USE OF NEW TECHNOLOGY IN DIFFERENT STREAMS OF EDUCATION: AN EVALUATION OF VIRTUAL REALITY APPLICATION IN TAMIL NADU

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ABSTRACT

Educationalists always strive hard to make it effective. Different age groups require different approaches to teaching and learning. Various disciplines of education solicit varied use of pedagogy. Technology plays an important role in teaching-learning process. Technology makes teaching more effective and meaningful. Virtual reality makes learning experiential. It gives completely 3D environment with 360-degree perspective, created using the combination of software and compatible hardware. These significant 3D techniques track the changes in user movements and project the object like those in real world. In last, 5 years, virtual reality (VR) and augmented reality (AR) have attracted the interest of investors and the general public, especially after Mark Zuckerberg bought Oculus for two billion dollars. It has created new resources for teaching and making learning as fun. It will help the students to have hands on training and witness different point of views from historical events or human physiology.

Virtual Reality plays a dynamic role in Life-or-Death implication like submarine technology, underwater studies, fighter jet training, Space Studies, Mining courses and defence studies. It can also be used in skill based training also, driving simulations can train tank drivers before allowing them to operate the real vehicle. A relatively tiny VR device will even act as an entire research lab. It can be of great benefit to instructors to have a tool such as the VR at their disposal, if it is paired with the right content. But such technologies are costly and almost impossible. They are also very limited in doing possible things. Currently, videogames supported by VR tools are very popular than the past, and they represent valuables, work-related tools for neuroscientists, psychologists, biologists, and other specialist as well.

The virtual reality yet to enter class rooms in Indian education system. Effective use of this technology will enhance the learning and foster the creativity. However, the use of technology in education has taken a great momentum during COVID-19 pandemic as students are unable attend the class rooms and labs physically. Therefore, present study world explores the possibilities of virtual reality inclusion in the teaching at various disciplines of education. Study specifically looks into present status of virtual reality use in the education in Indian context, technology used in virtual reality, to know the level of preparedness among the educational institutions and stakeholders, to understand the process of including virtual reality in various disciplines of education.

To accomplish the objectives of the study the researcher reviewed the literatures and analyse the documents along teaching resources available with major institutions which are using virtual reality technology in education. Data collected through structured interview among the teachers and virtual reality developers. The study was conducted in Tamil Nadu. This paper discusses about the pros and cons of using this new technology at present situation in education. The study throws light upon new dimensions of education.

KEYWORDS: virtual reality, recent technology in education, recent trends in animation

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EVALUATION OF VR IN ANIMATION EDUCATION

We are continually searching for new and higher ways in which to teach the young. Analysis suggests once students are having fun, they have an inclination to learn higher. It's even scientifically evidenced that retention of knowledge is higher once it's communicated through visual communication. We have a tendency to feel 3D animation as a learning medium offers exciting prospects for meeting the wants of twenty first century learners. Usage of animation instruction will considerably enhance student learning if it was properly designed.

In the past five years' Virtual reality plays a dynamic role in enhancing the 3d animation videos, it makes animation more powerful and interactive. And recently it has entered the world of education by generating new resources to teach and learn. Learners absorb information much better if they come into a 3D environment that makes the whole thing more fun, exciting and pleasurable. Virtual reality allows you to discover, travel without leaving the classroom, without moving learners can learn what they want to learn, and will have a greater professional coordination.

Recently the VR technology is coming into picture nearly every sector, however over the last few decades the technology entered into the robotics field, which has managing robots from particular distance. In skilled Technical courses, students will learn to program a robot to try and do certain tasks and use virtual reality to know-how the actions of robot.

Vocational training will begin to feel the influence of virtual reality over the next year or so. The facility to experience teaching and learning in 360 is helpful – and imagine growing mechanics viewing a working machine from all angles within the classroom. All this is possible using with VR technology enabled class rooms.

In military, aeronautics, and medicine, Teaching and training in Virtual Reality is an alternate method to live training with costly equipment, dangerous situations, or sensitive technology. Pilots can experience realistic cockpits with VR technology in their training programs that include virtual flight and live training. Medical surgeons can be trained with virtual tools and patients, and use their virtual skills into the operation theatre, and studies have already started to show that such training leads to make good medical specialists who make less mistakes in operation. Police department and armed forces are started conducting virtual raids that avoid putting their lives at risk.

Colleges and Universities have always been at the cutting edge of innovative technologies, driving development and creating the next generation of developers and Scientists. Currently, Virtual reality technologies are at the leading edge of development.

AIM & OBJECTIVE

This study is to explore the possibilities of virtual reality inclusion in the teaching at various disciplines of education and to find out barriers in implementing these new techniques in teaching learning process.

