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Virtual Reality In Education System

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ABSTRACT :

This review will give an overview of the use of Virtual Reality (VR) in the education industry, targeting the effectiveness of the VR tool on the students' understanding capabilities, to find the difference in learning experience of the student from the traditional way to the VR way of learning. The study aims to evaluate VR's effectiveness in different educational methods, including its ability to improve understanding of complex subjects, promote interactive learning, and increase student motivation. The methodology will contain surveys, interviews and experience sharing of the students and the staff.

Introduction :

In this review paper we are going to see the role of Virtual Reality (VR) in the education industry. Virtual Reality (VR) is a 3D graphical environment to help students understand and learn in an interactive manner. We are going to take a look at the advantages and challenges faced by VR in order to make learning more interactive. The integration of Virtual Reality (VR) in educational settings, particularly in science and technology disciplines, has recently gained significant momentum, marking a pivotal shift in practicing strategies. VR's unique ability to create immersive, interactive environments offers an innovative approach to teaching complex subjects. This study explores VR's role in redefining educational experiences, focusing on how it enhances student engagement and facilitates a deeper understanding of intricate scientific and technological principles. From the past studies done by researchers by collecting data and reviewing it they came to find out that students are very interested and quick to grasp the concept with the help of VR's. The engaging environment helps students to understand complex scientific concepts easily and increase their spirit for learning. Additionally, the researchers found out the challenges faced by the way of learning through the use of VR. It was difficult to make available the required equipment to all the students and was hard to set by the teaching staff and the students. This calls for joint efforts from policymakers, educators, and technology providers to collaborate in making VR accessible educational tool for all students. In this research we will also try to find a way to make use of virtual reality (VR) technologies long term effective and investigating the sustainability of VR as a teaching tool and its impact over an extended period would provide deeper insights into its efficacy and potential for wider adoption. Literature review Jonathan Blackledge and Napo Mosola (2020) described the different applications of AI in cryptography. Sumathi M S (2023) gone threw the application of AI with hybrid cryptography based on the survey they took, displaying that cryptographic methods are used to protect the data throughout the data exchange process and during different interactions. These methods are commonly used these days which makes them insecure. An innovative hybrid cryptographic approach for enhancing data security throughout network transmission is presented in this article. This paper also covers the problems faced in the application of AI in cryptography. Mengting Liu (2023) discussed the application of image sharing and encryption based on visual cryptography in NSAI (Networking Systems of AI) and gave the methods and steps of shared image preprocessing in detail, which will also be discussed further in this paper.

Problem Statement :

This review paper reviews the past study done on the challenges associated with integrating Virtual Reality (VR) into educational settings, particularly the need for adequate technical support and resources to effectively implement VR technology in classrooms.

Another problem reviewed in this paper is related to the problem faced while distributing required gear to the students or the end user to make the full use of VR learning method and the issue of ensuring equitable access to VR for all students, as discrepancies in access can lead to unequal learning opportunities, emphasizing the necessity for strategies to ensure equal benefits from advanced learning tools.

As discussed in the previous research papers have covered appropriate points. The latest technologies related to the application of AI must be considered and that's what is included in this paper.

Research Methods :

Literature Review: Conducted a comprehensive review of existing literature on VR in education system to gain a thorough understanding of the current state of research in this area. I have studied the latest developments and applications to identify any research gaps. I used tools such as,

- connectedpaper.com
- scispace.com
- chatpdf.com

to find relevant literature and identify research gaps in this field.

Empirical Research: Experiments are conducted and studies are performed to demonstrate the effectiveness of VR in education system

Case Studies: Analyzing and presenting case studies of real-world applications of VR in education system to showcase its practical relevance and impact.

Comparative Analysis: Different VR based approaches and methodologies are compared to evaluate their strengths, limitations, and potential implications for digital security

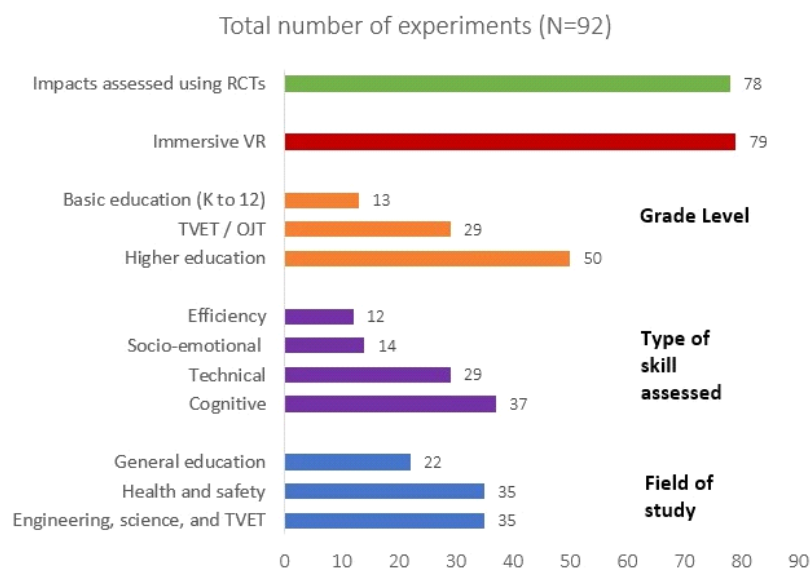
Research Findings :

