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Virtual Reality in Education and Training

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Abstract: Virtual Reality is one of the most modern and hottest mounting technologies in the world. Virtual reality is an artificial world with virtual constructions.VR plays a vital role in a variety of environments and it drawn a much concentration by researchers and scientists from the last few years. It allows user to interact with a computer-simulated environment that incorporates mainly auditory and visual. The immersive environment is an experiencing simulation of the real world or an imaginary world. It makes it possible to experience anything, anywhere, anytime in the world. Virtual learning environments have been much unbeaten in generating positive learning outcomes in a variety of domains. It can provide a space for students to explore problem spaces and check solutions without risk. Virtual Reality is a 3D computer based interactive environment. It simulates reality. Virtual Reality can bring us into an imaginary world which appears exactly similar to our own world. In this paper, a historical overview of Virtual reality, Virtual reality in education, challenges faced in virtual reality.

Keywords: Virtual reality, computer based technologies, virtual environment, education technology.

1. INTRODUCTION

Virtual means "being something in essence or effect". Virtual reality means experiencing something that it is really not (ie.) completely imaginary worlds with the help of high-performance computers and sensory equipment, like headsets and gloves. Virtual Reality (VR) technology is becoming more perfect and immerging, which can show the real world dynamically [11]. It allows user to see the surrounding world in different outlook and experience things in other extent. A new realistic three-dimensional image is created with a mixture of interactive hardware and software and presented to the user and it is accepted as a real world environment in which it is interacted with in a seemingly real or physical way.

Virtual reality is a real world technology and it is applied to various domains nowadays. It is an interactive technology from which the computer is able detects the user inputs and provides it in different environment. It gives a feel like a real world. It immerses the user completely. It helps a person in interacting with artificial 3D environment. The process for developing effective educational training virtual environments begins with understanding the learning objectives, re-creation of the real-world task(s), and assessing user performance and learning[12].

2. EVOLUTION OF VIRTUAL REALITY

a. Historical overview of VR

Nowadays virtual reality technologies build upon ideas that date back to the 1800s, almost to the very beginning of photography. In 1838, the first stereoscope was invented, using twin mirrors to project a single image. Virtual Reality concept has been knocking around since the 1950s. Morton Heilig, Who was 'the Father of Virtual Reality' and he was an American cinematographer who, in the 1960s, developed the Sensorama. An impressive machine, particularly for the 1960s, the Sensorama was a single-user entertainment console that brought together a number of sensory outputs; namely stereoscopic display, stereo speakers, odor emitters, fans, and a vibrating chair. It is used in the mid-1980s when Jaron Lanier, founder of VPL Research, began to develop the gear, including goggles and gloves, needed to experience what he called "virtual reality". In the year 2018, Neurable announces a "brain scanning" headband with built-in electrodes which gives hands-free control of virtual reality.

b. Definitions of VR:

- ✓ "Real-time interactive graphics with three dimensional models, combined with a display technology that gives the user the immersion in the model world and direct manipulation." [1]
- ✓ "The illusion of participation in a synthetic environment rather than external observation of such an environment. VR relies on a three-dimensional, stereoscopic head-tracker displays, hand/body tracking and binaural sound. VR is an immersive, multi-sensory experience." [2]
- ✓ "Computer simulations that use 3D graphics and devices such as the DataGlove to allow the user to interact with the simulation." [3]
- ✓

3. VIRTUAL REALITY IN EDUCATION

Education is one of the most powerful weapons, which you can use to change the world. It is the base to transfer of knowledge. Viewer should look for ways to make knowledge transfer more easily, more quickly, and more effectively. Here, VR is used for teaching and learning simulations e.g. creative or

those who find it easier to learn using symbols, colors and textures. The students want to experience the feel of the environment about the study. VR is used for new creativity learning, develop creativity, visual learning, learn as practical etc.

