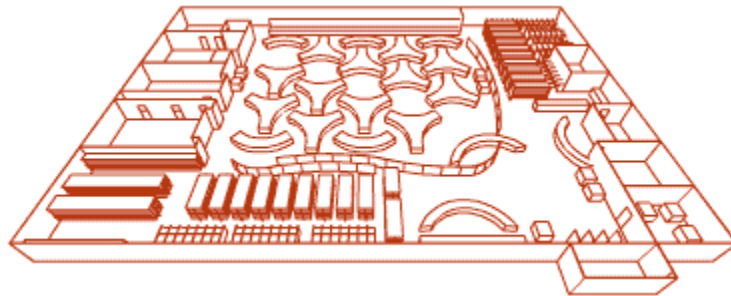


Research Paper: Development of an interactive virtual tour for Holmesglen
Information Commons. By Nicole Phillips



Abstract: the development of the Internet has seen a burgeoning of virtual tours. Virtual tours are as diverse as the websites developing them. From interactive 3D tours, 360 degree panoramas and linear explorations containing only images and text, the term virtual tour has become somewhat ubiquitous.

This paper explores some of the virtual tours currently available and looks at the development of a 'sensory immersing' and interactive virtual tour developed by students doing a master's degree in multimedia design at Monash University.

Background

The objective of this paper is to explore some of the current trends and developments being made in online virtual tours. Specifically, it will look at the development of an interactive virtual tour developed for the Holmesglen Information Commons by final year multimedia design students who are studying at Monash University.

The concept of the virtual tour, comes under the larger umbrella of virtual space and cyberspace. These terms are all relatively new concepts developing with the advent of new media and the Internet. There are many varied definitions of virtual reality and virtual space but are basically **‘A human-computer interface in which the computer creates a sensory-immersing environment that interactively responds to and is controlled by the behavior of the user.’**

www.hitl.washington.edu/scivw/EVE/IV.Definitions.html

Bryant (2001) describes virtual reality as ‘a 3-D cyberspatial environment which humans can ‘enter’ and ‘move through’, interacting with both the computer and other human beings’. For example, in an online gaming room, users move through a virtual world and interact with a computer program and with other users.

Bryant (2001) describes the concept of physical space as being a place, distance, size and route, all of which underpin our understanding of the world around us. She argues that cyber and virtual space are not too dissimilar to physical space ‘we treat cyberspace as an essentially *spatial* medium (as the word itself suggests), and so on a par with physical space. We visit websites, we zoom along the information superhighway, we enter chat rooms when participating in IRC (Internet Relay Chat) and Microsoft advertising executives try to reel us in with the slogan "Where do you want to go today?"™’ Bryant (2001)

Somewhere between the 3D cyberspatial environment and the utilitarian World Wide Web lies the virtual tour. Like virtual reality and cyberspace, virtual tours have developed as the Internet has developed. They are a way for people to experience and explore via the Internet, a place which exists in reality as a physical space. For example instead of physically going to Paris and exploring the Louvre, users can stay at home and virtually explore the Louvre from their computer.

Virtual tours have been developed in many areas; libraries and museums, monuments and buildings, educational institutions, hotels and other accommodation, real estate, zoos and amusement parks to mention only a few. (The appendix lists some virtual tours currently available)

Exploring a place virtually differs from exploring it in reality. If we can see, hear, smell, touch and taste in the real world, we identify where we are by our five senses. Virtual tours and realities are not the same as life in the real world. At present we can only use sight and sound in a virtual tour. Virtual tours however, remain an attractive alternative to the real thing. If you can't visit the Louvre in Paris, the virtual tour is a good proxy. It gives the user a good overview as to the layout and collections of the museum.

The term 'virtual tour' however, has become ubiquitous. Everywhere on the Internet, many sites offer virtual tours, but many of these contain little more than web pages with text and images and are only navigable in a linear fashion. The only interactive part in these tours is the user hitting a back or forward button. While technically this is a form of interactivity, is not the 'sensory-immersing environment' as described in the definition above.