While reviewing all the past paper I found that VR in Education system enhance experience for students and was a very good idea to work on in order to make learning easy and fun.

Results also indicate that students exposed to VR instruction, report higher scores in socio- emotional skills assessments after completing their training than their peers receiving traditional instruction. The analysis also indicates that students exposed to VR training are more efficient using inputs, time, and/or avoiding performance errors than students exposed to traditional training, per additional hour of instruction.

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Figure 1: Descriptive statistics of the primary experiments assessing the effects of VR on student learning



Source: Angel-Urdinola, Castillo-Castro, and Hoyos (2021)

Note: RCT experiments are defined as those where individuals are allocated at random (by chance alone) to receive one or several interventions. One of these interventions is the standard of comparison or control. The control may be a standard practice or no intervention at all.

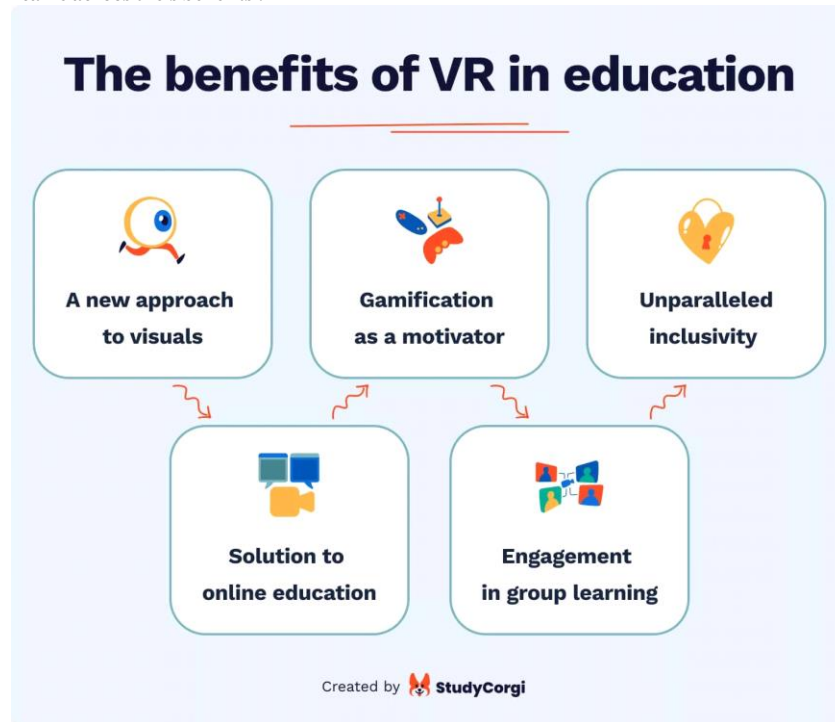
A total of 72 experiments show that VR training is equally or more conducive to improve student learning outcomes than traditional training.

For each additional hour of training, students exposed to VR training score 3 percent higher in learning assessments, when compared to students exposed to the same curricular content delivered through traditional training methods.

Students who complete VR training report 20% higher levels of confidence and self-efficacy towards learning after they complete their courses

Students who are exposed to VR training are, on average, up to 30 percent more efficient (using inputs, time, and/or avoiding performance errors) than students exposed to traditional training per additional hour of instruction

While reviewing the past paper I came across these benefits :



A game-changing approach to visuals:

Ten years ago, PowerPoint presentations were a fun alternative to boring textbooks. But the novelty effect tends to lose its power over time. One day, VR and the Metaverse will also become something like "Times New Roman." But for now, it can turn education into an exciting and rewarding activity.

Gamification as the new motivator:

Gamification is not new to modern students, but it is still efficient. Pretend-play is the natural way of learning, and nothing better has been invented yet. VR adds realism to practice exercises and allows for instant feedback from the instructor.

Unparalleled inclusivity:

VR engages people with special needs and helps them keep up with other students. It ensures a safe environment with comfortable and manageable conditions for everyone.