In educational technology, a concept of 'standalone' Virtual Reality headset is used, it complete with a unique student-friendly interface, gesture controls, embedded educational resources and simple-to-use teacher controls. ClassVR is a groundbreaking new technology designed to help raise engagement and increase knowledge retention for students of all ages. Virtual reality used to

a. leads to increased student engagement
b. allows for medical learning
c. provides genuine experiences to impact student identity
d. allows for constructivist learning
e. affords creativity and the ability to visualize the difficult models
f. virtual reality affords creativity and the ability to visualise
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h. virtual reality affords creativity and the ability to visualise
i. difficult models
j. virtual reality affords creativity and the ability to visualise
k. difficult models

A.Virtual Reality Leads To Increased Student Engagement

VR provides an opportunity to boost student engagement; it provides a novel way of learning for students, delivering powerful new experiences [13]. For example, Google Expeditions allows teachers to transport students to virtual field trips to Mars, the bottom of the ocean, and many other settings, which can spark new interest in subject matter, provide a shared experience for better classroom discussion, and improve overall engagement [14]. It provides unique and fresh learning moments for students, it piques their interest as they actively explore and exercise their curiosity. It also engaged the students and understands the reality of the nature of the kind. It also provides students with a strong sense of presence and immersion compared to traditional learning environments.

Fig:1 VR to increase student engagement

B. Allows For Medical Training

VR provides a 3D and dynamic view of structures and the ability of the user to interact with them. Virtual reality (VR) software that allows them to simulate being a patient with age-related diseases and to familiarize medical students with information resources related to the health of patients. Virtual reality provides a 3D simulation environment. With the help of the virtual reality, the medical trainer gets a real training environment and the trainer can easily analyze the problem and treat it. It gives an opportunity for training, therapy or simulation in situations where the students get repeated practices to handle. Medical students can operate on virtual patients and practice various surgical procedures using VR.

Fig:2VR in medical training

C.Virtual Reality Provides Genuine Experiences To Impact Student Identity

VR provides an authentic experience to students for experiencing things as a meaningful one. It makes it possible to visit anywhere, anytime with the help of virtual field trips. It is one of the powerful learning opportunities for students to get realistic experience. It gives an authentic, powerful and realistic experience.

D.Allows For Constructivist Learning

It allows students to construct their own knowledge. The students got experience about how to engage in authentic problems, exploring solutions and collaborating with others. This kind of constructivist learning provides students to improve academically

compared to traditional learning. It helps the students to construct visual and manipulate objects to represent knowledge.

Fig:3 VR in live and constructivist learning

E. Affords Creativity And The Ability To Visualize The Difficult Models

It enables students to create anything new from their imagination and also easily visualize and manipulate objects to make difficult concepts easier. For example, Google provides a "TiltBrush". It is a room scale 3D painting application. It creates creativity sense and also have the ability to visualize the models.

Fig:4 Tilt brush app(Google provides) for drawing in 3D

4. CHALLENGES FACED IN VIRTUAL REALITY

The big challenges in the field of virtual reality are developing better tracking systems, to find more natural ways to allow users to interact within a virtual environment and decrease the time it takes to build virtual spaces. The cost of the virtual reality interface is high. The viewer should use the basic VR glass, which is not effective for certain reasons. It also needs 5G speed and cyber security.

5. CONCLUSION

Nowadays, virtual reality is one of the researcher topics in the world. VR is one of the best knowledge creation environments. VR technology has been applied in various domain such as healthcare, military, education, entertainment, media, business, etc. VR is useful for providing several opportunities in education to increasing student engagement; providing constructivist, authentic experiences to impact student identity; and supporting creativity and the ability to visualize difficult models. So it is becoming more and more important simulations in education and also in all fields. This is a very exciting time to see the benefits VR will bring to the masses. The concept of VR appeared a long time ago; however, it is until now when it comes into people's sight. Virtual Reality is arguably the next footstep towards a modern and post-modern era of development nowadays. Very soon, it will overcome the challenges in future to use the advantages of this technology as possible. Virtual reality has thus finally begun to shift away from the purely theoretical towards practical knowledge.

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