# Virtual Reality – How Real Is the Indian Education Field?

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## Abstract

*Virtual reality (VR), Augmented Reality (AR) and Mixed Reality (MR) are transforming education. Use of technology in education has become unavoidable and application of technology has simplified many tasks with the help of EdTech platforms and remote learning devices. There are many resources available for both educators and learners alike, to pursue Open and Distance Learning (ODL) through Virtual Reality, Augmented Reality and Mixed Reality. These resources make learning memorable, as the learners can identify their needs and implement them with a joy of learning. Virtual reality puts them in real immersed environment making complex concepts simpler and easy to understand and comprehend. Indian initiatives in the field of Virtual Reality usage in the field of education is in the nascent stages only and the government has taken bold steps.This thematic paper on Virtual Reality in Education with special reference to Open and Distance Learning (ODL) tries to put how the pandemic has forced to adapt to modern innovative pedagogy.*

## Keywords

Virtual Reality, Augmented Reality**,** Mixed Reality, Technology, Education etc.

## Introduction

Enforced self-isolation as a result of the coronavirus pandemic, throughout the globe has promoted remote learning and extensive technology use in education, as the world is witnessing since March 2019. Entities must adopt a new method to adapt to changing learning habits. To enhance their capabilities, a remote and scattered workforce demands considerably deeper engagement tactics based on technological approaches. Education is undergoing dramatic changes as a result of this pandemic. Learning styles are constantly evolving, and technology plays a significant role in the lives of students. Online, mobile, and virtual reality is transforming the way to learn. Students and adult learners are aware of the knowledge they wish to acquire and the resources available to them. New generation learners are tech-savvy, self-sufficient, and have all of the answers. They want learning to be enjoyable, interactive and engaging, and they want to understand why they require new information and how it will benefit them.

When it comes to customizing information for a certain audience, the role of technology is crucial. Virtual reality is the process of creating virtual simulations through the use of computerized technology and devices. This places the viewer in the same environment as the image, allowing them to not only see but also feel what is happening in front of their eyes, as with

3D techniques, which is a feature of virtual reality as well. Users can use their sense stimulations to move up and down and see everything as if they were truly a part of a virtual world when they are embedded in that technology with the required specific devices. At home, people use advanced technologies and predict them being adopted in classrooms.

As digitalization continues to transform our lives, the education sector is compelled to incorporate technology into the classroom. Apart from widely adopted mobile apps, EdTech platforms, and remote learning tools, there are two additional technologies worth focusing on in the coming years: Augmented Reality (AR) and Virtual Reality (VR), both of which are determined to maintain the cutting edge of modern technology in education. Mixed reality (MR) is the combination of VR and AR in desirable and required proportion. Implementing virtual reality in education will assist educators, students, and providers of learning solutions in resolving the following challenges:

a) Perceiving complicated information and developing specialized abilities.
b) Analyzing large amounts of data and presenting it in an interactive format
c) Demonstrating the relevance of theoretical knowledge acquired during lessons
d) Retaining acquired knowledge and matching acquired skills to actual job requirements and
e) Utilizing exceptional experiences to engage students in the educational process

## Importance of Technology in Education

The purpose of technology in education is to maximize the effectiveness of a sound education. Technology has revolutionized virtually every aspect of life, from interpersonal communication to the economy, the entertainment industry, and even education. Students today, more than ever, appear to be confronted with changes that fundamentally alter not only their learning process, but also their daily lives.

While the importance of technology in education is evident at every level of education, the junior grades of elementary school and high school are where modernization is most palpable, as this is the time during which children prepare for the significant challenges that await them at the next stage of education, which is why it is critical that they approach learning appropriately. Numerous tasks have become simpler, allowing children to focus on their personal development and also it lowers the cost of education by providing access to a variety of skills and online degrees.With the advent of internet, computers, tablets, and smartphones, technology-based education is likely to become more exciting than discouraging. Access to education has become significantly easier as a result of technological advancements; individuals can now choose from a variety of learning styles and degree options.

## Difference among Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR)

AR and VR are fundamentally distinct, despite the fact that they are both visual technologies that rely on non-traditional interactions. Mixed reality is a term that refers to the employment of many technologies at the same time. With the acquisition of Tesseract, a deeptech business that created an MR device called Holoboard, Reliance Jio hopes to make mixed reality commonplace in India.

AR is a multi-sensory interactive experience that blends real-world and virtual elements. It is known for enhancing users' perceptions by merging real-world objects and naturally stacking information or visual assistance on top.These days, the most common instances of AR technology are animated emojis on smartphones. AR applications can enhance on-the-go learning for maintenance and troubleshooting, systems maintenance tasks, and other computer-aided learning

and training in the industrial setting.

