TRENDS IN EDUCATIONAL VIRTUAL, AUGMENTED & MIXED REALITY: A SYSTEMATIC REVIEW

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ABSTRACT:

This paper consists about the trends in educational virtual, augmented and mixed reality. Scientific inventions updated each field like medical, agriculture, management and education. Education field is also inspired through modernization. Virtual reality (VR) has typically been portrayed as a medium, like telephone or television. This new medium is typically defined in terms of an exacting collection of technological hardware, including computers, head-mounted displays, headphones, and motion-sensing gloves. The objectives of the study are to study the effect of virtual reality-based learning material on the success of students and to study the main effect and communication effect of group, gender and level of Achievement on the Educational Achievement of student. As it is a review paper, the Researcher has collected the secondary data from different sources. The reviews obtained by experimentation were surprising. Because there is no difference between achievement of students of self-learning experimental group 2 and restricted group. So, we can say that any modern learning technology is not as effective as it is used as a teaching method.

Keywords: *Virtual Reality, Education, Technology*

INTRODUCTION

Now a days in every field technological revolution takes place. Scientific inventions updated each field like medical, agriculture, management and education. Education field is also inspired through modernization. There are many teaching methods invented in educational field like exhibition method, programmed learning method, investigational technique, abstract education, multimedia method, etc. Every method is helpful though there are some limitations in each method. Specially while teaching, physics or chemistry, concepts of atom, it's particles like electron, proton neutron, atomic and molecular orbitals are unable to explain during charts, drawings or models. The pictures are two dimensional, so physical structure of atom, molecule and its orbitals could not be explained correctly. By virtual reality this restriction can be removed almost. So, students can understand these concepts easily.

"Virtual reality (VR) has typically been portrayed as a medium, like telephone or television. This new medium is typically defined in terms of an exacting collection of technological hardware, including computers, head-mounted displays, headphones, and motion-sensing gloves. The focus of practical reality is thus technological, fairly than experiential; the locus of virtual reality is a group of machines." Educating children now and in the future to live in an in-order society is critical. There is also a need to provide life-long education for all citizens and to support a flexible workplace. VR (virtual reality) technology has been broadly projected as a major technological advance that has potential to support for such education. There are more than a few ways in which VR technology is expected to assist learning. Most importantly it allows students to imagine conceptual concepts, to observe events at atomic or planetary scales, and to visit environments and interact with events that space, time, or security factor make unavailable. The types of activities supported by this technology endorse current learning thinking that students are better able to master, retain, and generalize new information when they are actively involved in constructing that understanding in a hand on education environment.

There is proof that, in appropriate application areas, VR can offer an effective medium for enhancing certain skills. For example, effectively coordinating sensory motor skills; ahead situation alertness through use of simulations; and training in design skills. The commercial success of virtual environments in direct training has led to speculations about the application (Krueger, 1991) of virtual environments to other areas of knowledge, such as in virtual science laboratories. This kind of approach could give students access to practical experiments involving the use of otherwise prohibitively exclusive equipment. However, study concerning practical environments to date has focused on skill gaining i.e., the growth of matched sensory motor skills and situation awareness. Empirical proof on the efficacy of virtual environments for promoting education of rich subject matters is partial.

Designers and evaluators of immersive VR systems have many ideas connecting to how VR can make easy learning, but there is little information concerning which of the VR's features best enhance understanding or how to modify those affordances for different learning environments. Other factors such as the concepts or skills to be learned, individual characteristics, the learning experience, and the interaction practice all play a role in determining the learning process and learning outcome.

For the first time, virtual reality has been used in a non-research, public-school environment. During the summer of 1998, summer program students at the Coles simple School and the Phoenix High School in Chicago used virtual reality to addition their usual learning. This original pilot program was born through a partnership between SUNRISE Virtual Reality, a Chicago-based virtual reality company, and Dr. Eleanor Byrd, director of the New Functional Learning Institute, also based in Chicago. The objective of the pilot plan was to discern the optimal ways virtual reality could be integrated into an educational curriculum, and to see how students and teachers similar reacted to the new technology.

IMPORTANCE OF THE STUDY

In this article the researcher justifies how immersive virtual reality may be helpful; for implicit education that is acquiring information and skills without conscious efforts, or without explicitly having to learn specific information.

