Use of Augmented Reality in Education

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Abstract:- Augmented reality in education will soon impact the traditional learning process. AR has the potential to introduce new ways of learning and teaching. The power of augmented reality can make lessons more engaging and information easier to understand. Today, 80% of young people own a smartphone. Most of them are active users who use these devices to access social platforms, play games and connect with friends, while another small group of young people use their mobile phones to study, do homework, search for information on specific topics, etc. The educational potential of smartphones and augmented reality is huge, yet undiscovered. Augmented reality can provide students with additional digital information on any topic and make complex issues easier to understand in a variety of ways.

Keywords:- *Augmented Reality, New Learning and Teaching Methods, Digital Information.*

I. INTRODUCTION

Augmented reality is characterized by the superimposition of virtual elements on the real world. The user's perception then changes in real time without completely tricking him into an artificial world. Often attributed to vision, this change occurs when a mobile device (smartphone or tablet) or computer camera captures a real or virtual geotag or trigger (icon, image, or logo). Once the marker is recognized by a specific application installed on the device, it becomes 2D or 3D digital content overlaid on the captured reality.

Augmented reality is a field of science and technology that uses computational and behavioral interfaces to simulate the behavior of 3D entities in a virtual environment [1]. Perhaps it is worth explaining the term "augmented reality". A virtual environment is defined as "a computer-generated 3D simulation of a real or imagined environment" [2]. Students using these environments can interact through "avatars"; this allows students to get immediate answers based on their actions in the virtual environment [3]. Augmented reality offers several exploitable benefits for working with students by stimulating and motivating learners' understanding of specific events, especially those for which traditional teaching concepts have proven difficult. This technology is being applied in the field of education and is changing the relationship between the learner and the learning environment. Augmented reality creates a connection between learners and content, which can improve teaching efficiency, knowledge transfer and skill development.

➢ *Explain Abstract and Difficult Concepts*

AR technology can turn unimaginable objects into 3D models, making it easier for people to understand abstract and difficult content. It is especially suitable for visual learners and almost anyone who translates theoretical material into real concepts. For example, the Carthage Dermech Children's Advanced Management School at Carthage University integrates AR into courses in various disciplines, and students say it's helpful, easy, and fun. (Figures 01&02) [4].

By incorporating augmented reality into lessons, teachers can use 3D models to engage students in the process. For example, CASE, a Canadian technology company, transformed the walls of a school gymnasium into a ball game by adding layers of augmented reality. Children have fun doing physical activity by hitting floating shapes with balls on the wall. [5] Museum visitors can access augmented reality via their smartphones and experience historical content related to exhibits. More information on what they see, but not all museums and monuments can afford it due to space or budget constraints. Once AR becomes more available, there will be huge new opportunities for museums. The advantage is that visitors can already access augmented reality via mobile devices. [6]

The use of augmented reality in education puts students at the heart of learning. By interacting with the environment and peers in different ways, teaching methods change and offer many advantages. The use of augmented reality can adapt teaching methods by promoting learner autonomy and making them more active. Based on constructivist and social constructivist theories, knowledge is constantly confronted with data about individuals and their environment and then restructured, an approach that enriches the contextualization of sometimes more abstract concepts or specialized knowledge. Reading comprehension, teaching subjects that require a spatial component, and even learning technical gestures (especially in the fields of science, engineering, and medicine) are facilitated.

By being able to develop in a more informal setting, students can benefit from both real and virtual learning environments, adding authentic context conducive to knowledge transfer and skill development.

Fig 1 Modeling and Application of AR

Fig 2 The Advantage is that Augmented Reality is already Accessible to Visitors via Mobile Devices

II. METHODOLGY

A. Object Modeling and Interactive Training

Craft training, craft exercises, puzzle solving, etc. help to master more knowledge in each lesson. AR apps for medical students can be one of the ways to learn human anatomy, explore deeper. Augmented reality basically means interacting with 3D models. And you can set rotation, transparency, color scheme, style, etc. Finally, more advanced animation is possible through special gadgets such as holographic lenses, rather than smartphones.[7]

In many cases, theoretical knowledge is not enough to acquire the right skills in the area of specialization. Students should not be just passive listeners and observers.