VR, on the other hand, is a simulated experience that can either deliver a highly realistic virtual experience or provide stunning new visual sensations that defy reality. Currently, standard virtual reality systems generate visuals, sounds, and other sensations using either VR headsets or multi-projected environments. Virtual reality applications are being used in the healthtech, edtech, and consumer services industries.

**VR and Education**

While the majority of people have heard of virtual reality (VR), many are unaware of what it is or how it is used in educational processes of teaching and learning. It is a term that refers to interactive content (images or videos) that enables the viewer to explore a scene in 360 degrees. It immerses or surrounds the viewer.

Essentially, there are three major ways to incorporate virtual reality technology into the educational process. The first is to create an immersive classroom environment through the use of projections on the walls and throughout the environment. The second is to augment surroundings with augmented reality technology via smartphones, as seen in augmented reality applications such as Pokémon GO. Thirdly, learners can be equipped with virtual reality/augmented reality devices or glasses such as Google Glasses, Face Computers, iphone device (expected to be launched in 2022) to delve deeper into the virtual world.

No technology can completely replace human interaction, but it can enhance it. Virtual reality is rapidly gaining traction in education, with almost all students of all ages adopting it. Virtual reality is an excellent tool for providing students with a new perspective and firsthand experience of the subject they are studying without physically being there.

Virtual reality in education is drawing major investment, in addition to its popularity among instructors and students. According to the Perkins Coie's 2018 Survey Report on Augmented and Virtual Reality, the education sector ranks second in terms of investment in the deployment of virtual reality technology.

It is not necessary to spend a lot of money to bring augmented and virtual reality equipment into the classroom. Resources ranging from low-cost viewers like Google Cardboard to cost-effective equipment that connects to smartphones are accessible without breaking the bank. Teachers can use tools such as 360 Cities, which allows pupils to go to cities such as Rome and Tokyo for a cheap or no cost. Another software TimeLooper, allows students to experience historical settings such as mediaeval London or World War II via the viewpoint of history.

There are several challenges in education that are unlikely to be solved exclusively through the use of virtual reality technology. On the other hand, the interactivity enabled by virtual and augmented reality can help mitigate low levels of student engagement, which has become one of the field's most hotly debated issues. By implementing an immersive VR application, one can significantly increase learners' enthusiasm for studying. Rather than sitting through a tedious classroom lesson, learners can engage in real-world activities and become active participants. Through the use of virtual reality, they can interact with objects, one another, and teachers in novel ways. Additionally, virtual reality eliminates all of the distractions that plague classrooms. Procrastination becomes more enticing than studying.

**Resources of VR**

| S.No | VR Application | Functions/Uses/Options |
|------|----------------|------------------------|
| 1 | 360 Cities | Virtual Tour of Cities of the World |

| 2 | TimeLooper | Historical Lens – to experience mediaeval periods |
|---|---|---|
| 3 | Arloopa | Enables to position 3D objects precisely within AR |
| 4 | AugThat | Library of Augmented Virtual Reality |
| 5 | Arize | Allows creating a direct link to a website. |
| 6 | CoSpa es Edu | Tools and resources that enables students to create 3D, learn to code, and engage more deeply with their curriculum |
| 7 | Google Cardboard | A low-cost virtual reality headset that works with smartphone VR applications |
| 8 | Nearpod | This is a free VR – based curriculum for teachers |
| 9 | Immersive VR Education | This is an open-source education platform enables educators create their own lesson plans and immersive experiences. |
| 10 | EON Reality | Students and teachers can collaborate to create a blended-learning environment that combines 3D with power Point, sound effects and notes among other things. |
| 11 | Schell Games | Interactive game experiences with the goal of positively influencing a person's Knowledge, Attitude and Habits. |
| 12 | Minecraft Education Edition | The popular game now includes an educational component that enables students to create their own virtual worlds, such as Fort Clatsop or Jamestown. |

## Multifaceted Applications of VR

It is easily accessible to all students and teachers and can easily be monitored. Virtual experiences have the potential to captivate and inspire students in a profound way. Students can learn and gain experience through VR; it has the ability to inspire students; it fosters imagination and the ability to create new things; it engages students and promotes student interaction; it fosters an inclusive classroom environment, memorable learning, and a realistic travel experience. In education, virtual reality is used to increase students' engagement with their studies. Virtual Reality creates the physical world in which we live. It has the potential to transform the way education is delivered in the modern era.

Virtual reality can be used in almost all walks of life. Its application in industries of wide range including medical, paramedical, architecture, national security such as military and policing, anti-terrorism, traffic accident awareness, and weather forecasting are immense. New avenues are opening everyday with innovative experimentations.

