International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 03 | Mar 2021 www.irjet.net p-ISSN: 2395-0072

Extended Reality – Effective and Modern Learning Technique

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Abstract: *This paper explores extended reality (XR) topics with a focus on mixed reality (MR), augmented reality (AR) and Virtual reality (VR), which can be used in the educational sector with help of which the students can experience the new way of learning most effectively. In the educational institutes, stretched-out reality permits students to learn in manners they've never had the option to. It very well may be showing kindergarteners the close planetary system, or showing secondary school understudies human life structures, as far as possible up to getting ready clinical understudies to perform life-saving careful tasks.*

Key Words: **Extended Reality(XR), Mixed Reality(MR), Augmented Reality(AR), Virtual Reality(VR), Internet of Things (IOT),Effective learning.**

1. INTRODUCTION

Over the past year, interest in extended reality technologies (e.g., virtual, augmented, immersive, and mixed reality) has increased in various domains from entertainment to combat training and critical applications. By severely obliging travel, get-togethers, and conventional business activities, the COVID-19 pandemic has made the capability of XR more alluring and critical than any time in recent memory.

In the era of the Internet of Things (IoT), Augmented Reality (AR), Virtual Reality (VR), and shared learning offer a total encounter during an understudy's interaction of securing data, and empower the spread of imagination. VR and AR permit students to perform tests in a protected climate[1].

In Extended Reality, the user acknowledges virtual components of their current circumstance as a feature of the entire and becomes less cognizant that those components are not a piece of actual reality.

AR puts a computerized layer over this present reality, MR places intelligent advanced items into this present reality, and VR places the user in a different universe altogether.

The realistic underneath outlines the distinction between VR, AR, and MR.

Fig -1: Difference between VR, AR, MR The capacity to reflect genuine circumstances gives

Broadened reality the advantage of surpassing any conceivable breaking point. You can't send a class of 1st- grade understudies on a field excursion to the moon. With an essential VR re-enactment, they can begin exploring the surface of the moon in seconds.

With the help of augmented reality tablet applications or full, 360-degree headsets, understudies can improve their comprehension of what life resembles all through the world.

Students can learn best when they use perceptual learning styles, which are sensory-based. Hence it is important that educators/teachers ought to give more viable and genuine experiences for the better comprehension of every single student. It very well may be of incredible advantage for educators just as students whenever extended reality innovations - VR, AR, and MR are included in the educational sector.

2. Background of Literature

Colleges need to distribute assets cleverly to get supportable and to give students with life encounters in a supportable climate. They should be an impetus for important changes in the public eye with the goal that their alumni can be important for the change of the entire society, in the bearing of the economical turn of events. Moreover, there is an assumption from a society that colleges will assume a significant part in encouraging instruction that permits current and people in the future to update their exercises, just as their own and expert life, to make a reasonable future.

The literature review uncovers some significant advantages of the e-learning climate in the period of IoT. An application was created for managing curricular activities in college. It can record student's actions, tasks, and responses in a very efficient manner using the concept of extended reality. This XR technology takes the activities from the real-world and intends to make them possible in the virtual world. Interactions between the user and the system were possible with the previous work results.

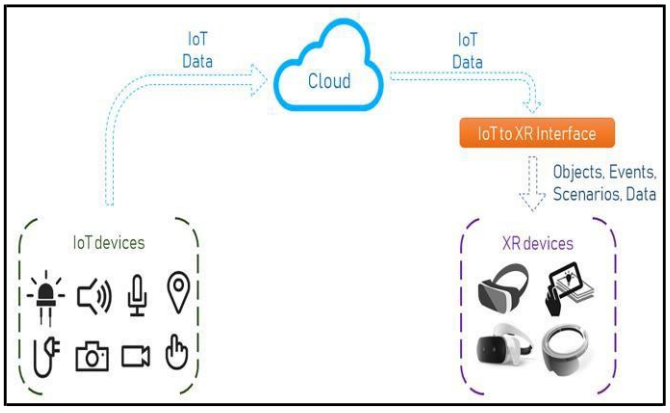

Fig -2: Model for data communication between IoT devices and XR devices

In [3], a device was created to permit the production of online city arranging arrangements utilizing VR, Geographic Information System (GIS), IoT, and Peer-to- Peer (P2P) virtual organizations.

Multisensory learning is preferred by millennials due to different IQ levels, which vary between individuals. This method presents the learning content through different sources and senses (sight, touch, hearing, and smell) for effective learning[4].

3. Benefits of XR in Education over Traditional

Learning Methods

The traditional classroom learning method mostly includes verbal presentation, reasonable information isn't given to the students. Not every student has the same level of grasping power, some students can grasp knowledge and

can understand the concept just by listening once, while on other hand some may take time to understandthe particular topic.

