Augmented Reality Usages in Multimedia Based Training and Interactive Demonstration

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Abstract: Due to the technological advancement, the applications of augmented and virtual reality (AR/VR) technologies in multimedia-based training and interactive demonstration are rapidly getting attention. To provide students or learners with access to a visual, immersive, and engaging world, an increasing number of teachers have started to use AR/VR technologies, especially in education and training. The inclusion of AR in learning applications for mobile devices has made it easier to involve students more effectively. AR adds new content to multimedia platforms by scanning texts, magazines, and newspapers. It has been proven to be one of the most effective instructional methods for younger children students. Because the audio and visual depiction of the subject matter creates a realistic ambiance, students are more interested in a specific topic. AR technology fosters an environment where the students are more eager to learn and engage in activities. There are often improved classroom learning experiences, communicating new knowledge, involving students' ideas, and stimulating their desire to try out new learning activities by utilizing the engagement and experimentation that AR technology provides.

Keywords: AR Augmented Reality, Learning, Multimedia Design, Students, Technology, Visual Communication.

1.   1ntroduction

In essence, augmented reality (AR) is a tool that links the tangible and digital worlds. It has been challenging to comprehend how AR has had such a profound impact on contemporary gadgets, including Computers, notebooks, mobile phones, and a variety of others [1]. Because of AR, a person could interact with both the physical world and the digital one at the same time. In this contemporary era, a quick interaction between society and machines or systems has enriched the wave of technological growth. Virtual reality (VR), on the other hand, has been acknowledged as one of the key outputs of contemporary technological progression [2]. However, there are some key distinctions between VR and AR. In other words, the distance between the actual world and the digital world could be widened using both AR and VR.

However, both technologies allow for the optical perception of material and information, similar to how one might perceive the world or the cosmos. Additionally, this study has focused on the important role that AR can play in visual interaction that is effective in both professional and academic contexts. AR would be useful for creating a simulated world with some actual feelings or experiences of sound, movement, and vision [3]. Based on previous case studies and research articles, it has been shown that AR has fully immersed the community in the nearby

virtual world. On the other hand, utilizing technology to energize the surroundings of the actual scenario may be advantageous. It is possible to counter that AR's many benefits have increased its value and legitimacy in the workplace and education.

The inclusion of general digital tools in the workplace and educational training events have been recognized as the causes of the challenges or issues faced each year [3]. However, in this competitive atmosphere, individuals grow weary of working so hard all the time [4]. Although teachers or trainers may not have been fully informed about the introduction of AR, it has been noted that students have already been won over by its use. The first issue statement concluded that students' ignorance of AR may be due to a shortage of educational tools and teacher involvement [5]. Although the architecture of Chinese schools is well-maintained, the lack of virtual reality tools and their use has been noted, which has led the educational system to progress somewhat more slowly.

2.   Method

AR refers to a collaborative process with students that uses digital pictures or actual instances to enhance comprehension [5]. A variety of technologies are used in augmented reality to help students relate to the subject. Using virtual reality increases student motivation and engagement. A child's comprehension of their surroundings is severely constrained when they discover something for the first time. Because they found the conventional teaching approach in this circumstance to be so monotonous, they became less interested [6]. Virtual reality in early childhood education maintains the conventional approach while also igniting the child's interest and drive. To enhance learning results, many different tools are being used. In the early years, a child's surroundings, schools, families, families, scholastic groups, and other public locations have an impact on

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everything they learn [7]. Their ability to interact with the outside world is extremely limited. Since everything has been documented in their minds, they make an effort to relate every truth to what they have learned. Numerous studies have shown that students in Shanghai battle with bad study practices and a lack of motivation.

Fig 1. Application of AR in learning

Elementary school is the only grade where virtual reality is used in lessons, even if the percentage is less than 50%. AR has been able to solve these issues and draw in young people by offering new activities. China, for example, has limited interaction with the rest of the world when it comes to teaching English; as a result, it is up to them to give kids access to the right education and tools so that they do not run into any issues in the future [8]. The ideal time for a child to learn a language, according to specialists, is between the ages of 3 and 6 years [8]. Instructors must inspire their pupils, but when they employ traditional teaching methods, they fall short. Psychologists claim that any images or three-dimensional models can be used to teach students while promoting the memory of information. Students can learn a lot from the circumstances she is currently experiencing [9].
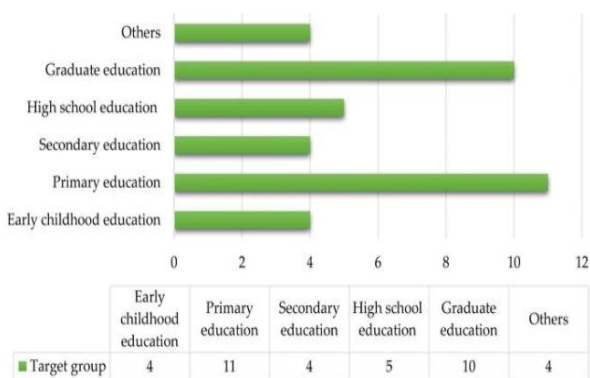

Fig 2: Usage of AR in teaching [8]

2.1. Application of AR for Training and Interactive Demonstration

The goal of AR is to improve communication between pupils in Chinese educational establishments by providing a more accurate depiction of the real world. In the early phases of growth, a child learns two of the most important lessons:

appropriate interaction and dialogue. A key aspect of AR is the use of various elements, such as audio, visual, and sensory stimuli. It is a growing trend in both corporate organizations and academic institutions around the world.

