AUGMENTED REALITY: A POTENTIAL AND PERVASIVE PEDAGOGICAL TOOL

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ABSTRACT

Teachers are the sculptors of our nation. Teachers, educators always searching for innovative pedagogical techniques and strategies able to enhance the learning experience. Augmented Reality proved to be an effective and efficient tool to optimize learning. Artificial intelligence is the study of creating machines that can think like humans do, including learning, reasoning, and self-correction. the idea that technology can be developed to give machines those traits typically associated with human intelligence, such as learning, adapting, and self-correction, etc. There are an increasing number of research looking into pedagogical innovations integrated with emerging technologies in this digital era due to the rapid development of artificial intelligence and technical advancements. The most popular application of augmented reality in education is in connection with interactive course materials that improve the ability to bridge the gap between the real and virtual worlds (3D visualization). Investigators thus made an attempt to develop deployable augmented reality content on teaching human organ system and find its effectiveness using appropriate experimental research design and analysis. Investigators aims to explore on finding out the effectiveness of augmented reality in teaching human organ system among school students by adopting quasi experimental design with a specific objective and by using appropriate statistical analysis tried to establish how Augmented Reality is a potential, pervasive and pedagogical tool to promote pro-active students thus optimise learning.

Keywords: Artificial Intelligence, Augmented Reality, Digital Pedagogical tool, Digital Initiative

Introduction

The Government of India has launched the "Digital India" campaign to ensure that its services are electronically accessible to its citizens by boosting Internet connection and online infrastructure, or by empowering the people in the digital arena. As part of the effort, initiatives are underway to connect rural villages to high-speed internet networks. Electronic technologies encompass digital tools, methods, and resources used for data generation, archiving, and management. Information technology (IT), often known as computer-assisted data and information processing, is an important aspect of digital technology. Today, the majority of businesses use digital technology to expedite customer interactions, manage operations, and processes.

Digital initiatives in Education

The Indian government is committed to improving and expanding educational opportunities for all children in the country's distant regions by providing them with the technology

and digital support they need to receive an education with a single click using digital tools. The Indian government's IT initiatives have modernized and revitalized the educational sector. In addition to eradicating the digital divide, it has been critical in proving the excellence and digital reach of its programs for the better future of our country's children.

Artificial Intelligence

AI can act independently of a human team, automating procedures and processes. AI, for example, can help to automate cybersecurity operations by continuously monitoring and analysing network data. A smart factory, like a smart home, might incorporate hundreds of different types of AI, such as robots that use computer vision to navigate the factory floor or check products for faults, create digital twins, or use real-time analytics to track productivity.

Augmented Reality

A computer-generated perception of the real world is improved with an interactive experience known as augmented reality. Augmented reality employs software, apps, and hardware, such as AR glasses, to superimpose digital content over real-world environments and objects. Augmented Reality provides a distinct virtual environment, creating a new platform for the teaching and learning process. Augmented reality adds virtual data or objects to any indirect view of a user's real-world environment in order to improve their impressions and interactions with it. Augmented reality aims to overlay virtual features on real-world sceneries or locations in order to provide a natural and intuitive user experience. In this interactive environment, virtual objects are employed in real time to enhance daily life.

According to Azuma (1997), augmented reality must integrate the physical and virtual worlds, interact with users in real time, and be registered in three dimensions. Augmented reality, rather than completely immersing the user in a synthetic environment, allows the user to view and enhance the real world.

Objectives of the study:

- To develop Augmented Reality for human organ system such as circulatory system, respiratory system, digestive system, skeletal system, muscular system and nervous system.
- To implement Augmented Reality on human organ system among secondary school students.
- To analyse the effectiveness of Augmented Reality in enhancing learning human organ system among secondary school students.

Statement of the problem

Some concepts and topics in biology that are considered difficult by students include the human organ system (M. H. Khan) such as the respiratory system, digestive system, nervous system, skeletal system, muscular system, and circulatory system. Students tend to lack interest in book content, so in our research work, we attempted to implement augmented reality videos to improve the curiosity and subject knowledge among school students.