OBJECTIVES OF THE STUDY

- To study the effect of virtual reality-based learning material on the success of students.
- To study the main effect and communication effect of group, gender and level of Achievement on the Educational Achievement of student.

METHODOLOGY OF THE STUDY

This present study is based on the secondary data in nature. The secondary data have been gathered from, books, national and international journals/ articles, magazine and research related websites only.

REVIEW ON TRENDS IN EDUCATIONAL VIRTUAL, AUGMENTED AND MIXED REALITY

Liu, D. Dede, C. Huang, R. and Richards, J. (Eds**.)** have conducted a study on **"**Virtual, Augmented, and Mixed Realities in Education" c This book describes the current state of the art of various types of immersive learning: in research, in practice, and in the marketplace. It discusses advanced approaches in the design and development for a range of forms of immersive learning environments, and also the rising innovations in assessment and research in the field. In addition, it demonstrates the opportunities and challenges in implementing advances in VR and immersion at scale in formal and casual knowledge.

All are living in a time of quick advances in terms of both the capabilities and the cost of virtual reality, multi-user virtual environments, and various forms of mixed actuality. These new media potentially offer strange opportunities meant for ornamental both motivation and learning across a range of subject areas, student developmental levels, and instructive settings. With the development of practical and affordable virtual reality and mixed reality, people now have the chance to experience immersive knowledge both in classrooms and informally in homes, libraries, and community centers.

The book appeals to a broad readership including teachers, administrators, scholars, policy makers, instructional designers, evaluators and industry leaders.

Solomon Sunday & others, conducted studied on "Exploring the trends of educational virtual reality games: an orderly review of empirical studies". This research focuses on Virtual Reality (VR) and educational games are rising technologies mediating a rapid transformation in the educational world. However, few studies have thoroughly analyzed Educational Virtual Reality Games (EVRGs) and how they have been applied in educational settings. This study reviewed 31 articles published in high impact journals and educational conference dealings to

unravel the technological, pedagogical, and gaming characteristics of contemporary EVRGs. The results show the predominance of Oculus Rift headsets and HTC Vive as the main technology used in EVRGs. Moreover, the analysis revealed that the pedagogical application of the majority of EVRGs was developed for all levels of education (e.g., tertiary, K-12, lifelong learning), with the specific target audience of each game based on the desired learning outcome. Furthermore, the application of EVRGs has primarily alert on out of class use, with healthcare education topics dominating the topics taught using EVRGs. Based on our findings, we show up some key implications and suggestions to advance the field of EVRGs. This study explores the advances of educational virtual reality games (EVRGs) and expounds its important developmental features such as technology, pedagogy and gaming. The rapid development in order and Communication Technology (ICT) has revolutionized the computing industry and propelled a paradigm shift in the pedagogy of teaching and learning (Kaliisa, Edward, & Julia, Oyelere, Suhonen, Wajiga, & Sutinen. Contemporary computer hardware and software have improved considerably in size, speed, and precision, and a key to the creation of immersive technological applications. The results are organized in four main categories: A general overview of the EVRGs, technological, pedagogical, and gaming characteristics.

Jorge Martí, Carlos, Beatriz and Antonio, conducted research on Antonio have conducted a study entitled: Virtual Technologies Trends in Education: “Virtual reality captures people’s attention. This technology has been applied in many sectors such as medicine, industry, education, video games, or tourism. Perhaps its biggest area of interest has been leisure and entertainment. Regardless the sector, the introduction of virtual or augmented reality had several constraints: it was expensive, it had poor ergonomics, or implied too much work to create contents. Recent technological innovations, including the rapid adoption of smartphones by society, have facilitated the access to virtual reality and increased reality of anyone. In addition, several large companies like Apple, Facebook, Samsung, and Magic Leap, among others, have increased their investment to make these technologies to improve their convenience within the next few years. Educational institutions will benefit from better accessibility to virtual technologies; this will make it possible to teach in virtual environments that are impossible to visualize in physical classrooms, like accessing into virtual laboratories, visualizing machines, industrial plants, or even medical scenarios. The huge possibilities of accessible virtual technologies will make it possible to break the limits of formal education. Virtual Reality (VR) industry market is expected to grow $15.9 billion by 2019 (Fildes, 2015), and according to analyst Kota Ezawa from Citi Research, 2016 is the year that virtual reality takes off in earnest (Ezawa, 2016). Digi-Capital’s Virtual/Augmented Reality (VR/AR) Report 2016, and VR/AR deals database totalize $686 millions of investments in Augmented and Virtual Reality during 2015, and $1.2 billion just in the first quarter of 2016; this investment in Q1 2016 represents roughly 25 times VR/AR investment in Q2 2014 (Digi-Capital, 2016). According to Digi-Capital´s report this year could be the tipping point for VR/AR investment, and it looks like it could drive growth to $120 billion by 2020.

