

Need of Virtual Reality to Enrich Teacher Education

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Abstract

Virtual reality (VR) is a technology which allows a user to interact with a computer-simulated imaginary environment. Users can interact with a virtual environment through the keyboard and mouse or special devices. Virtual reality can be defined as an upcoming technology that makes users feel in a Virtual Environment (VE) by using computer hardware and software. VR provides a different way to see and experience information, one that is dynamic and immediate. This paper explains the different models of VR devices in the world.

The aim of the research is to identify the level of awareness of virtual technology in the B.Ed college student-teachers in the Tamil Nadu State of India. A descriptive survey method to adopt and a total of 350 first year student-teachers from Seven B.Ed Colleges in and around Salem district of Tamil Nadu were selected by using simple random sampling technique. An awareness of virtual technology (AVT) tool with 0.89 reliability and known content validity was used.

The calculated 't' value among student-teachers with respect to gender; mobile in the home; to having PC in the home; and net course already passed significantly differ at 0.05 level could be noticed as rejected these hypotheses. Whereas locality and type of college of education are accepted the hypothesis. Postgraduate qualified student teachers had better awareness than undergraduate qualified student-teachers. The author recommends the students may be encouraged to use the network in their home.

Keywords: Virtual Reality, VR devices, student teachers, teacher education, multimedia, awareness, VR environment.

Introduction

Today's technologies have greatly enhanced more learning environments. Virtual reality learning is, plainly speaking, seeing an imaginary world, rather than the real one. Antonin Artaud an actor described in his book about the "virtual reality" for the first time in the world in 1938. Like another one book in 1958, described the illusory nature of characters and objects. Up to the 1970s, the name was coined as 'artificial reality'. In Oxford English Dictionary 1981 edition, cited this name. Virtual reality name was popularized through a film namely Brainstorm in 1981. And then, Damien Broderick (1982) used this word in his science fiction novel. Virtual Reality book was newly published by Howard Rheingold in 1991 and Randell packer published the same title in 2001 (John Vince, 2004). Now it was revolutionized and utilized in classroom techniques.

Virtual Reality (VR)

Virtual reality (VR) is a technology which allows a user to interact with a computer-simulated imaginary environment. Most current virtual reality environments are displayed either on VDU or through special displays. For e.g., it is easier to learn how a human heart works by actually going inside by a heart display and used in bio-medical reactions and complicated surgical techniques (Senthilkumar, 2012).

VR provides a firsthand approach to learning without the hazards of dealing with the real environment. Even in our history VR class, we will be able to visit different historical events. Likewise in mathematics we can go through the easiest calculations in trigonometry, light reactions in physics; color combinations of chemicals in chemistry; cytology & genetics in biology; consumer rights in economics & commerce; flora and fauna in geography; past events in history; grammar examples in languages; like these virtual technology methods can be used in different teaching units in different subjects. (Nachimuthu, 2011). Most up-to-date virtual realities are displayed either on a computer monitor or special devices.

Users can interact with a virtual environment through the keyboard and mouse or through the multi-model device of the wired glove. In the most popular applications of VR technology, any student viewer simply tours various needy content sites in a three-dimensional space; even virtual surgery and virtual gaming are also possible. The screen of the Multimedia player allows the user to select audio tracks, videos or presentations from a dynamic list (Vijayakumari, 2011). The 'User Selection Tools' allows the presenter to select what type of media they would like to show to their audience. Just as filmmaking, all characters, and settings have to follow a well-defined script to go through till the end (Wen-Hsi Chang, 2008). An Educationist could play the role of a director to make the virtual system keep storyline forward. This includes where and when virtual figures are placed, what kind of events would be triggered, and their corresponding reactions (Xia, 2000). A science specimen is multiplied on a 3D model, which when viewed would show not only the texture but also its appearance under different types of illumination from different angles.

Virtual Environment

Virtual reality can be defined as an upcoming technology that makes users feel in a Virtual Environment (VE) by using computer hardware and software. It was originally conceived as a digitally created space which humans could access by donning special computer equipment. It enables people to deal with information more easily. VR provides a different way to see and experience information, one that is dynamic and immediate. For example, in a computer game, user's mouse motions are tracked and the objects in the game are moved according to the mouse movements. In the same way, a simulated, three-dimensional world is created around the user in which he/she could interact with objects, people, and environments.

Typically three-dimensional life-sized images with support of audio devices are presented around the user and the perspective is modified in accordance with the user input (generally head or eye movements). Many devices along with the computers are used to create a virtual environment. The virtual environments are intended to replace the real world environment with the digital one and the human senses are immersed in the VE. Immersion is an experience of losing oneself in the VE and shutting out all cues from the physical world. A Virtual Environment can be created on different extents depending on the computer-based platform ranging from a cell phone screen to a desktop monitor or a fully Immersive Virtual Environment (IVE). The following table describes the variety of models available in Virtual Reality Devices.

