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A Proposed Model for Virtual Reality Based Smart Classes

Kavita Choudhary and Anuradha

ITM University, Gurgaon.

Abstract

Virtual reality provides simulated interactive environment. Virtual reality applications are reflected on a computer screen or through stereoscopic displays. Virtual reality came into existence in 1860's. Virtual reality is evolving into new folds in the field of games, music, radio, fine-art, motion pictures and learning. Nowadays we are incorporating education with ICT. ICT is basically a composition of IT and CT. IT is application of computer to store, retrieve and manipulate data. CT is based on integration of telephone lines and wireless signals. In education through classroom have many flaws like – growing student population, increase in tuition fee and teaching restricted to classrooms only. The remedy to these flaws is there in ICT based learning like more virtual universities, cost effective solutions and shared whiteboards. 19th century is basically a "Textual Era" and 20th century is a "Digital Era" because today modernization of education took place. E-Learning enables people to learn anytime and anywhere. It reduces access time and distances. Smart classes are one of the methodologies of e-learning through ICT enabled technology. Smart classes are need of effective teaching-learning process. They provide interactive visual communication. In this paper, we are proposing a model of virtual reality incorporated smart classes. Future of e-learning will be of digital text books and virtual reality.

Keywords: ICT, Virtual Reality, Smart classes, E-learning, sensors and interactive communication technology.

1. Introduction

We are aiming at building student vision and focusing on important key trends like mobile learning, online learning and e-textbooks. Each of these trends comprises of

the essential components of the student vision in terms of socially-based and digitally rich learning. Providing students increased access to educational resources and experts to identify their calibre and extend learning beyond the capacities or limitations of their school or community.

Exposing students to rich, compelling learning experiences that help develop deeper knowledge and skill especially the problem-solving, creativity and critical thinking which are so highly desired forour world today.Empowering students to take responsibility for their own educational destinies and to explore and innovate thus creating an independent new generation of life long learners.The Augmented reality exercise ,wherein models designed to teach concepts like rotation/revolution, solstice/equinox, and seasonal variation of light and temperature, resulted in an overall significant improvement in student understanding as well as a noticeable reduction in student misunderstandings. Other important conclusions about this system were that AR interfaces not only change the delivery mechanism of instructional content but They fundamentally change the way that content is imparted and conceived , through a unique combination of visual and sensory information that results in a powerful cognitive and learning experience.21st century learning highlights digital-age literacy, effective communication and high productivity where students have access to rich information and global communication. Teachers support, facilitate, encourage, and collaborate with their students. Pre-requisites for the skill set are basic language literacy, decision making, costs and benefits, pros and cons, rewards and consequences, embrace modern media to think, decide, and communicate thoughts and ideas.

2. Virtual Reality based Classrooms

Simulations in virtual environments are becoming an important research tool for educators. Augmented reality, in particular, has been used by Tettegah and colleagues to teach chemistry using physical models for an effective education. They evaluated their perceptions regarding these two representations in learning about amino acids. The results showed that some students enjoyed manipulating AR models by rotating the markers to observe different orientations of the virtual objects. Construct3D is a three-dimensional geometric construction tool specifically designed for mathematics and geometry education.It is easy to learn, encourages experimentation with geometric constructions, and improves spatial skills. In order to support teacher-student interaction scenarios, flexible methods were implemented for context and user dependent rendering of parts of the construction. Together with hybrid hardware setups they allowed the use of Construct3D in classrooms and provided a test bed for future evaluations. AR has also been used in summer schools. AR educational systems and conclude that using both quantitative and qualitative data is a cost-effective support for the user-centered design of AR-based education technologies. Applications of AR education also extends to physics. AR is used to dynamically present information associated to the change of scenery being used in the real world. In this case, the

authors perform an experiment in the field of physics to display information that varies in time, such as velocity and acceleration, which can be estimated and displayed in real time. The visualization of real and estimated data during the experiment promoted the cognitive mechanisms of learning, along with the use of AR techniques, it proved to be quite efficient, since the experiments could be more detailed and interesting. The use of AR in formal education could prove a key component in the learning environments of the future. These environments will be abundantly populated with a blend of hardware and software applications. However, relatively little is known about the potential of this technology to support teaching and learning with groups of young children in the classroom, like in our present study. This shows that using AR alone is not merely insufficient to keep children engaged, it could even reduce their level of engagement, which proves the challenge posed to researchers when trying to deploy and study systems like the ones we propose.