John T. Bell & H. Scott Fogler, (1997) in their Research Paper entitled "The Application of Virtual Reality to Chemical Engineering Education"13 Presented At: International Conference on Simulation in Engineering Education (ICSEE, 97), San Diego. They found that Virtual reality (VR) is an emerging computer interface that has the potential to have tremendous impact on engineering education, by given that students with new insights into their studies and permitting them to explore environments that would be otherwise out-of-the-way. However, before that potential can be fully exploited, engineering educators must first learn not only the mechanics of VR, but also the intricacies of how best to apply this new tool to scientific and technical education. In order to develop techniques for the effective application of VR to engineering education, continuing research in the department of chemical engineering at the University of Michigan has produced three major and numerous minor VR based educational modules, designed to aid in the instruction of chemical engineering topics. Besides developing effective methodology, another primary goal of this research is to reach as many students as possible on a nationwide basis, which requires the use of relatively inexpensive (student affordable) personal computers as a base platform portraying technical information in real time using minimal computing power requires special simulation techniques that are unique to this environment. This paper provides a brief description of the VR modules developed to date, counting some of the special simulation techniques that they incorporate, and discusses steps that are currently being taken to reach a wider audience through VRML and other world wide web-based techniques.

Margaret Horne & Dr Emine M. Thompson (2007) studied on "Virtual Reality and 3D Modeling in Built Environment Education" Presented At: 7th Conference on Construction Applications of Virtual Reality (CONVR 2007), Penn State University, USA. And this study builds upon previous research on the integration of Virtual Reality (VR) within the built environment curriculum and aims to investigate the role of Virtual Reality and three-dimensional (3D) computer modeling on learning and teaching in a school of the built environment. In order to achieve this, aim a number of academic experiences were analyzed to explore the applicability and viability of 3D computer modeling and Virtual Reality (VR) into built surroundings subject areas. Although two-dimensional representations have been greatly accepted by built environment professions and education, three-dimensional computer representations and VR applications, offering interactivity, are not yet broadly accepted. The project builds on previous studies which focused on selecting and implementing appropriate VR strategies and technologies (Horne and Hamza, 2006) and offers a move toward on how three-dimensional computer modeling and virtual reality may be integrated into built environment teaching. It identifies the challenges and apparent benefits of doing so by educational staff and reports on the systematic approach which was adopted by Northumbria University, School of the Built Environment, to raise awareness of VR technologies across the spectrum of built environment disciplines. A selection of case studies is presented which illustrate how VR and 3D modeling have been integrated to extend traditional forms of representation and enhance the students‟ learning experience. The attitudes perceptions, opinions and concerns of educational staff in regards to use of 3D and VR technologies in their teaching are discussed.

Demetra Eggarxou & Sarantos Psycharis (2007 Paper on "Teaching history using a Virtual Reality Modelling Language model of Erechtheum" International Journal of teaching and Development using Information and Communication Technology (IJEDICT), Greece. And the aim of this paper is to present a Virtual Reality Modeling Language VRML exploration of the Erechtheum in Athens. It indicates the 4th grade students and it constitutes a teaching approach through the use of various representations created with VRML language. The design principles of the applications are described in detail as well as the technical individuality of the application. A pilot evaluation of the teaching approach is also presented and the results indicate a strong positive impact on students" performance. The application also aims to highlight the significant advantages of VRML as an efficient way of offering ICT course materials to students.

Yukiko Inoue (2007) had studied on "Concepts, Applications, and Research of Virtual Reality Learning Environments" Published International Journal of Human and Social Sciences, Guam.