Interactivity is integral to the experience of a virtual tour. Interactivity requires the user to act, to shape their own experience of the virtual tour. This depends on a tour's ability to react to input from the user. "Cyberspace environments currently fall short on the dimensions of smell and touch, but they are becoming increasingly more sophisticated in the visual and auditory stimulation provided. Each degree of added sensory complexity and detail can heighten our perception of environmental presence because the setting acquires more *sensory character* ...We reach a fuller level of presence when we can interact with the environment rather than simply witness it. A very basic element of interaction involves the ability to enter, move within, and leave a setting. Any sensory or verbal cue that heightens the sensation of entering and leaving an environment enhances its presence as a setting distinct from other settings." Suler (2004)

Like many other sectors and industries the education sector has embraced virtual teaching and virtual space, not as a replacement for traditional 'chalk and talk' teaching but as a much-needed enhancement. The importance of virtual instructional packages (also known as virtual learning, flexible learning or eLearning) should not be understated. For example, within the Victorian TAFE and private provider sector, '78 course providers supporting 13,500 on-line students. The number of students is growing at 1000 a month' (Wilson, 2001, cited in Mare 2002) TAFE virtual campus had 63,000 students enrolled in Victoria in 2003. (Phillips, 2004). In the information age, students demand choices about when, where, how and what they learn and educational institutions have to provide flexible learning options.

Le Cornu (2004), currently recognised as a leader in flexible learning, states that "It seems to me that the vast majority of Australians have gotten very used to using technology and living in the information age. And if we can't respond with information provided to meet those expectations, then we're not even in the race."

Xiao (2000) describes how Jaehyun Kim and Young-Soo Song (1997) examined how to apply virtual reality to education. They constructed five guidelines for creating a new learning environment:

- (1) provide divergent learning outcomes;
- (2) focus on learner-centered control;
- (3) provide a high level of user interaction;
- (4) follow the principles of instructional design; and
- (5) consider constructivist learning principles.

There is sufficient documented evidence to show that online learning 'if used wisely – enhances education. We know it works. It is an empirical success in schools, an empirical success in the private sector' (Web-based Education Commission, 2000).

Oxford University in Britain is leading the development of interactive virtual tours. The department of Chemistry hosts the tours. There are over 40 tours of the University campus as well as over 100 tours of major landmarks in the town. The main tour page

gets over 1000 hits per day. In total there are over 2500 interactive panoramas on the site. (Harrison, 2004) 'This visually stunning resource uses interactive web pages which allow you to explore and manipulate 360- degree photographic panoramas of the city and university. It is constructed from hundreds of high quality photographs of Oxford.' (Harrison, K, 2004)

These sophisticated tours utilize Apple Quicktime VR as well as incorporating Flash interactivity and interactive 3D maps for navigation.

The tours come under the general resource of eLearning or flexible learning with Dr. Karl Harrison, chemistry lecturer, being the main creative force behind their development. Dr. Harrison is a keen proponent of online learning, having also developed a virtual chemistry laboratory which won the *ScientificAmerican* Sci/Tech Web Awards in 2002, with the virtual tours of Oxford being his hobby. (Harrison, K, 2004)

Information Commons Virtual Tour Background

The Holmesglen Information Commons comprises four branches incorporating the library and over 300 computers for student use. The centre is a computer-based learning environment, which provides a meeting place for students to work collaboratively. The facilities include access to a wide range of electronic information resources via personal computers as well as traditional library services.

Holmesglen is proud of its entrepreneurship, which allows it to initiate innovative new projects. Central to its strategic plan is the identified need to utilise new technologies and innovative delivery modes to ensure that it maintains a competitive advantage in its industry sector.

Providing physical tours in the Information Commons is an important part of information literacy sessions given to Holmesglen Institute students. These tours consist of librarians taking students on a 30- minute tour of the Information Commons facility, showing them where things are and how they work. However, only 25% of students take a physical tour during any one semester. This low number is due to time constraints on teachers as well as time constraints on librarians who conduct the

tours. The development of a virtual tour of the Information Commons would help make the facility available to the majority of students who don't take a physical tour. The virtual tour goes a step further than the physical tour. Xiao (2002) describes 'With a Web browser in hand, people can receive information or services from the library without even stepping outside their door. However, since most current virtual library tours are text-based, users are greatly restricted to reading rather than viewing.'

The starting point for writing a creative brief for the virtual tour, was to define the concept of the Information Commons itself.

