Implementing Virtual Reality Technology As An Effective Web Based Kiosk: Darulaman's Teacher Training College Tour (Ipda Vr Tour)

by
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Abstract

At present the development of Virtual Reality (VR) technology is expanding due to the importance and needs to use the 3D elements and 360° degrees panorama. In expressing a clearer picture to consumers in various fields such as education, military, medicine, entertainment and so on. In live with the development the web based VR kiosk project in Darulaman`s Teacher Training College (IPDA) was developed as an alternative to the present widely web based systems. The kiosk system development in IPDA adopted the VR technology which makes use the QuickTime Virtual Reality (QTVR) and Virtual Reality Modelling Language (VRML). The advantage of panoramic views in this kiosk is that, could manouvre and view the location through 360° using a specified hotspots. In VRML user could explore through walkthrough, flythrough, rotation and etc. The model developed is called `Smart School Virtual Reality Lab Model`.

1.0 Introduction

Computer technology has become one technology that has a continuous development ever since last decade and this includes Virtual Reality (VR). VR is not something new in computer technology. VR has been around since the years of Morton Heilig in 1960`s known as a `SENSORAMA'. Until today the concept has altered the way people think and view the word of computing. Nevertheless, there is an inevitable misconception about topic of VR despite the considerable advancement in computing science, which has allowed VR to accomplish it objectives until today and for the future. However, in actuality, much of the VR research has seriously been undertaken elsewhere but not in Malaysia. The problem stems from the lack of awareness in VR, which leads to failing to recognize its practically. The usage of this technology has substantially emerged from entertainment to greater and wider areas. This includes education, medicine, military, engineering, and so on. The emerging is due to potential benefits that it has provided to the user.

Extensive media coverage causes this interest to grow rapidly. In this situation all Teacher Training Colleges has been promoting themselves in web-based **(*www.moe.gov.my/~bpg*)**. By doing this, it eventually give the opportunities for the people who is interested to get some information regardless the Teacher Training Colleges. This normally includes college information, course offered, location, facilities and so on and this information is important especially for those who are looking for a suitable place to pursue with their studies.

However providing information sometimes is not sufficient enough for certain people. This is where VR plays an important tool as to generate more useful and interactive information. The usage of VR technology such as panoramic view has become very popular nowadays. This technology enables the user to take a virtual tour from one place to another. The main strength of this technique is that it allows the users to view that place in three hundred and sixty degree (360°) and 3 dimension modeling object (3-D). The viewer is allows to interact with the image through the hotspots and this is something different from just sharing at the information display in the screen of the computer.

1.2 Problem Statement

In the most web site of Teacher Training Colleges, the information that have been provided is basically a general information such as the courses offered, duration of the courses, subjects, location, facilities and so on. A part from it, image with some explanation is normally included in the site. It is never been seen that VR technology is being applied for the purpose of enhancing the information as well as to attract the viewer attention.

For this reason, VR is the most suitable technology that should be adopted. For promoting purposes, something extraordinary and elegant needs to be used so that the site is worth visited. Having a panoramic view is simply the best tools to generate people to gain more information as well as exploring the Teacher Training Colleges in a more detailed approach. Virtual tour can provide an interactive between user and system. It is also more realistic of the properties using a form of web-based VR technology i.e. 360° panoramic view. In the other hand, it can make the scenario looks more interesting thus making people feel that the information is sufficient enough for them. By having this kind of technology integration, the viewer will have greater information and perhaps have more confidence towards what the Teacher Training College is offering them.

The incorporation of VR technique on the Web enables VR to be experienced not only by specific group but also the parent or anybody. Through the Web, information regarding the properties can be accessed anywhere at anytime offers various benefits to all Internet user.

1.3 Objectives

The objectives of this project are:

1. To be a pioneer Teacher Training College introducing and implementing VR Web-based Kiosk and Panoramic View.
2. To determine the virtual tour functions and requirements
3. To identify VR techniques and tools to be used for creating virtual tour and investigate their individual characteristics and features
4. To develop a virtual tour prototype using VR
5. To attract more people in seeing what do the Teacher Training Colleges can offer them.