METHOD

Two main experts working in both teaching VR and VR development were interviewed and a few employees working as designer and programmers were selected for one to one interview. Interviews were recorded and transcribed manually. The responses in regional languages (Tamil) were translated to English. During the coding, similar statements by the experts were finalized.

Analysis

Narratives of Expert1: Dr Ezhil Vendhan, dentist, 3D instructor & Animation film maker is well-known for his 3D film “Hanumanvs. Mahiravana”. He narrates that

“VR technology is just entering in the field of education and it has long way to go, and at the same time it’s an excellent technique for the students to view their subject content in 360-degree view.”

“At that time, when I was studying dental degree, teachers used to teach through diagram which is not much interesting. But recent days; through VR, virtually we can go inside the mouth of the patient and remove the damaged tooth and replace the artificial tooth” in this way, we can feel like we got the real experience about the operation very clearly without having any doubt in mind.

Using virtual hand gloves [by holding joy stick] it is possible to interact with the scenes. Example: we can feel like we are assembling a car by taking the parts one by one in hand and placing it in appropriate positions.

When speaking about safety precautions implemented in VR devices Dr Ezhil said

“It’s a great advantage by having walk around techniques and when we are trying to go across boundary mesh which displays and gives warning for not to go beyond boundary. This protects us from physical collision.”

Long Distance model and Prototyping

Prototyping is one of the valuable tools that a VR designer can control during their design process. Constructing something that can be used, verified and analysed is how we decide if design results stay or go. When it is done quickly, prototyping really becomes unsafe. Prototyping is mainly useful in virtual reality. VR experiences can be tremendously abstract, often tough to visualize, let alone clarify to another person.

Limitation

“While modelling the 3D content in modelling software like Maya, 3Dsmax, or Mud box poly count of the mesh should be taken care of, it should be limited and maintained a low poly mesh and same time Low resolution content are unacceptable by human eyes, while looking through VR devices”

Virtual reality, 3D input contents are very limited and main thing is, in the country like India services are not available for repairing the headset and joy stick kit. Moreover, it's sad that India is not added in oculus services list.

“Wearing VR headset is similar to tying the binocular device straight away to the human eye, while watching content for prolonged time definitely it makes discomfort for the students”

Narratives of Expert 2&3:

Amazon a well-known online marketing company -Chennai division located in OMR is in the process of making their commercial products visible in VR. Customer can click products which they want to purchase and can see it in virtual 3D.

VR developers and quality checking analysts Mr Ramesh Krishna and Mr Rahul from this unit together witnessed that hardware devices for VR is very cost effective for the countries like India.

“According to their findings HTC Vive is 80000 Rupees, Oculus Go 25000 Rupees, Oculus Rift 50000 Rupees and it requires Graphic card Nvidia gtx 1070 for smooth work flow which comes around 50000 rupees. This is not much affordable price for the normal people to purchase”

Narratives of Expert 4:

Daril Games is a studio, having specialist in making VR content and their latest project is making Adhani port in VR content which is located in Chennai. Mr Sudharsan Srinivasan VR developer mentioned

“Educational sector having more projects equal to industrial, but it's true that there is very less scope in syllabus. And the most challenging part in VR production is cost of production and building hardware devices”

He admits that VR is going to play major role in education in future several medical colleges have invested in creating surgical simulation and many schools are introducing customised VR lessons.

Audi, a German car company, launched a first fully functional virtual reality application for customer consultation at dealerships. Audi dealers in Germany, the UK and Spain are now starting to use the virtual reality headset system, with extra markets and sites to follow. With the VR result, consumers can get an awfully realistic experience on their own configured car. Their experience in VR explains Audi technologies naturally and offers customers the chance to engage themselves virtually in surprising moments from the world of AUDI.

Using VR headset, potential buyers can configure their own car and see even the smallest details from an extremely realistic view, selecting from several models and various equipment. The VR allows users to become entirely immersed in the virtual world, conveying all detailed image prior to the purchase decision. The configured Audi is proficient in 3D and 360 degrees, with light and sound effects.

Development Tools

Maya & 3ds max: Autodesk Maya and 3ds are square measure 2 popular 3d computer graphic programs. Though originally discharged in the Nineteen Nineties, each software package platforms are unceasingly updated and in wide use nowadays. Maya is incredibly widespread among digital artists. The platform is employed for making several of the graphics seen within the movies, and is used for making visual effects for each live action and animated TV series. 3ds max is additionally used for CGI animation, notably within the computer game and film industries. It's additionally used quite extensively for renderings by design and engineering design companies.