Students of special engineering faculties need practice and real-world experience in their field. Through interactivity, unlike virtual reality, augmented reality features can make virtual reality possible – with digital modeling and simulation, and gain some experience later on.

It is not surprising that active and engaged students understand the subject better and learn faster. (Figure 03)[8]

B. Learn in Augmented Reality at all Ages

Despite everything, augmented reality has the potential to profoundly disrupt the education system. and this, in particular because it is applicable in almost all contexts and at all ages.

- In primary and secondary education. AR applications can be used in the classroom to enhance understanding of subject matter. They allow you to explore more complex subjects (such as mathematics, physics, etc.) in an interactive and engaging way. It is also a good way to stimulate the creativity of the youngest;
- In higher education. Augmented reality solutions are increasingly popular in universities. They are, for example, used in the humanities and technical sciences to boost student engagement and make the learning process more effective. In medicine, for example, AR facilitates the learning of anatomy;
- For distance education. Since the pandemic, education has largely gone digital. Augmented reality apps can serve as a convenient platform for sharing educational materials. But also to encourage collaboration in real time. In some cases, they will be able to replace the teacher by giving a complete and practical representation of a complex subject;

- In vocational training. Thanks to AR learning, it is easier for junior profiles or people in retraining to acquire new skills. Learning in augmented reality will allow them, for example, to handle new equipment in complete safety. But also to understand their work environment in practice. Research has shown that AR-assisted training improved General Electric (GE) employee productivity by 34%. This increase is 46% for GE Healthcare.

➤ Wo use Cases for Augmented Reality Training

In addition to applying to all educational stages, AR also finds concrete use cases in many fields. From astronomy to history, learning in augmented reality opens up new perspectives for teachers and students. Here are two examples of areas that benefit from it!

- #### Anatomy

  Augmented reality dramatically improves the way medical students learn about anatomy. AR is thus particularly suitable for understanding complex anatomical systems. It allows you to study different parts of the body and organs separately, while appreciating how they work together.

  The Apple Design Award-winning Complete Anatomy app is a perfect example of a 3D anatomy platform. With over 20,000 body structures, the app allows users to view body parts in isolation, track arterial pathways, or explore neurovascular structures and muscle movements, and more. Students can also place a 3D anatomical model of a human body on any surface.

  Similar applications can thus be used to boost the mastery of technical skills (hard skills). And this, especially in complex or potentially dangerous industrial contexts.

- #### Prepare Students and Teachers to Learn in Augmented Reality

  The impact of augmented reality on student engagement, performance and confidence is unmatched by any other education technology available today. The only notable exception is that of virtual reality, which nevertheless remains much more expensive and complex to set up.