Scope of the study

Our research aims to reduce the amount of time spent studying through the use of cutting-edge technologies. Augmented reality movies are more successful at enhancing existing teaching materials by providing additional contextual experiences. Augmented reality encourages students to understand about human anatomy in biological science. A paradigm shift in education necessitates a student-centered approach to instruction. As a result, Augmented Reality movies will meet students' needs and interests in the digital world. Digital natives appreciate using digital media in the teaching and learning process. This study will be a fun way to explore and obtain more information. NEP2020 emphasizes experiential learning, and using artificial intelligence to create such a learning environment will be extremely beneficial to 21st century Z learners.

Review of Related Literature

Augmented reality can improve qualitative education. Suvarna Kumar Gogula, Sandhya Devi Gogula, Chanakya Puranam, 2015, emphasize the importance of augmented reality in education, particularly when combined with mobile devices that provide students with new options for participatory classroom instruction. A camera in the classroom recognizes markers and shows them in a virtual environment by mapping their 3D coordinates. The application being utilized improves children's learning by allowing them to interact with virtual items and visualize the 3D world. This essay also looks at the current use of augmented reality in the classroom and how to use it. In conclusion, this study provides a wide range of research options for using augmented reality to improve the quality of the current educational system.

The role of augmented reality in anatomical education: an overview. Dimitrios Chytas et al. Ann Anat (2020) Although research on the application of augmented reality (AR) in anatomy education is sparse, there are promising results about AR's teaching potential. The impact of implementing AR in anatomy teaching has yet to be investigated. Review of seven papers. Randomized controlled studies are needed to demonstrate whether AR can effectively replace or improve present anatomy pedagogy strategies.

Using Augmented Reality for Biology Teaching, In a 2021 study by İ. Yapici and Ferit Karakoyun, 16 prospective biology instructors' perspectives on augmented reality (AR) were analyzed. The majority of future biology professors gave positive feedback on AR activities. Some of the advantages of augmented reality (AR) activities include content concretization, retention, interest and entertainment, repeatability, and multimedia support. In addition to these advantages, certain disadvantages were mentioned, such as the loss of internet connection, the need to keep a reliable phone, the eventual inactivity of the students, the cost, and the fact that it was not ideal for all topics. Prospective instructors also proposed expanding AR activities in schools, ensuring equal access to technological resources, merging these activities into diverse lessons, and developing a variety of applications.

Methodology Description

The major objectives of this research is to explore school students achievement on science particularly human organs using Augmented Reality in classrooms. The participants in this research were 61 school students from matriculation schools in Dindigul district. The participants were selected via convenience sample techniques. It used a quasi-experimental study design. There

was a three-phase quasi-experimental design used (Levy & Ellis, 2011; Campbell & Stanley, 1963). A pre-test is used in the first stage to gauge the students' prior understanding of the subject matter that will be covered in class. Also, a series of questions on the lecture-method-taught subject were presented to the students. The treatment group was educated utilising augmented reality videos throughout the second research phase's teaching phase.

The students took the same test they took for the pre-test during the final research period, but in a different order. Also, the same questionnaire about their present interest in the issue was given to them. The quasi-experimental research design is illustrated below:

Research Instrument

In this investigation, two different kinds of instruments were used. The first instrument was a questionnaire that was used to gauge the participants' desire to learn, and the second was a set of questions from a student performance test that evaluated the participants' level of performance. Question from a student performance test. The lecturer of the course (Biology, Human organ system) created the question for the student performance test based on the discussion of exponential and logarithmic functions. The pupils were handed the test question. The first time, it was given to eighth-grade pupils before the subject was lecture-taught. This was done to determine each participant's baseline knowledge of the selected topic. The second time, the order of the identical question was changed. To lessen testing bias, the same question was rearranged the second time. The results of a quasi-experimental study may be impacted by the pre-administration. test's

Motivation to Learn Questionnaire

The questionnaire Ersoy and Oksuz (2015) devised to assess primary school pupils' motivation for learning mathematics served as the basis for the motivation to learn instrument. According to their investigation, the tool was extremely trustworthy and had sufficient predictive ability for the item total score (Ersoy & Oksuz, 2015). Although the measure can be used to assess motivation in general, it does not distinguish between internal and extrinsic motivation. 33 questions were originally included in the test, each on a three-point scale.