Nicole Phillips, eLearning Librarian at Holmesglen Information Commons, initially put forward the idea to develop a virtual tour to the master's in multimedia design team (Stewart Prain, Jane McDougall and Torika Bolatagici) in late February 2004. All four were studying a master's degree in Multimedia Design at Monash University and needed a project for their major design studio subject. Nicole felt that the tour would have a real- world application; the team would have a tangible client and would develop a tangible product. Team members would have a 'live' product to add to their portfolios. The benefit to Holmesglen Information Commons would be a functional prototype of a virtual tour. The virtual tour would put them ahead of any higher education institution in the country in terms of offering an interactive, visually immersive tour of the facility. Within the semester for Monash, the team decided that they could get the virtual tour for the Building 8 Information Commons built. That would leave the three other branch tours to be developed. The only constraints given to the team by the Information Commons website librarian, were to stay within the designated colour coding system for each branch. Thus Building 8 was to be identifiable with #9A3334, Building 5 with #467486, Moorabbin with #8B7CBA and Waverley with #30906F (see main heading banner at beginning of this paper for examples) Apart from these constraints, the team were free to design whatever they liked.

Team Member Roles

The team members took on varying roles for the project:

Nicole Phillips - project manager and content development

Jane McDougall - narrative structure, architectural 3D

Stewart Prain - general illustrator, animator

Torika Bolatagici - photographer/image collector, art director

These roles were flexible with team members overlapping tasks. For example, all four submitted designs for how the tour could look. The team then chose which aspects would be used in the final design. The three-dimensional map came from Jane while the use of a pixilated colour scheme came from Torika. Both elements were incorporated into the final design. Everyone did ActionScript coding as well as designing the navigational architecture.

Software considerations

The team had to decide early on which software they were going to use to develop the virtual tour. First the team discussed the issue of bandwidth and the download time of the tour. The tour would be web- based and it was imperative that it loaded quickly and seamlessly.

360- degree panorama software was initially considered by the team. There are many technologies which can develop 360 degree virtual reality panoramas for Web delivery. Some of these include, Apple QuickTime VR Authoring Studio, PhotoVista, and Spin Panorama. However, the team decided for several reasons not to use 360- degree virtual panoramas. One was that 360 panoramas are generally associated with real estate tours; the team wanted the Information Commons tour to be richer and more interactive than a 360- degree spin- around and they didn't want users to associate the tour with a real estate promotion. While 360 - degree software is interactive and 360-degree panoramas create the sense of standing in a space and

looking in all directions, there is a drawback. Users zooming in to view close details often get a zoomed-in image that is highly pixelated. The team wanted to avoid this problem. The following examples from one of the Oxford University tours outline this problem below. Scenes in the distance and middle distance have good resolution and clarity but the closer the user zooms to an object, the more it pixelates and becomes unfocused. In this case the red circle is what is being zoomed in on.

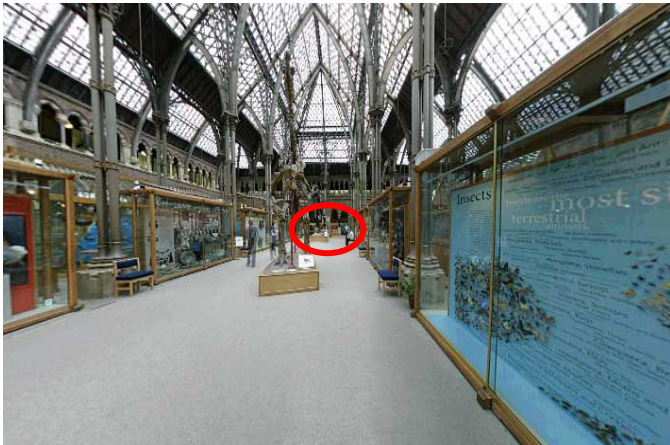


Figure 1. Oxford Museum Virtual tour
360 degree - distance
(Harrison, 2004)