Year: 2007. And Educational virtual reality (VR) may result in a significant improvement over traditional instruction because it is not only an interactive multimedia tool but also a learning environment that is extremely close to *reality*. There have been few empirical studies on the use of VR for learning and it is essential to investigate VR both in different scenarios and for different applications for learning. The present paper provides a critical discussion on the concepts, applications, and research of VR learning environments (VRLEs), touching upon VR and distance learning. Central to the discussion is a better understanding of scientific breakthroughs in human-computer interaction. VR further serves as a problem-solving tool or medium that lets people accomplish what was previously impossible. The targeted goal of the paper, therefore, is to stimulate the discussion of VRLEs based on current research and practical applications.

Alcinia Z. Sampio (2012) studied a Research Paper on "Virtual Reality Technology Applied in Teaching and Research in Civil Engineering Education" Journal of Information Technology and Application in Education, Portugal. December, 2012. Besides the constant updating of training in the new graphic resources obtainable to engineering and architecture professions, and in widespread and frequent use, the school should also adapt its teaching activities to the new tools of visual communication. In Civil Engineering, the capacity to visualize the construction, management and maintenance of buildings can be added through the use of three-dimensional (3D) models which, facilitate the interpretation and understanding of target elements of maintenance and construction and of 4D models (3D + time) through which the evolution of construction steps and deterioration of materials can be visually demonstrated and understood. Furthermore, the possibility of interaction with the geometric models can be provided through the use of Virtual Technology (VR). The text presents diverse perspectives of introduction a new technology in school. It can be used as a tool to create didactic applications and as a new issue in the training of students. The students involved, in the research works had to learn advanced software of geometric modeling and visualization and to explore the capacities of a VR technology system. Also programming skills had to be adapted to ascertain the integration needed for the creation of virtual prototypes. Furthermore, the structure of different kind of databases had to be studied and implemented, integrating diverse type of information, needed to develop the interactive virtual model. The VR technology was introduced in school in order to get ready civil

engineering students to consider this knowledge as an important support, later in professional activity, and also to facilitate the link between, engineering theory and its implementation.

Suman Chhabra & Neelam Dhamija (20132) "Comparative Study of Computer Assisted Instruction Technique (CAI) and Conventional Teaching (CT) on the Achievement of Pupil Teachers in Methods of Teaching English Language", MIER Journal of Educational Studies, Trends & Practices. Educational Technology has made a significant contribution to education by taking into thought the individual differences of learners and catering to their needs. The emerging trend the world over is towards more individualized and supple forms of learning with an emphasis on individualized methods of instruction. This paper is based on an experiment to study the effect of a new teaching methodology i.e., Computer Assisted Instruction Technique (CAI) in comparison to CT (Conventional Teaching) on the achievement of pupil teachers in methods of teaching English language. In this study, instructional material was developed for both methods of instructions i.e., CAI as well as for Conventional Teaching (CT). The instructional material for both the methods was developed and validated by the researcher. The trial was carried out on the pupil teachers of B.Ed. class of a College of Education. Pretest- Posttest Control Group design was used. Results of the test showed that CAI was found effective in terms of the achievement of pupil teachers in methods of teaching English language at post-test stage. However, no significant difference was found to exist between the experimental group and control group at the pretest stage.

CONCLUSIONS

Reviews of researches conducted in abroad and in India are mentioned in this chapter. The research articles presented at different conferences and published in national and international journals also verified here. The researcher has studied all these research works and try to make his research best at all level.

The use of virtual reality (VR) in education can be careful as one of the natural evolutions of computer-assisted instruction (CAI) or computer-based training (CBT). Use of computer as instructional aid has a long history going back to the early 1950s. Serious studies began in the early 1960s. Since the advent of the microcomputer in 1977, computers, particularly microcomputers or personal computers (PCs), have become a growing and renowned delivery system for many forms of education. In this study researcher has tried to develop such type of virtual reality-based teaching learning material. An experiment was conducted to check the effectiveness of this software and found very good responses and results.

The reviews obtained by experimentation were surprising. Because there is no difference between achievement of students of self-learning experimental group 2 and restricted group. So, we can say that any modern learning technology is not as effective as it is used as a teaching method. The students can't learn effectively without a teacher with any modern learning materials.

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