Research Design
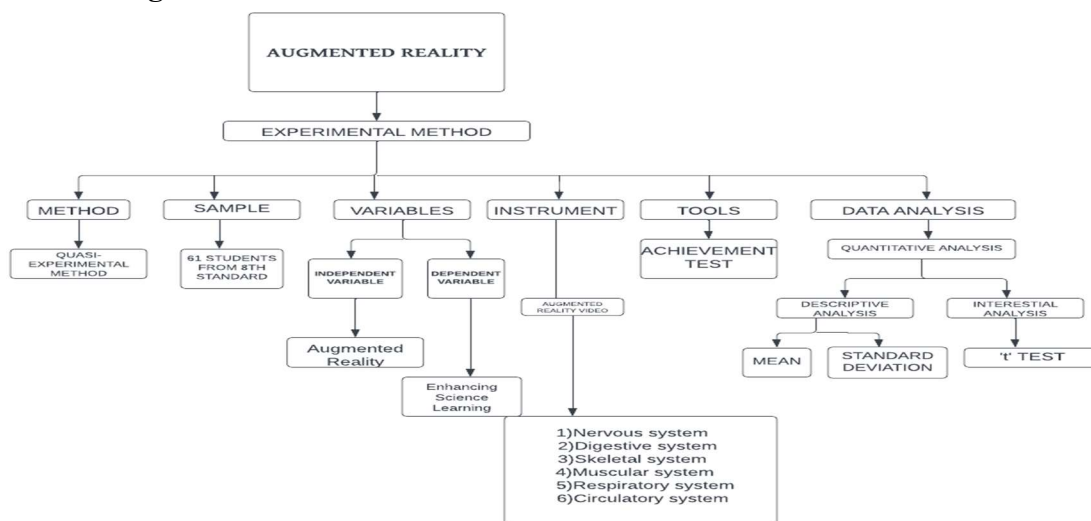
Data Analysis

Data analysis involves proper arrangement or organization, systematic analysis and numerical interpretation of the collected data. The role of statistical methods to achieve this purpose is indispensable. These statistical methods are used to discover the relation between the variables involved in the study, So that it becomes universally acceptable.

Quantitative Analysis

A numerical way of characterising observations of materials or attributes is known as quantification. When a certain area of the material or characteristic is employed as a standard form, it guarantees that every sample will be described using a valid and accurate approach. The investigator has used the descriptive (Mean, Standard deviation) and inferential statistical technique ('t' test) for analysis the collected data.

Data Analysis

- **Hypothesis- 1 (H_01) :** There is no significant différence between the means scores of the Pre-test and Post-test of the students in teaching of human organ system using augmented reality videos. In order to establish the identity of the whole sample with regard to the Pre and Post-tests as the variable. In order to test this null hypothesis,'t' test attempted between the means of the Pre and Post-test scores of the Girls.

Table 1: *Mean, Standard Deviation, Calculated 't' value of the Pre and Post-test scores of the Girls*

Significant at the level of 0.05

Test	N	Mean	Standard Deviation	't' value	Remarks
Pre-test	52	44.30	8.33		
Post-test	52	91.41	9.551	26.81	Significant

Graph of the table 1
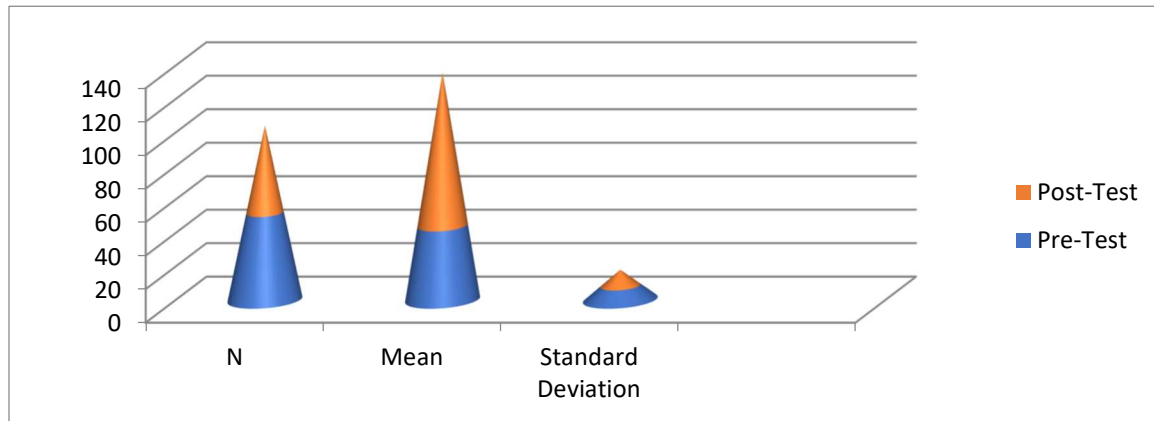
A detailed examination of the table 3's mean scores reveals that the pre- and post-test mean scores were 44.30 and 91.41, respectively, with standard deviations of 8.33 and 9.551. The calculated 't' value is larger than the table 't' value of 1.96, indicating that the difference in scores between the Pre and Post-test is significant. The calculated 't' value is 26.81. As a result, it is determined that there is a significant difference between the mean scores of the students' Pre and