3. Methodology

Our research goal was twofold: Firstly, we were interested in studying how AR technology could be used in an unobtrusive way and effectively help students learn; and Secondly, we were interested in establishing design guidelines from the experiences as a whole. These guidelines, built as summarizations of lessons learned, could be useful to educators interested in novel technologies for education, and also to user interface designers interested in designing new kinds of systems. The bridge between real and virtual environments is a Metaphor. Virtual reality always provides a metaphorical parallel to our real world. The fundamental role of metaphor is to design, structure and build meaningful virtual reality systems and our model takes advantage of the fact. The learning of source knowledge can be made easier by its metaphorical embodiment in artificial worlds, where students can visualize, experience and interpret this knowledge directly. The key component of our model is metaphorical projection, which is defined as a mapping between the source knowledge of the real world and the virtual world. The main goal of this process of metaphorical transfer is to build a system or network of metaphors capable of defining the structure of the virtual world and organizing how to learn, navigate and interact with this. Metaphorical projection takes place on four different, albeit interdependent planes:

1. The structural plane
2. The learning plane,
3. The navigation plane
4. The interaction plane.

A virtual reality system is basically a computer application which is capable of generating a 3Denvironment in which the user is an active participant who interacts with the artificial world using arrangements of multisensory interfaces. Main features offered by Virtual reality system are Users immersed in a virtual reality system get the

feeling that they are actually there in the real place and are carried off to an environment of pure information that they can see, listen and touch .The sensation of immersion is so strong that the interface disappears and users lose all notion of interacting with a machine.User can be either immobile observers or travellers in the virtual environment, moving around in different ways, e.g., walking, speaking, using a vehicle, touching an object or pointing in any direction within the environment, etc.The scale of the virtual environments can be altered by changing the relative size of users in respect of the virtual world and allowing the user to become the same size as bigger as a star or as smaller as an atom.Capability of user to change perspective at will. For example, user could pass on their viewpoint to a given artificial world object or process, or even to the viewpoint of another participant. Users can make use of a range of ways of manipulating and modifying virtual worlds. Students could move the virtual objects by hand, eye movement or voice and have the ability to create and alter their environment.A virtual environment is capable of pursuing its own goals, executing actions and evolving, irrespective of user interactions which makes it autonomous and dynamic.Distributed and networked environments offers several users the possibility to share virtual spaces at the same time, providing collective participation and accordingly, the real-time interaction between different students leads to genuine co-operative learning.This model aims to be universal and the main contribution of this paper is to propose a model of virtual reality systems for education. It offers a framework for an independent architecture of external factors that can be used in different scenarios. The central component of the model is the metaphorical projection, which provides the guidelines for the entire virtual world design and create a semantic space. All its elements are configured symbolically to make sense of an artificial environment that students can visualize perceive, assimilate and make sense of the stimuli from this environment. The virtual environment thus becomes the physical representation of the knowledge to be taught.It is a question of interpreting or reading and not just sensing or experiencing the environment. This is the characteristic, which, in our opinion, distinguishes virtual reality as an educational technology: the possibility of creating symbolic spaces capable of embodying knowledge.

4. Necessity of Virtual Reality in education

The following reasons support virtual reality in education:

- It provides new forms and methods of visualization, drawing on the strengths of visual representations and it provides an alternate method for presentation of material. VR can also more accurately illustrate some features, processes than by other means, allowing extreme close-up examination of an object, observation from a great distance, and observation and examination of areas and events which are unavailable by other means.
- Motivate and encourage active participation and interaction from students rather than passivity. Some types of virtual reality, for example, collaborative

virtual reality using text input with virtual worlds, encourage or require collaboration and provide a social atmosphere.

- Virtual reality allows the learner to proceed through an experience during a broad time period. It allows the disabled to participate in an experiment or learning environment & transcends all language barriers. With text access it provides equal opportunity for communication with students in other cultures allowing student to take on the role of a person in different cultures.The potential benefits of the use of VR in education and training: visualization and reification, an alternate method for presentation of material; learning in contexts impossible or difficult to experience in real life; motivation enhancement; collaboration fostering; adaptability, offering the possibility for learning to be tailored to learner's characteristics and needs; and evaluation and assessment, offering great potential as a tool for evaluation because of easy monitoring andrecording of sessions in a virtual environment.

5. Conclusion

Virtual reality can be used when a simulation could be used, teaching or training using the real thing is dangerous, impossible, inconvenient, or difficult, a model of an environment will teach or train as well as the real thing, interacting with a model is as motivating as or more motivating than interacting with the real thing, shared experiences of a group in a shared environment are important, the experience of creating a simulated environment or model is important to thelearning objective, developing participatory environments and activities that can only exist as computer-generated worlds.

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