  However, adopting AR in classrooms (or remote learning platforms) requires some preparation. First, that of the teachers. The latter must indeed appropriate the technology and its applications and develop their teaching methods around them. Secondly, that of the students, by giving them the time to discover for themselves and to test the many possibilities offered by augmented reality.
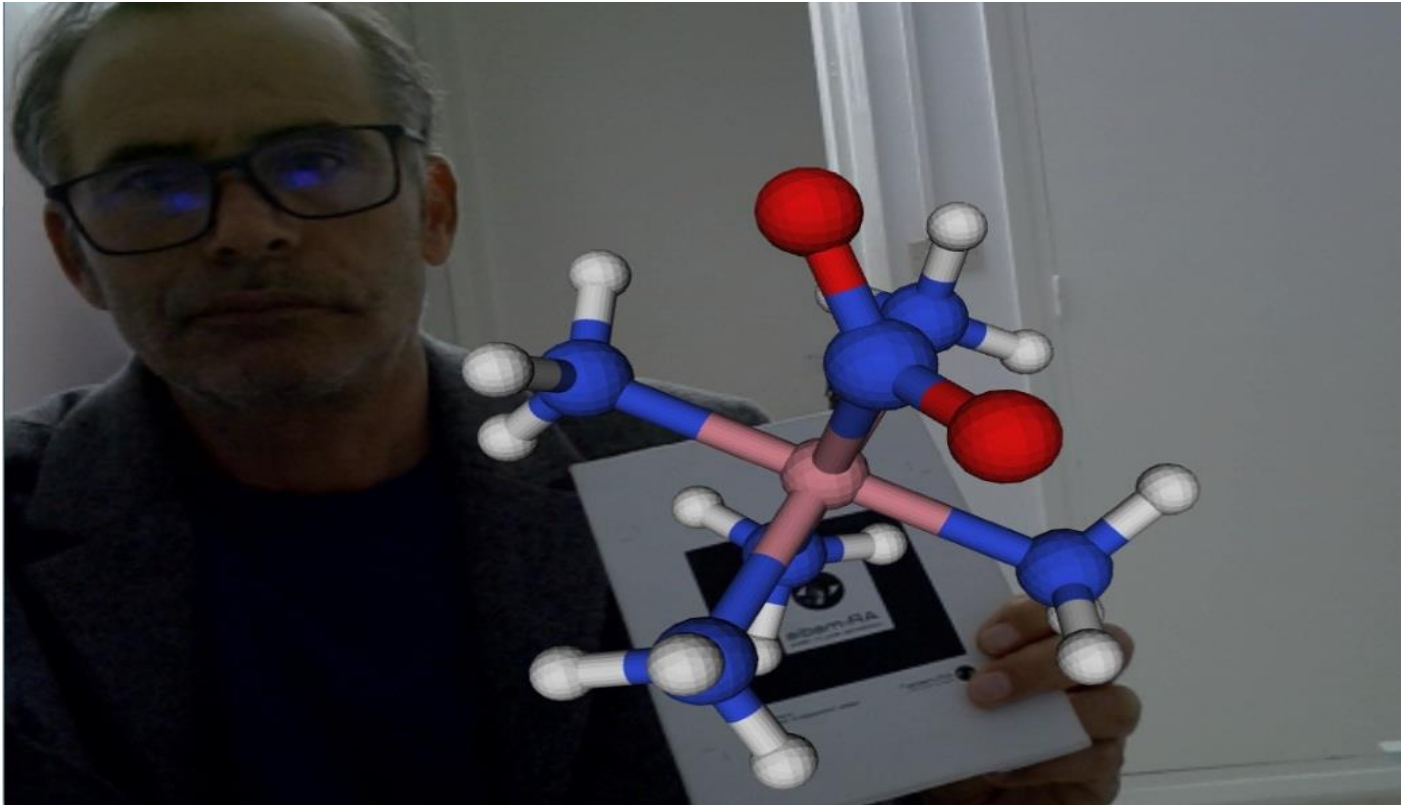
Fig 3 Interactive Training

III. RESULTS AND DISCUSSION

Augmented reality is a reality in many educational data and information, because teachers can use the expert tools of this technique.

This allows teachers to both explore and bring augmented reality into their field of instruction.

The curriculum is designed to achieve defined goals such as providing knowledge, practical work, instruction and training to encourage creativity and collaboration.

Augmented reality is an environment for teachers and students to use every day in the learning process.

The multifunctionality of these techniques and the new capabilities brought by computers, tablets, and iPhones are key to the delivery of AR content in education.

➢ *N Addition to using AR-based Techniques, the Resources can be Easily Adapted to Instructional Situations:*

- AR teachers can use didactic materials for collaborative tasks and independent learning.
- AR provides rich and authentic contextual learning for student learning and skill development, while engaging a wide variety of learning styles, appealing to thematic educational concepts. onstructivist meaning.
- In the field of teaching future professions (mechanical, civil engineering, computer engineering, etc.), there are no real consequences if a mistake is made when teaching the skill.

- Our research has observed that AR use is associated with strong motivation among students because it encourages them to learn and interact with virtual objects, avatars and virtual environments.
- We can confirm, as some studies have mentioned, that the teaching process will be faster.
- For educational institutions, it should be emphasized that augmented reality is a cost-effective technique for providing students with more engaging content than paper, so expanding its use to all grade level is interesting.

Schools can solve equipment failures with avatars and 3D objects to do the training, then work is underway in some classrooms that will allow engineering students to create them individually precisely by interacting with avatars and objects.[9]

IV. CONCLUSION

Despite the increasing use of augmented reality in many areas of the modern era, augmented reality in education is still new and volatile. Although the possibilities of AR in education are vast, they offer new ways to learn. Teachers capture students' attention and motivate them to do better, while students gain new tools to visualize their complex topics and concepts and learn practical skills. [10] What's more, even parents can benefit - by encouraging their children to learn with fun apps.

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