2.0 Definition Of Virtual Reality

There are many varying definitions and terms for virtual reality (VR), all of which could be considered accurate within certain circles of knowledge. Since the technology behind VR is still basically a new field, there are a lot of researchers, authors, and columnists spewing out their own theories behind VR. Naturally, everyone offers a new and "better" definition--from Myron Krueger's terminology that appeals more toward the layperson up to the much more accurate and technical definition by Howard Rheingold. **Krueger (1991)**, defines VR as an *"artificial reality"*. His research has an artistic and psychological slant and is thus reflected in the following definition:

> *"An artificial reality perceives a participant's action in terms of the body's relationship to a graphic world and generates responses that maintain the illusion that his actions are taking place within that world"* **(Krueger 1991).**

In Krueger's artificial reality, art and science become interrelated, and the viewer interacts with and actually becomes part of the new simulated environment.On the other hand, **Rheingold (1991),** dove more into what actually makes up virtual reality. He states,

> *"that the idea of immersion (using stereoscopy, gaze-tracking, and other technologies to create the illusion of being inside a computer generated scene) is one of the two foundations of virtual reality technology. The idea of navigation (creating a computer model of a molecule or a city and enabling the user to move around, as if inside it) is the other fundamental element"* **(Rheingold 1991).**

Stone (1995) defines VR as *`an interface between human and computerized applications based on real-time, three-dimensioned graphical worlds`*. Some type of VR systems enables user to interact with the system the same way they interact with objects and events in a day-to-day basis. It is a shared 3-D experience between people and computer with certain unique capabilities. This allows the user to experience an artificially creased generated environment as if it were real.

Held & Durlach (1992) use "telepresence" to refer to the experience common to both teleoperation and the experience of virtual environments. The broader term is used here in order to highlight the similarities between teleoperation and virtual environments. By employing the concept telepresence, we can now define "virtual reality" without reference to any particular hardware system: A "virtual reality" is defined as a real or simulated environment in which a perceiver experiences telepresence .

Admittedly, this definition does not mesh precisely with typical uses of the term. Indeed, given the broad definitions of the concepts involved, this definition of virtual reality includes virtually all mediated experience. In so doing, it suggests an alternative view of mediated communication in general. Traditionally, the process of communication is described in terms of the transmission of information, as a process linking sender and receiver. Media are therefore important only as a conduit, as a means of connecting sender and receiver, and are only interesting to the extent that they contribute to or otherwise interfere with transmission of message from sender to receiver. In contrast, the telepresence view focuses attention on the relationship between an individual who is both a sender and a receiver, and on the mediated environment with which he or she interacts. Information is not transmitted from sender to receiver; rather, mediated environments are created

and then experienced. A graphical contrast between these two views of mediated communication is shown in ***Figure 1***.

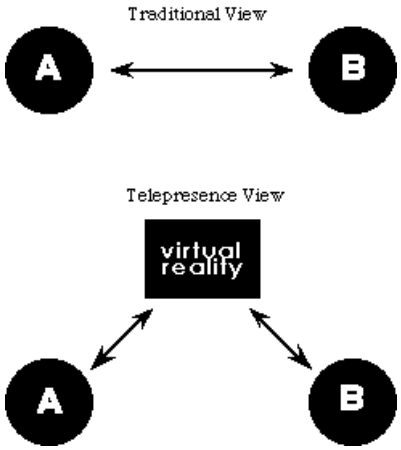

Figure 1: Two Models of Mediated Communication

Jerry Isdale (1995), VR can best defined as a way for humans to visualize, manipulate and interact with computers and extremely complex data. The visualization refers to the computer generating visual, auditory or other sensual outputs to the user of a world within the computer. This world may be a CAD model, a scientific simulation, or a view into database. The user can interact with the world and directly manipulate objects within the world. Some world animated by other processes, perhaps physical simulations, or simple animation scripts. Interaction with the virtual world, at least with near real time control of the viewpoint, is a critical test for a `virtual reality`.

Hamit (1993), virtual reality can be defined as *"the idea of human presence in a computer-generated space"* or more specifically, *"a highly interactive, computer-based, multimedia environment in which the user becomes a participant with the computer in a virtually real world."*

3.0 Methodology

The development of Virtual Reality Kiosk in Institut Perguruan Darulaman is an effort to explore a new field that could be utilized to enhance teaching and learning in the Teacher Training Colleges in Malaysia.

To implement the Virtual Reality Kiosk, there are several methodologies and model to choose from. Among the models available are the System Development Life Cycle (SDLC) which includes Waterfall Model, RAD Model, Spiral Model and others.