Many spectacular VR apps can use 3D special effects to simulate immersive worlds – be it underwater, in space, or in buildings not however designed. The transformational power of VR permits US utterly expertise completely pc unreal environments. To form the media to be used within the VR app, designers have to be compelled to leverage programs like Maya and 3ds max.

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Maya and 3ds max panoramas is rendered directly into 3 supported InstaVR image types: png, tiff and jpg. Once in those formats, they'll be simply uploaded into InstaVR to be authored and published.

InstaVR: InstaVR is one in all the platform for augmenting and distributing 3d pc rendered pictures and videos. It will flip the media files into absolutely shareable apps, complete with home screen, navigation between scenes, and gaze-activated hotspots. This platform allows users to publish their 3d apps to iOS, Android, Gear VR, Google Cardboard, HTC Vive and web-embedded VR.

Unity 3D: Unity3D could be a development engine that was 1st released in 2005. Since then it's become the foremost widespread 3D and 2nd development platform within the world. Hour of AR/VR content and five hundreds of mobile games are created with Unity3D, It Supports twenty-eight platforms from iOS & oculus to Windows Mixed Reality and every one intermediate. Thanks to its high quality with mobile platforms, there's a persistent story that Unity3D is merely sensible for mobile-oriented projects. That's largely as a result of, within the past, Unity3D themselves heavily targeted the mobile market, particularly throughout the increase of the Apple's App Store and Google's Play Market. Within the previous couple of years, the engine has advanced most that currently it's a multi-faceted development platform which will be used for any advanced XR solution. Unity is nice for each cross platform solutions and complicated XR projects alike (e.g. entire Audi provision and car configurator training is made inside Unity3D platform).

Unreal engine: Unreal Engine includes a long history as a game engine dating back to 1998. It's had many versions, like Unreal Engine two & three. In 2015, the fourth version of this present development engine was created unengaged to the overall public. There's a five-hitter royalty fee for Unreal Engine-powered merchandise that create over \$3,000 per calendar quarter. There's no royalty if you're victimization the Unreal Engine for design, automotive, film, television, broadcast, live events, coaching and simulation, or alternative non-games comes. These days, major studios use Unreal Engine for its numerous projects, including, education systems, games and business solutions.

Unity 3D

Unreal

Required Hardware device: For installing the unity or unreal software following are best windows configuration for smooth work flow

Minimum requirements	Windows
Operating system	Windows 10, 64-bit.
CPU	X64 architecture supported with SSE2 instruction set
Graphics API	DX12 - capable GPUs
Additional requirements	Hardware vendor with authorized supported drivers

Oculus Quest, Oculus Go, Oculus Rift S, IOS / Android / Google Cardboard, WebVR are some the instruments used for VR.

Sample Animation

<https://www.dariyalgames.com/blank-page?pgid=kdct755k2-afedc0cb-b4ca-45de-91de-99365764efff>

Reference website: Dariyal Games

Pros and Cons of using VR in Education

Advantages

- It is very much successful among the students on the explainer videos, explainer videos are nothing but short animation. It will explain a key concept of a logic, demonstration or overview usually within a maximum duration of two minutes in 360-degree view. Recently it is more popular on start-up company websites.

- In wireless device there is flexibility to walk around and can interact using physical movements and action in hand.
- Long distance model and prototype can be incorporated in a 3d scene, zoom in, zoom out controls will be the most useful option to view the detail model.
- Creates a safe Learning environment with physical collision boundaries in both application and also in VR instrument

Disadvantages

- Due to lack of technicians and designers, content is very limited, creating good quality contents will take enormous time and cost
- Low resolution videos are less acceptable by human eyes and will create tiredness on eyes.
- Students will suffer to watch lengthy videos, because wearing the head gear for long hours will make students uncomfortable, it is nearly like wearing a binocular for prolonged hours on the eyes.
- There is no service centres in India to repair these hardware instruments. India is not in Oculus services list.
- Using low cost wired instrument will restrict the flexibility in physical movement.
- Though it is interactive we cannot feel the smell and touch sense.
- Not only in Tamil Nadu almost in every states of India, this technology just arrives in education field, it has long way to go.
- Even though it has safe boundary indication, using VR without supervision can lead to physical damage.
- The main important disadvantage is high cost.

CONCLUSIONS

Predictions are that in next five years VR will start becoming mainstream, and some of the major players in the education and technology sectors including Google and Facebook are already acquiring applications for the teaching space. Although in theory VR technology ought to be a tremendous tool for learning and teaching, the truth is that it's been slow to take off in academic settings, in large part due to the circumstance that it's still so costly to implement the technology. Since the technology is new, and very few developers and teachers available in Tamil Nadu, the sample of study is very limited; further studies and more perfect assessments are necessary.

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