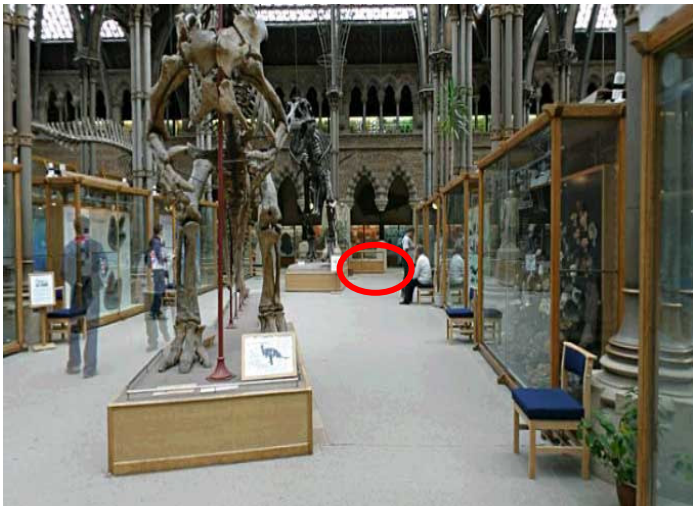


Figure 2. Oxford Museum Virtual tour
360 degree - middle distance
(Harrison, 2004)

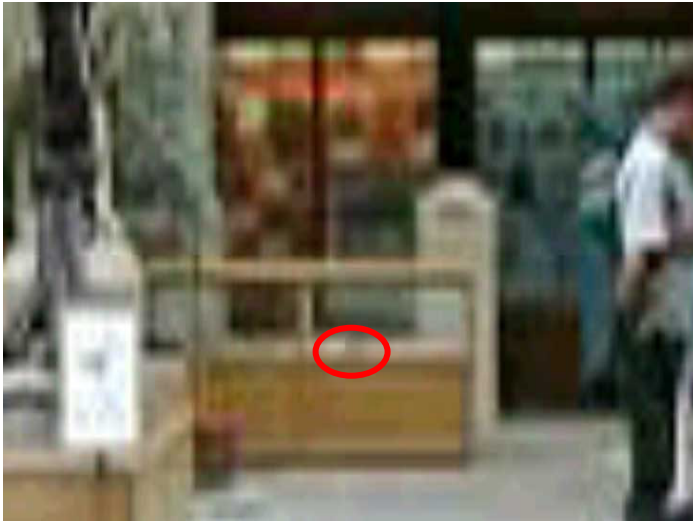


Figure 2. Oxford Museum Virtual tour
360 degree - pixelated close up shot
(Harrison, 2004)

The team ultimately decided to use Flash MX. This choice gave them: the ability to build a complex design and maintain good download times; ability to build good interactivity; ability to backend data to an XML file; ability to create instructional animations. Also, there were no outlay costs for software. The interface design was created and animated in Flash MX. Images were tinted and manipulated in Photoshop 7.0 and imported into Flash MX. 3D map images were created in the architectural software Vectorworks. Short textual descriptive data was created and stored in an XML file, created in Wordpad and Dreamweaver. It took the team the full thirteen weeks to develop the prototype which was then handed over to Holmesglen Institute. The Institute now host the tour on their server (see <http://www.ic.holmesglen.vic.edu.au>)

Conclusions

The MMD team members came from diverse professions, including librarian, architect, industrial designer and webmaster. Combining their existing skills with skills learnt in the master's degree has produced a cutting-edge product that is groundbreaking for

Holmesglen Institute. In the process of developing the tour, team members learnt a great deal including designing an application to be user-friendly, to download quickly, to be intuitive and interactive as well as have an impressive design aesthetic. The tour is also a good example of inter-institute cooperation; the team were based at Monash University, developing a tour for Holmesglen Institute.

If it is not possible to physically visit a place, virtual tours can be a good substitute. A virtual tour should encompass interactivity and be 'sensory immersing'. 360 - degree panorama software gives a good sense of being in a space and being able to seamlessly pan around that space. Its downfall is pixilation when a user zooms in close to something. As development of this software continues, it would be hoped that this problem is rectified, making for a fully immersive experience, rather than one where the user is limited by the capabilities of the software.

In developing the Holmesglen virtual tour, the MMD team investigated many, varied examples of online tours. From these tours, the team were able to identify elements which worked and elements which didn't.