According to **Cone of Learning** by **Edgar Dale** in 1969, the least effective method of learning involves learning from information presented through verbal symbols, i.e. Listening to spoken words, and the most effective methods involve direct, purposeful learning experiences, such as hands-on or field experience.

If XR-based technologies are included in Education Sector, Students can get proficient information uptake. Unlike in traditional classroom learning, here, students can focus on a topic or idea, and there would be a distraction-free environment. It can be helpful to gain real-life experience of a certain subject or topic. It can help in making learning considerably more intuitive and energizing.

The Coronavirus pandemic has changed the method of learning, today the greater part of the schools and universities take online classes which are in 2D, so students can't generally comprehend what is being taught. Extended Reality technologies can offer clear benefits in providing an effective immersive learning experience.

Hence, there is a need to include XR in Educational Industries, which can not only provide practical knowledge but, can also provide deep knowledge extraordinarily and most effectively.

4. How to Involve: XR in Teaching and Learning?

EDUCAUSE has distributed three reports on XR, which exhibit that XR is a successful innovation for dynamic and experiential picking up, empowering clients to acquire solid experience that may not, in any case, be available[5]. By giving "hands-on" insight, XR advances student commitment with learning materials and develops student interaction with complex issues.

An examination on the VR and memory in Maryland has shown that the understudy's review has been improved by

8.8% with the vivid experience when contrasted with the basic work area screens insight. Alongside this, 40% of the member understudies got an increment in review with the use of VR.

There are various AR, VR tools developed for the educational industry to provide the student a better understanding of any particular topic or subject.

Some of the immersive technology tools that can be used by educational institutes are,

i. **Experience Real History:** Travel back in time to the Alamo in 1836 using an AR book, trading cards, or mat Download the ERH application to interact in interactive AR learning with historic characters that come to life before your eyes.

ii. **Figment AR:** This free tool combines AR and VR into one. Using Figment AR, you can add animated characters, objects, special effects, and portals to your creations. Enter the portals to switch from AR to VR. To narrate a story in the real world, record a screen recording. (Android and iOS)

iii. **Google Expeditions:** With over 800 virtual reality and 100 augmented reality tours to choose from, you can provide students with a more immersive learning experience. Simply download the free app from Google Play or the App Store and allow students to explore the world outside of the classroom.

iv. **Google Translate AR:** Using your camera, you can instantly translate signs, letters, images, and more into 38 different languages. Excellent for instant translation.

v. **Merge EDU:** Imagine being able to hold a frog, a volcano, the earth, and other objects in your hands for close examination! Merge EDU is an AR/VR platform that allows students to engage in more interactive learning by exploring science-related topics in AR via Merge Explorer.

These are only a couple of the numerous tools accessible to investigate AR and VR and begin rapidly at various levels and content areas.

Fig -3: Students experience immersive virtual spaces at the College of Architecture at Texas A&M University.

5. Future of XR in Providing Quality Education

Considering the current circumstance with COVID-19 where children need to gain from home, just as the inescapable need of changing the educational system, many see AI, AR, and VR as the fate of education.

Education is relied upon to be the fourth biggest area that will put resources into the VR venture. Numerous examinations including this one done by Statista are anticipating that by 2025, VR in schooling is to be a $700 million industry.

Educators prefer using VR in their classrooms [6], Insights from a National Survey are showing that 90% of teachers concur that XR innovation is a significant compelling method of giving separated and customized learning encounters for understudies. One of the fundamental battles' instructors face is catching and keeping up with understudies' consideration, and VR and AR are empowering educators to catch child's consideration, yet additionally to instruct in an energizing, profitable route that simultaneously facilitates the clarification interaction and is more diversion for the children.

Conclusion

Coronavirus has changed the world and the job of establishments of higher ed in it. The present circumstance clarifies the capability of XR for instructing and learning, yet it additionally clarifies the way that not the entirety of the devices are set up for XR to be as valuable in training as it very well maybe. The objective of the XR in Education Summit was to make a dream and activity plan for the fate of XR innovation and its utilization in higher ed. Much to our dismay that reality would make that vision more significant than any other time. This innovation is changing over the most drilling and dreary subjects into generally captivating and fascinating for each understudy. This industry is unquestionably reclassifying the learning and showing measure and changing over the experience into more intuitive and proficient. With the goal that each understudy has an ache to get more information.

Additionally, without the pressing factor and intensity that study halls regularly can bring, understudies feel more urged and engaged to learn and rehearse with these gadgets, through essentially investigating at their speed.

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