Post-test in the teaching of the human organ system using augmented reality films, rejecting the null hypothesis.

Findings of the study

- Researchers used open software to create six Augmented Reality applications for human organ systems, including the circulatory, respiratory, nervous, digestive, skeletal, and muscular systems.
- Researchers used Augmented Reality for two weeks with VII standard school kids.
- Researchers collected and analyzed data to determine the effectiveness of Augmented Reality in improving organ system learning for school children.
- Females showed a substantial change in pre-test and post-test scores when taught the human organ system via augmented reality films.

Results and discussions

According to the study's findings, integrating AR helped students do better academically. This study's findings are consistent with those of Srakaya and Alsancak Srakaya (2018), who discovered that augmented reality was used during the teaching process for students in the experimental group of the middle school science course "Solar System and Beyond: Space Riddle". Contero Students are learning about the digestive and circulatory systems, implying that AR implementations promote lifetime learning. It also supports study findings proving that students learn the subject matter more effectively in a classroom environment enhanced with AR implementations. (Chen and Wang 2015; Enyedy and et al., 2012; Hwang et al., 2016; Akçayır, 2017; İzgi Onbaşılı, 2018; Buluş, Kırıkkaya and Şentürk, 2019; Yıldırım, 2020). Recent study shows that augmented reality implementations are effective teaching tools in educational contexts. On the other hand, it has been discovered that AR provides a number of advantages, including increasing attention levels, making learning more efficient and engaging, providing incentive, and increasing engagement. When the different applications of AR technology are reviewed, it is obvious that AR technology is becoming more prevalent in a variety of industries, including entertainment, marketing, defence, medicine, engineering, psychology, marketing, and education.

This technology is also used in the humanities (history, language, anthropology), natural sciences (chemistry, physics, biology, astrology, etc.), computer and information sciences, mathematics, and engineering (mechanical, electrical, biomedical, etc.) (Wojciechowski & Cellary, 2013). AR is clearly used successfully in sectors such as engineering, medicine, biology, physics, chemistry, geometry training, astronomy, museums, and the transmission of cultural knowledge and engineering. The capacity of augmented reality to display both real and virtual environments at the same time can help to address this concern. In this direction, academics have focused on the best ways to incorporate augmented reality into classrooms (Sumadio & Rambli, 2010). Conformity with the educational process, adherence to the curriculum utilized in schools, and successful engagement in curriculum development are critical (Hsiao et al., 2010). As a result, it is expected that integrating AR-enabled activities in schools will aid in the integration of this technology into education.

Conclusion

Augmented reality (AR) movies have the potential to improve secondary school students' learning by delivering immersive and interactive experiences that allow them to better understand complicated ideas. AR films can bring abstract concepts to life, making learning more interesting and pleasant. Teachers can use AR technology to develop more interactive and individualized learning materials, allowing students to study subjects at their own pace and in a way that is appropriate for their learning style. This technology can assist students have a better knowledge of the material and improve their critical thinking abilities. Furthermore, AR movies can help to bridge the gap between academic and practical learning by providing students with virtual simulations of real-world scenarios. This approach is especially beneficial in science and engineering courses, where students can mimic experiments and interact with virtual models of complex systems. Overall, augmented reality movies have the potential to transform secondary education by making it more entertaining and productive for pupils. However, their usefulness is dependent on the quality of the content, the availability of proper equipment, and the teacher's ability to use and integrate AR movies into the curriculum.

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