contrived learning experiences are essential in education as they connect the divide between theoretical understanding and practical implementation (Bilbao et al., 2019). These educational tools, including simulations, models, and virtual and augmented realities, offer learners a secure and regulated setting to actively interact with the subject matter. Through the replication of real-life events, they improve comprehension, memory, and the capacity to apply acquired abilities to real-world contexts. In addition, they cater to a wide range of learning styles and foster the development of critical thinking, problem-solving, and decision-making abilities. Moreover, these experiences mitigate the hazards and expenses of real-world applications, rendering them proficient and potent educational instruments. Ultimately, they provide learners with a more thorough preparation for real-life obstacles.

Virtual Reality (VR) and Augmented Reality (AR) are contrived learning tools used in education to generate immersive and interactive environments for

teaching and learning. They increase participation, offer lifelike simulations, enable practical experience, and boost understanding and memory by incorporating digital components into real-life environments.

A. Virtual Reality (VR)

VR in education is a technology that generates computer-based settings that fully engage users and allow them to interact with simulated items and scenarios. It improves educational experiences by offering practical, hands-on exercises that boost engagement, comprehension, and retention through interactive, experiential learning.

VR is a computer-based technology that creates the illusion of being immersed in another universe. VR glasses are used to substitute the observable reality with computer-generated graphics. The glasses have a display that obstructs your vision of the external environment. The perception of depth in the virtual environment results from the minor differences in the images seen by each eye. Put simply, you can observe this virtual three-dimensional realm.

The following are popular educational VR apps based on Bookwidgets Teacher Blog (2023) across subject areas.



ImmerseMe (Language Learning). This app is an academic language tool in the world. The application offers a selection of 9 distinct languages and over 3000 diverse scenarios from German, Spanish, French, English, Japanese, Chinese, Italian, Greek, and Indonesian languages. In this VR app, users can experience scenarios like dining at a German restaurant, conversing with street locals in Italy, strolling along Sakura Park in Japan, and much more.



4D Anatomy (Science Learning). Utilize this virtual reality application to scrutinize the anatomical structure of the human body. You can examine the entire body and navigate it independently and thoroughly. Students can complete tests, explore more than 2000 anatomical features, remove layers, and engage in additional activities. Students can explore and interact with different systems, like the circulatory or digestive system, seeing how organs work together. For instance, they might follow the food journey through the digestive tract,

observing how it is broken down and how nutrients are absorbed. This engaging, interactive experience makes learning anatomy fun and memorable.



Number Hunt (Arithmetic). The virtual reality application in your mathematics class is delightful and captivating. Students engage in an interactive virtual experience where they actively search for numbers and employ shooting techniques to acquire addition, multiplication, division, and subtraction skills. Kids are allowed to engage in virtual reality combat within the confines of the classroom.

Children are immersed in a dynamic virtual realm, locating and gathering concealed numbers in many settings, such as woodlands or underwater scenes. While collecting these numerical values, participants solve mathematical puzzles and difficulties, such as addition or multiplication problems, to advance to the subsequent stage. This dynamic and captivating method enhances the enjoyment of learning mathematics by developing numerical aptitude and problem-solving abilities in a stimulating and immersive manner.

B. Augmented Reality (AR)

The education field is experiencing a significant shift, primarily due to technological improvements. An exciting development we are now observing is the increasing prevalence of augmented reality (AR) in education. If you are still trying to comprehend the concept of AR, envision it as a stratum of digital data, such as photos, movies, and audio, superimposed upon the physical environment.

AR enriches the physical environment by superimposing digital elements, enabling learners to maintain awareness of and engage with their actual surroundings. This integration enhances the relevance and practicality of learning by connecting it to real-world scenarios. AR is frequently more easily obtainable and economical, as it usually necessitates merely smartphones or tablets instead of specialized VR equipment. Furthermore, AR can be effortlessly integrated into ordinary learning activities, facilitating its utilization in diverse educational environments without detaching learners from their surroundings.

Based on EducatorsTechnology.com (Kharbach, 2024), the following are some of the most popularly used AR apps across subject areas.