**Table 1: Different models of VR devices
(Nachimuthu, K- 2011)**

No.	VR Device	Different VR Device Models
1.	HMD 3D Stereo	HMD Pro 3D, Z800 Duel Pro, ARV-3D & nVisor SX
2.	HMD 2D Stereo	i-Cine Hi-Res, i-Trek, Myvu Crystal & SunVisor

3.	HMD Monocular	Proview S035-A, M3 Monocular, ET-Centra & I-Port
4.	Head Trackers	Minuteman, Gyro-Track Pro, TrackIR Pro & Cymouse
5.	3D Controllers	X-Gun, SpaceBall 5000, SpaceTraveler & Wanda
6.	M.T - Inertial	GyroTrack, InertiaCube2, Hy-Bird & 3D-Bird
7.	M.T - Magnetic	Minuteman, Patriot, Wintracker & micro-BIRD
8.	M.T - Optical	Hy-BIRD, laser-BIRD 2, FaceTraker & IMPULSE
9.	M.T- Capture Suits	MotionStar, Gypsy5, CypsyGyro-18 & Torso
10.	Gloves	5DT Glove 14, 5-VHand, Pinch Glove & Cyber-II
11.	Hap tics	Motion Chair, Shadow Hand, Cyber-Grasp & Cushion
12.	Stereo Displays	SVI MU 19, 17 SX /21SX, VisBox-HD & VisDuo
13.	VR Domes	Vision Station, VisionDome2, VD3 & VD5
14.	3D DVD	IMAX 3D DVD, Sci-Fi, H-3D DVD 2 & DVD3
15.	VR wear	VR T-Shirt, VR Women's Top, Sleeveless & Shorts
16.	VR software & Kits	VR Racer, VR pilot, NuView 3D & Visualizer

The following research is to identify the level of awareness of virtual technology in their academic stream and to explain its advantages. For example,

nobody wants to be a pig for dental students in training. Through this VR, dental students can make all their mistakes on a virtual patient by the help of the virtual dental implant training simulation program. It helps to walk students through an entire procedure from administering anesthesia to choosing the right drill size operations. Like this, we can use teaching methods with zoom in, zoom out activities of simulations and animations activities.

Virtual Reality Applications Review

The appearance of VR has been used in different fields, as for Education (**Englund et al., 2017**), Learning and social skills training (**Schmidt et al., 2017**), medial teaching (**Gallagher et al., 2005**), psychological treatments (**Freeman et al., 2017**), military training (**Alexander et al., 2017**), gaming (**Zyda, 2005; Meldrum et al., 2012**), architectural design (Song et al., 2017), phobia problems (**Botella et al., 2017**) and motor rehabilitation (**Llorens et al., 2014**).

The VR and Augmented Reality (AR) has been used in research in recent application history (**Burdea & Coiffet, 2003; Kim, 2005; Bohil et al., 2011; Cipresso & Serino, 2014; Wexelblat, 2014**). The study of VR was initiated in the computer graphics field and has been extended to other subjects (**Sutherland, 1965; Mazuryk & Gervautz 1996**) and in video games teaching (**Choi et al., 2015**).

VR is defined as, Real-time interactive graphics with 3D models, combined with a display technology that gives the user the immersion in the model world and direct manipulation. Fuchs & Bishop(1992) defined VR as, the illusion of participation in a synthetic environment rather than external observation of such an environment. Gigante (1993) defined as; VR relies on 3D, stereoscopic head-tracker displays, hand/body tracking and binaural sound. VR is an immersive, multi-sensory experience and Cruz-Neira (1993), virtual reality refers to immersive, interactive, multi-sensory, viewer-centered, 3D computer generated environments and the combination of technologies required building environments.

The higher immersive systems, than the other two systems, can give the possibility to add several sensory outputs allowing that the interaction and

actions were perceived as real (Loomis et al., 1999; Heeter, 2000; Biocca et al., 2001). Higher technological immersive systems have showed a closest experience to reality, giving to the user the illusion of technological non-mediation and feeling him or her of ‘being in’ or present in the virtual environment (**Lombard & Ditton, 1997**).

Technologically, the devices used in the virtual environments play an important role in the creation of successful virtual experiences. Input devices are the ones that allow the user to communicate with the virtual environment, which can range from a simple joystick or keyboard to a glove allowing capturing finger movements or a tracker able to capture postures. (**Burdea et al., 1996**). Some of the companies like Sony, Samsung, HTC, and Google are making huge investments in VR (**Korolov, 2014; Ebert, 2015**).

Objectives

The following are the major objectives of the present study:

- (i) to study the awareness level of virtual technology among the B.Ed student-teachers and
- (ii) to analyze the significant difference if any, in the awareness of virtual technology among the B.Ed student-teachers based on some demographic variables.

Hypothesis

On the basis of the objectives of the study, the following hypotheses have been formulated:

- (i) the awareness level of virtual technology among the B.Ed student-teachers in Salem district is above the average and
- (ii) there is no significant difference in student-teachers with respect to the awareness of virtual technology on the basis of some demographic variables.

Methodology

The investigator adopted the descriptive survey method for studying the problem of this study.

Sample

A total of 350 first year student-teachers from Seven B.Ed Colleges in and around Salem district of Tamil Nadu were selected by using simple random sampling technique for this study.