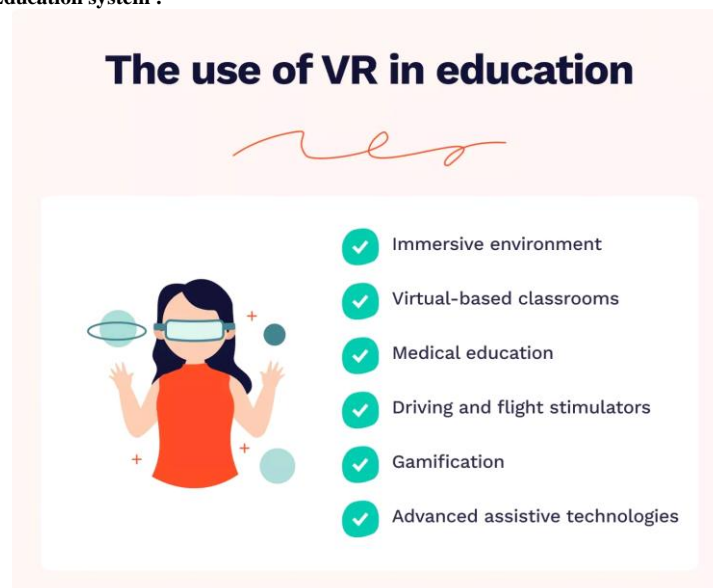
An excellent solution for online education:

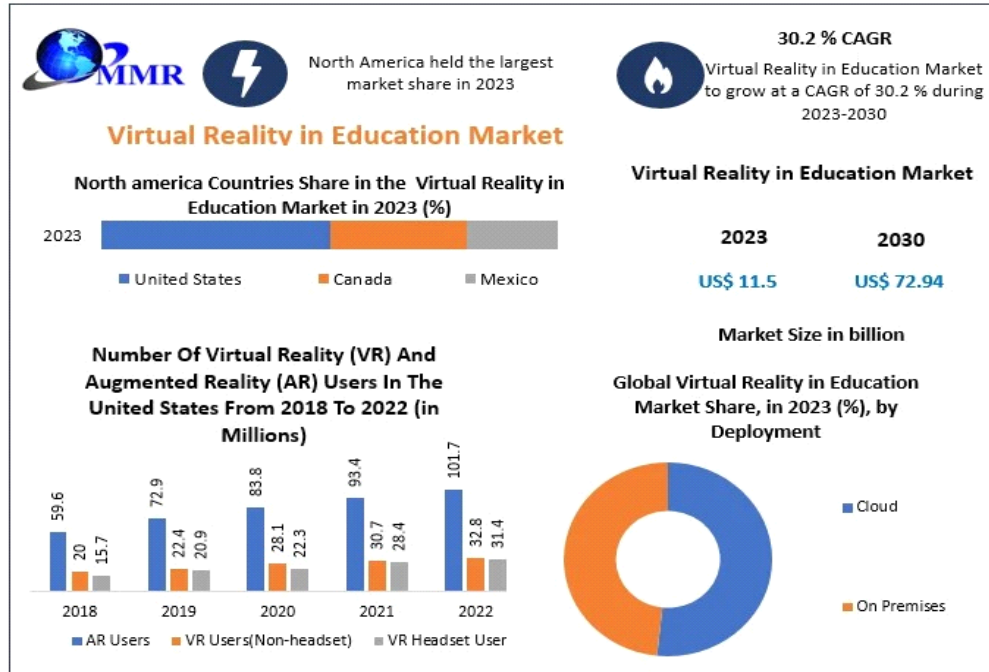
The pandemic has shown that online education solves many study-related issues. It would be reasonable to expect colleges to embrace even more online modalities. And while the most severe drawback of video conferences is the lack of a feeling of "presence," VR could definitely help with that.

Student engagement in group learning:

Teacher-centered education is on its way to becoming a relic of the past because it's no longer effective. The use of virtual reality in education has helped students become more eager to discuss, collaborate, and debate. The technology also improves communication among those with lower social adaptation.

I also found few uses of VR in Education system :



The international market for VR in Education system is :

Recent studies have shown significant growth in the Virtual Reality in Education Market. According to a report by MMR, there are approximately 57.4 million users of VR in the United States alone, accounting for around 15% of the country's population. These studies also reveal a high level of interest among students, with 97% expressing enthusiasm for virtual reality courses. Also, 93% of teachers believe that integrating VR technology into the classroom enhances student engagement. Many educators express a strong desire to leverage VR to simulate relevant experiences tied to their curriculum. The Virtual Reality in Education Market size was valued at USD 11.5 Bn in 2023 and market revenue is growing at a CAGR of 30.2 % from 2023 to 2030, reaching nearly USD 72.94 Bn by 2030.

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