Photomath (Math Learning). Photomath is a comprehensive math learning platform for students of varying skill levels. It is an excellent tool for finishing assignments and studying for tests because it offers complementary, methodical solutions to problems. If you want access to more advanced features like AI animations, instructional films, and multimedia learning tools like thorough explanations, then you should upgrade to Photomath Plus. To guarantee that you obtain trustworthy assistance, the data is carefully reviewed by certified math teachers. The integrated glossary is tailor-made for mathematical terms and provides a nice touch to the whole experience.



Quiver (Art Learning). Quiver enhances the conventional coloring book by incorporating augmented reality to animate colored pages, adding magical elements. Catering to young students from Pre-K to Grade 4, the application provides various AR-based lessons and activities that enhance the interactive and enjoyable aspects of learning. Additionally, it offers a dashboard that enables teachers to distribute the application to various classroom devices using just one subscription.



3DBear (Reading Comprehension). 3DBear is a platform that utilizes augmented reality (AR) to enable users to construct their own 3D environments and narratives, serving as a creative outlet for the imagination. The application provides a diverse selection of three-dimensional models and avatars that can be used for narrative or simply for engaging in creative enjoyment. By sharing learners' creations within the 3DBear community, they have the opportunity to earn points and unlock new features.

2. Learning Essentials of VR and AR

Virtual Reality (VR) and Augmented Reality (AR) enhance the process of teaching and learning by offering immersive and interactive experiences that effectively engage students at a profound level. They allow for the representation of intricate ideas, promote interactive experience in a simulated setting, and accommodate various learning methods. They also enhance experiential learning through physical and intangible concepts, enhancing retention and comprehension. In addition, they provide secure and regulated environments for

simulations and experiments, thereby increasing practical abilities without exposing individuals to real-world hazards. Here are some key benefits:

a. Immersive Learning Experiences

Virtual Reality (VR) enables students to engage with intricate subjects in a virtual and controlled environment, providing a fully immersive experience. For instance, students studying history can physically traverse past civilizations, while biology students can delve into the details of the human body at a microscopic level.

Augmented reality (AR) superimposes digital information onto the physical environment, enabling pupils to engage with and visualize complex topics. For instance, it can enhance a static diagram in a textbook by incorporating interactive 3D features that may be easily controlled.

b. Enhanced Engagement and Motivation

Interactive Content: Both Virtual Reality (VR) and Augmented Reality (AR) offer interactive and gamified learning experiences that have the potential to enhance student engagement and motivation greatly. Students are more inclined to maintain their interest and commitment to their studies when they can actively engage with the subject.

Immediate Feedback: These technologies can offer real-time feedback, enabling students to immediately comprehend their errors and enhance their learning efficiency.

c. Improved Retention and Understanding

Experiential Learning: VR and AR facilitate experiential learning, a method in which students acquire knowledge via practical engagement. This approach is recognized for enhancing retention rates compared to conventional learning methods.

Complex concepts can be simplified and better understood through VR and AR technologies, enabling visualization of these concepts in three dimensions (3D). Geometry students, for instance, can perceive and control three-dimensional models of structures to enhance their comprehension of the mechanics involved.

d. Accessibility, Adaptability, and Inclusivity

Equitable Learning Opportunities: VR and AR have the potential to create a fair and balanced educational environment for students with diverse learning preferences and capabilities. For example, students with impairments can benefit from personalized VR and AR experiences specifically designed to meet their individual requirements.

Adaptive Learning: These technologies can offer individualized learning experiences specifically designed to meet the unique needs of each student. This enables students to learn independently and receive customized content depending on their performance and preferences.

e. Safe Learning Environments

Risk-Free Exploration: Virtual reality enables students to conduct experiments and navigate hazardous or fragile areas without encountering any actual risks in the physical world. Medical students can simulate surgical procedures in a virtual environment, allowing them to practice without facing any negative repercussions for errors.

f. Cost-Effectiveness

Resource Saving: Over time, VR and AR technologies might diminish the requirement for tangible materials and resources. Virtual labs can serve as a cost-effective alternative to expensive physical lab setups, while virtual field trips can reduce the need for travel and its associated expenses.

D. Conclusion

VR and AR have many educational benefits, such as making learning more fun, accessible, and facilitative of understanding. As these technologies evolve, they give teachers and students new ways to learn and improve outcomes.

E. References

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