AR has a major impact on how blended reality is portrayed in the physical world [10]. The area where the two extremes; the physical world and the virtual world, intersect is known as mixed reality. Numerous devices have made use of virtual reality software [11]. One of the main advantages that AR provides people is the capacity to enhance daily activities. AR has been applied to improve business operations in a variety of fields, including the manufacturing, automotive, and business sectors.
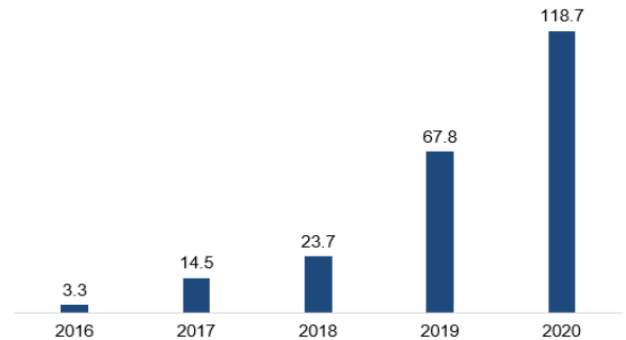

Fig 3: AR Market in China [10]

One of the main benefits of using AR technology in students' education, is that it successfully connects them to virtual reality [12]. Online education has replaced traditional classroom instruction as the new norm since the worldwide pandemic. The inclusion of AR in learning applications for mobile devices has made it easier to involve students more effectively. AR adds new content to multimedia platforms by scanning texts, magazines, and newspapers [13]. It has been proven to be one of the most effective instructional methods for younger children students. Because the audio and visual depiction of the subject matter creates a realistic ambiance, students are more interested in a specific topic. Another advantage of the learning process is that students in preschools and classes can be introduced to the letters and vocabulary more interestingly and straightforwardly [14]. It has been demonstrated that using AR tools in school settings in Shanghai, China, has some benefits, including facilitating the teaching and learning processes.

Fig 4: AR Keywords search in China (2019) [10]

3. Result And Discussion

Currently, it's accepted practice to use AR in early schooling. By utilizing cutting-edge technology and virtual reality, it is

possible to increase students' enthusiasm for learning. AR has been viewed as being immensely useful because student involvement has been perceived as being highly resistant to studies [6]. Students have demonstrated increased responding, scrutinizing, pointing, and turning off their gadget screens while using AR to learn. AR is advantageous for early education because it promotes imaginative engagement in addition to reading and listening.

With the right virtual reality techniques, students' inventiveness may increase. Early school pupils are more motivated and engaged when AR technology is used [15]. Using AR technology, pupils can learn by interacting with and changing their surroundings. Contrary to traditional teaching strategies, AR technology engages students in the learning process and raises their attention levels in class. Learning processes have been significantly enhanced by the use of virtual tools. Virtual reality technology makes it possible to deliver teachings to students in a way that is much more engaging. The use of virtual tools makes studying more enjoyable for pupils.
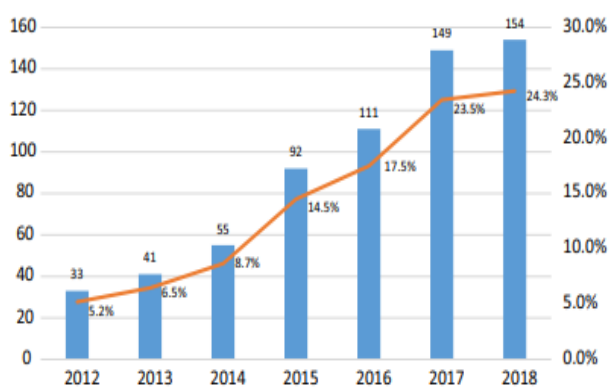

Fig 5: Increase in application of AR technology in early education [15]

Interacting with virtual problems enhances a student's problem-solving skills. The most important characteristic of AR is the capacity to create simulated things in the physical world. This factor aids in the growth of problems with social contact. Interaction with problems from the actual world helps students understand basic concepts. Giving students the chance to interact with issues digitally leads to an improvement in their ability to handle problems [16]. Students who utilize AR are better able to connect their limbs and thoughts. Students can more successfully handle complicated problems created by this technology by combining their bodies and thoughts.

With the aid of AR technology, children can quickly and simply learn about long-term patterns. The most crucial element for learning through AR is the construction of virtual figures in the actual world [2]. Through the incorporation of AR into the instructional process, students can learn about the cycles of vegetation evolving into woods, various space cycles, or seasons. Thanks to AR, students can experiment with substances in a much-improved environment. These components significantly increase students' interest in learning about courses. Using virtual reality, students can gain a better understanding of physical, geometrical, and abstract concepts. By watching and handling three-dimensional objects from different perspectives, students can learn spatial, geometrical, or abstract concepts. Instructors require AR more than students do to plan lessons or engage students in the learning process [15]. The use of AR

technology by teachers enables the development of better learning settings.

4. Conclusion

The development of AR-based interactive videos can aid students in better understanding concepts, how to apply them to connect concepts, and how to analyse data for problem-solving. Product enhancements made during the development stage result in AR-based interactive multimedia that teachers-in-training of elementary schools can use to build their critical thinking skills in the learning process. AR technology fosters an environment where the students are more eager to learn and engage in activities. Through direct interaction with simulated items or settings, students participating in AR education can better understand their circumstances. There are often improved classroom learning experiences, communicating new knowledge, involving students' ideas, and stimulating their desire to try out new learning activities by utilizing the engagement and experimentation that AR technology provides. The utilization of AR in early childhood education greatly improves the linguistic development of young children.

Conflicts of interest

The authors declare no conflicts of interest.

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