As more people come into contact with digital automation in all spheres of life, particularly at work, educational platforms, online courses, and virtual classrooms assist learners in grasping technology and remaining current on industry-wide transformations. Today, a teacher does not teach students; rather, he or she serves as a mentor, guiding students on their path to acquiring knowledge and applying Virtual reality in an open environment.

## Indian Initiatives

In 2018, under 'The Prime Minister's Digital India' scheme, a Rs. 130 crore project launched the first-of-its-kind AR based education and training institute in Varanasi City as a joint venture with US based AR company, 'Eon Reality'. This project will give students of skill schools and engineering, hands-on training for excellence in ultramodern machines.

IIT Madras has created a body consisting industries, academicians, fresh startups, governmental agencies to create new advanced technologies and applications in Virtual Reality

(VR), Augmented Reality (AR) Mixed Reality (MR/XR) and haptics.

Indian Chapters of International VR/AR Association (VRARA) are functioning in various cities of India. It is designed to collaborate between industries, educational institutes, research organizations to establish high standards among member organizations. Virtual and Augmented Reality Center of Excellence (VARCoE), Odisha, is striving for excellence in a wide range of industries and research fields such as Product and Skill Development, Health and Medical Sciences, Art and Architecture, Transport, Construction, Tourism, Entertainment, Productivity Software and Education. The center has multi-disciplines engaged in research, teaching and servicing.

UE & HCL lab, and Department of Design, IIT, Guwahati is undertaking a research project on 3D user interfaces for Virtual and Mixed Reality with several complex tasks in VR environment working on user centered aspects of Internet Of Things (IOT).

The Sainik (Military) School for Girls, Kherva, Gujarat, has the India's first interactive virtual reality-based education classroom with 3D and 360-degree technology.

## Futuristic Approach of VR, AR and MR

AR, VR and MR are seen as the future of learning and education as
  a) it helps the learner to remember what has been learned,
  b) learning experiences are tailored to the learner,
  c) provides expandable experimentation possibilities,
  d) reduces reliance on rote memory learning,
  e) both the educators and students are empowered and
  f) encourages active and interactive learning.

It is realized that AR, VR and MR technology may be useful not only for children, but also for re-skilling, corporate learning, industrial applications, and other purposes. Educators, too, may gain a lot from using AR/VR approaches for teaching when they're combined with the correct content. Content reigns supreme, regardless of medium, according to Edtech startups. VR headsets, like textbooks, will collect dust on a shelf if they don't have the correct material.

Learning may be made more entertaining for learners and students by using virtual labs, social media learning, and gamification. In the future, books could be digitized, with AR technology included. Teachers can publish helpful milestones in the actual world for students to stumble upon. Subjects and digital versions of real-world things will simplify lesson delivery. New games with AR-enabled assistance and immersive VR experiences could change student learning and coaching.

Virtual reality is the next big thing in education and training; it will enable the development of a new pedagogy for the study of previously difficult scientific theories, increases students' knowledge area, boosts students' creativity, and improves students' understanding level. Students can easily grasp difficult concepts in a short period of time; distractions do not occur while studying; it increases learners' efficiency in acquiring knowledge; it increases teachers' skill among teachers; it improves students' memory power through connection with education; and it makes students more active.

## Disadvantages of VR

There are certain disadvantages of augmented reality too. Students tend to become 'lazy learners' and turn more towards entertainment and recreational aspects than educational. Lack of

teachers' interest and knowledge of modern innovative technology to adapt to new methods of emerging pedagogy is a real challenge. It requires specialized devices and content adapted to VR, AR and MR. The cost factor may hinder many institutes to adopt these measures.  It can be expensive to implement and some schools may not have the necessary budget and depend on subsidies being put in place.

**Conclusion**

 The pandemic has the pushed entire world into unforeseen situations. But life has to go on and as it is said 'necessity is the mother of invention' many innovative measures are taken. Education field is no exception. Though initial efforts of Virtual reality started in 1980's and grew through 2000s it has found its application presently. VR, AR and MR are being used widely in every aspect of life now. Virtual reality (VR), augmented reality (AR), and Mixed Reality (MR) are technological innovative pedagogical methodologies that provide joy of memorable learning for the learners. There are many resources available both for the educators and learners alike. Applications of Virtual reality is very wide and is being used in almost all fields of industries, medical and pure sciences, arts and architecture, agriculture, power, urban and rural planning etc. Indian initiatives are in nascent stage due to the well-known reasons of diversity. Yet the government has taken bold steps to mitigate the shortcomings. The future of Education is in the laps of VR, AR, and MR.

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