Tool Used

Virtual reality is all about the creation of a virtual world that users can interact with. This virtual world should be designed in such a way that users would find it difficult to tell the difference from what is real and what is not. Education and technology are interconnected. This synergy is able to transform the world we live in. The contradictory phenomenon is that while being an early adopter of technology, education is also one of the last sectors to be fully transformed by it, due to institutional inertia and a number of other reasons.

The present study was carried out with the help of awareness of virtual technology (AVT) tool based on multiple-choice items developed by the investigator. The tool consists of 30 statements covering the different classroom utility aspects of virtual technology. The investigator established the reliability ($r=0.89$) and content validity of the tool. The tool was administered and subsequently, data was gathered from the sample.

From the analysis, the awareness level of virtual technology among the B.Ed student-teachers in Salem district is above average and there is no significant difference in student-teachers with respect to the awareness of virtual technology on the basis of some demographic variables was analyzed both descriptively and inferentially though hypotheses.

Table 2: Virtual Technology awareness based on the demography variables

Variables		N	Mean	S.D	‘t’ value
Gender	Male	168	149.13	13.663	2.1778 *
	Female	182	153.14	20.370	
Locality	Rural	193	150.33	19.696	0.9441@
	Urban	157	152.26	18.468	

Type	Govt.	100	150.42	19.210	0.7211@
	Private	250	151.98	15.732	
Having Mobile in Home	Yes	183	162.69	17.249	4.3873 *
	No	067	150.69	18.428	
Having PC in Home	Yes	192	160.29	18.822	4.8865 *
	No	158	151.06	16.505	
Course Studied	PG	176	155.74	19.696	3.2622 *
	UG	174	149.63	15.076	

From the table-2, it is inferred that, the calculated 't' value among student-teachers with respect to gender-wise is 2.18; 't' value among student-teachers with respect to having mobile in home is 4.39, and with respect to having PC in home is 4.89 and their course already passed is 3.26 has significantly differed at 0.05 level could be noticed as rejected these hypotheses.

Whereas the calculated 't' value among student-teachers with respect to locality is 0.94 and with respect to the type of college of education is 0.72 at 0.05 level indicates there will be no significant difference. That means, as per the locality and the types of the college of education, the student's teachers' awareness of virtual technology are equal. These types of two variables were accepted the hypothetical conditions.

Postgraduate qualified student teachers had better awareness than undergraduate qualified student-teachers. The Salem district B.Ed institutions may provide proper motivation and orientation to the student-teachers to enhance their knowledge of contemporary affairs and also may bring some experts in the field of Virtual technology for student teachers' knowledge enhancement.

Conclusion

Teaching is a serious task; indeed, a noble profession. Teachers need to roundly understand the needs of students in different aspects of their learning style. It may seem difficult; however, teaching is one way of communicating with students. Considering the students' differences, teachers are challenged to become effective, adept and innovative (Senthilkumar, 2012). Indeed, teaching is more than just a profession. It is a noble passion to pursue. Teachers do not stop teaching inside the classroom. Though this chosen vocation is tiring sometimes,

everything would be rewarding and fulsome in the end through the burning desire, love, and dedication of teachers to teach their students effectively. We believe that our teaching profession gives me different fulfillment. No matter how challenging it is; how difficult it is; how fulfilling the pleasure is; still we feel, we have inspired and encouraged our students greatly in bringing out their best potential by technology help. The most significant thing is our desire to consistently and continuously exercise excellence in the utility of virtual technology resources and affects a positive working attitude among our students. Hence the virtual technology resources will give our teaching for us, pleasure and pressures.

My recommendation for teacher educators will improve ICT skills and develop the academic carrier and improve e-knowledge through the available virtual technology resources. Then only today's teachers are to be a future e-teacher for future generation community.

Educational Implications of the Study

The results yielded can be a pointer for B.Ed training programmes which will help them grasp the modern trends and innovative practices in technology teaching and adopt them in all classrooms to provide the pupils the best possible learning situations. The management of secondary students should conduct a programme on virtual technology. It is helpful to the students to be aware of virtual technology. Also, the management should provide a computer lab with internet facilities for the betterment of the students. My recommendations are the students should be engaged in using a network that keeps a person in a good knowledge about their subjects and the students may be encouraged to use the network in their home.

At present, on the basis of evidence, VR can be considered as a useful tool for education, training, medical, defense, management, banking, diagnosis, and therapy. However, the technique is still in its infancy and much work is needed including controlled trials before they can be put to routine use. Another factor is not addressed the substantial cost of these systems and software. This is another barrier that has to be surmounted before VR can be introduced in routine use. But at the same time, due to these virtual technology methods creates an imaginary world, which is capable of breaking the boundaries in traditional classrooms. The simulation and animation environments using sensory immersion have been proven an effective learning method. In educational institutions, Virtual simulations have been used to teach students how to make easy, quick understanding ability and effective knowledge about their subjects. In future, these virtual reality gadgets are filled in our Indian classrooms and to develop our student's knowledge.

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