Rapid Prototyping Model was chosen because this model allows users to provide feedback in the process of developing the system. The system then, could be revised repeatedly until an efficient system is developed. (***see Figure 2***)

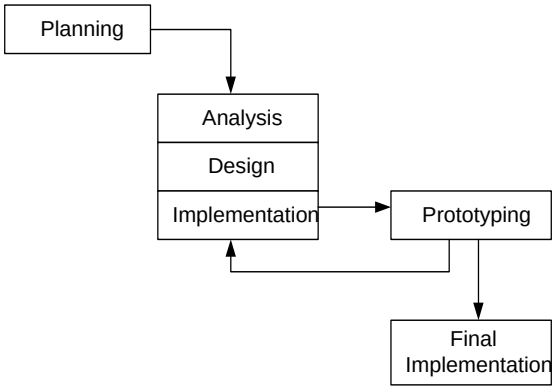

Figure 2 : Rapid Prototyping Model

Rapid Prototyping techniques emphasize user involvement in the rapid and evolutionary construction of working prototypes of a system to accelerate the system development process. RAD is sometimes called a *`spiral approach`* because the model can repeatedly spiral through the phases to construct a system in various degrees of completeness and complexity.

4.0 360° Panoramic View Virtual Reality

QuickTime VR is a component of Apple`s QuickTime and the core technology used for QTVR is the same that used in Quicktime movies. (***See Figure 3***) QTVR is used to create panoramas of both interior and exterior spaces, as well as object movies that resemble three dimensional objects floating in space. Panoramas are ideal for depicting the interiors if building or rooms, or the view from a mountaintop or castle tower. QTVR objects resemble objects that can be turned on screen in any axis, like a globe of the Earth mounted on a stand but able to rotate to any point. These objects, which are ideal for showing off industrial designs and fanciful sculptures, has been used to display clothes on a model from every conceivable angle, and more popularity to show off shiny new models of cars.

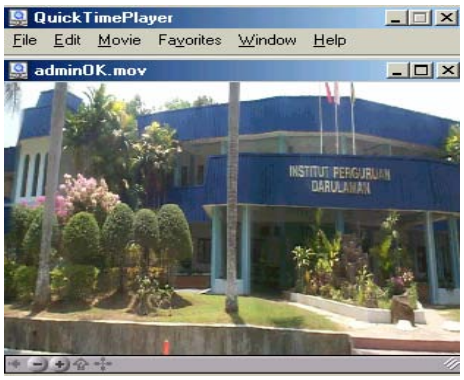

Figure 3 : IPDA Panoramic View in QTVR player

The key component of QTVR panoramas is the virtual 360-degree camera that's takes a picture of the inside of a space. For mechanical reasons and as a result of optical physics, true 360-degree photographic cameras are very rare and exorbitantly expensive. Typically, the lens has to be rotated past the film, which is synchronized by a motor to move with the lens.

Special software that comes with the lens converts the resulting, highly distorted spherical photograph into a form that usable with QTVR or with Live Picture`s Photovista and the results are impressive. QTVR is cheapest, more portable and more readily available standard digital

camera or film camera to shoot a scene from a single point in 360 degrees as a series of a frames, then it stitches these images into a single seamless panoramic image.

5.0 Virtual Reality Modelling Language (VRML)

VRML was developed by Mark Pesce and Tony in 1994 **(Crispen, 2000)** to allow the display of and navigation through 3D objects on the Web. They use similar protocol as HTML that can display text and images on the WWW. Small code files are used to describe 3D objects and behaviors to a VRML viewer, which interprets these and displays them on the computer.

According to **What Is.Com (1999)**, using VRML user can build a sequence of visual images into Web settings where user can interact by viewing, moving, rotating and otherwise interacting with an apparently 3-D scene. For example, user can view a room and use controls to move the room as he/she would experience it if he/ she were walking through in real space and time. A mouse can be used to navigate through the scene as it in real life, moving close to one objects which then become larger. **(See Figure 4)**

Figure 4 : The IPDA Smart School Lab 3D Modelling

Like the HTML, VRML can be use by any Internet users. It is an inexpensive tool because it can be obtained and used freely. VRML provides one of the cheap solutions to desktop VR. However, there are disadvantages of the VRML standards. For example, the VRML comparatively large file sizes and do not support photo realistic scans **(The Standard Intelligence for The Internet Economy, 1998).**

Virtual Reality is a promising technology that has been around since 1960`s but the popularity has only been increasing at the faster rate in the 1990`s. The technology and techniques of VR has been enhanced where realistic representation and real time application and interactivity has been achieved. The PC based and web-based VR technology has also taken place in the end user environment.The attempted study was to introducing and implementing the VR element in providing the right information for the higher education institution through a kiosk as a step in realizing the need of a higher intensity of VR awareness in Malaysia. It is hoped with this study will become the starting platform to Teacher`s Training Colleges and other institutions for another steps forward in VR orientation in education.

6.0 Conclusion

Virtual Reality is a promising technology that has been around since 1960`s but the popularity has only been increasing at the faster rate in the 1990`s. The technology and techniques of VR has been enhanced where realistic representation and real time application and interactivity has been achieved. The PC based and web-based VR technology has also taken place in the end user environment.

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