There are so many variations on the virtual tour theme. The best are 'sensory immersing' narratives where the user moves through virtual space intuitively, where there is a good design aesthetic, and where the user can interact with the virtual space. The weakest are not much more than web pages containing text and pictures. The beauty (or downfall for some) of the Internet is that tours can vary from professional quality right through to amateur in terms of design aesthetic and usability.

It will be interesting to see how virtual tours develop in the years to come.

de Almeida and Yokoi (2003) describe the development of a "virtual tour guide" as an enhancement to the virtual tour. They describe digital interactive life-like characters which guide users through virtual exhibitions with the ability to customize the virtual tour information to users interests. These characters are based on "a computer keyword spot program with a natural language processing system that delivers pre-scripted statements from a knowledge-content database and an MS-Agent character that performs such statements as gesture-choreographed dialogue pieces." (de Almeida and Yokoi, 2003)

de Almeida and Yokoi (2003) say that these characters will not only instruct, guide, advise and perform tasks on user's behalf, but they will also enhance communication with users through both verbal and non-verbal interactions such as hand gestures, facial expressions and eye movements.

If these guides are anything like the Microsoft Office Assistant (PaperClip or Dog),



(Microsoft, 2004)

they will need further development so they become more informative than the irritating Microsoft Office assistants.

Suler (2003) describes a future where a 'person physically steps into the virtual situation created by the computer...that means the computer generates the ground, the trees, the sky, the breeze, the smells. The computer creates the environment, and you walk into it.' While we are a long way from developing worlds like this, it is hoped that the development of the Holmesglen virtual tour may serve as a basic guide for other developers of interactive virtual tours.

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Appendix

1.1 Current Virtual Tour design trends

Inside the Sydney Opera House – virtual tour

http://www.sydneyoperahouse.com/sections/tours/virtual_tour/?sm=3&ss=11

Apple VR software, interactive map navigation, sound effects.

Louvre virtual tour

<http://www.louvre.or.jp/louvre/QTVR/anglais/index.htm>

Apple VR software, interactive map navigation.

Oxford University virtual tour

<http://www.chem.ox.ac.uk/oxfordtour/>

Apple VR software and Flash. Contains hundreds of interactive panoramas of the Oxford University campus and town.

Real Estate 3D virtual tour

<http://www.imagemaker360.com/>

Imagemaker 360 software. Company based in the US developing real estate virtual tours.

Technosphere

<http://www.technosphere.com.au/>

Company based in Brisbane developing virtual tours for television programs, real estate, and tourism.

PBS Hidden New York

<http://www.pbs.org/wnet/newyork/hidden/index.html>

Apple VR software, includes sound and dialogue, explores various attractions around New York city. Interactive map for navigation.

Pyramids virtual tour

<http://www.pbs.org/wgbh/nova/pyramid/explore/khufuall.html>

Apple VR software, includes interactive map to navigate with.

Sacred Worlds

<http://www.vrview.com/sacredworlds/>

Apple VR software. New Age art viewable as 360 panoramas from around the world.

Virtual Canberra

<http://www.virtualcanberra.gov.au>

Combines 360 panorama with Flash interactivity, hotspots in 3d panorama, 3D map for navigation, interactive noise as user navigates through tour.

Virtual Tour of the South Pole

<http://astro.uchicago.edu/cara/vtour/pole/>

Basic tour with text, images and links.

1.2 Library Virtual Tour Design Trends

360 degree tours

State Library of Victoria

<http://www.statelibrary.vic.gov.au/slv/exhibitions/virtualtours/>

Ipix software, 360 panorama.

Interactive tours

Holmesglen Information Commons

<http://www.ic.holmesglen.vic.edu.au>

Flash software, interactive, 3D navigation map

Seattle Law Library

<http://www.law.seattleu.edu/library/virtualtour?mode=flash>

Flash software, interactive floorplan and navigation. Hotlinks within tour to move to different parts of the library.

University of Wollongong

<http://www.uow.edu.au/virtual/gallery/facilities/library.html>

Apple VR software and Flash interactivity.

Linear tours

Monash University Library

http://www.lib.monash.edu.au/peninsula/virtual_tour/

Basic, linear navigation, text and graphics.

Bowling Green State University Library

http://www.bgsu.edu/colleges/library/lib_tour_main.html

Flash based but not interactive, linear navigation.