FOUR DIMENSIONAL PRESENTATIONS AS A NEW REPRESENTATION METHOD: A PROPOSAL FOR THE USE OF INTERACTIVE MULTIMEDIA PRESENTATION IN LANDSCAPE ARCHITECTURE

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Abstract

Few studies on presentation methods in the profession of landscape architecture have been done in the past, because evaluating presentations raises primarily subjective issues. Today, interactive multimedia presentations offer an excellent opportunity to investigate the presentation methods employed by landscape architects,

"Can new communication technologies help to enhance the communication between the presenter and his audience?" This is the fundamental question addressed in this thesis. It explores interactive multimedia presentations to see their potentials, and considers ways to integrate various multimedia as presentation methods for future landscape architectural presentations.

The main terms, interactivity and multimedia, are explained to understand the features of interactive multimedia presentations. Conventions of traditional presentations and historical aspects are overviewed to deepen the meanings of presentation methods. An interactive multimedia presentation is actually produced to explore how multimedia can be effective tools and to document how the interactive multimedia presentations are produced. It used to be very difficult to represent the transitions between spaces in traditional paper board presentations; however, interactive multimedia presentations make it possible to

visualize the transitions and relationship between the designed spaces three-dimensionally. Landscape architects today should make the most use of various media and utilize the new computer communication technologies to enhance their presentations. 3D modeling process greatly helps designers check and reevaluate their proposed designs as well. In fact, interactive multimedia presentations are useful not only for the presentations but also for total professional communication and educational purposes.

Chapter 1
Introduction

1.1. Study Issues

"Presentation graphics are nothing more than the visualization of information and ideas–representations that allow others to see ones point quite literally. They support a message and clarify its meaning. They add depth and even beauty to your work. They help to engage the audience. When your presentation graphics stand behind you, you're not up there alone."-Rabb, Margaret Y. *The Presentation Design Book: Tips, Techniques & Advice for Creating Effective, Attractive Slides, Overheads, Multimedia Presentations, Screen Shows & More*, xv.

"The presentation itself should be viewed as a problem. This means it should be visually appealing and at the same time convey information in a lively and interesting way."-Mulherin, Jennifer. *Presentation Techniques for the Graphic Artist: How to Sell Your Ideas Effectively*, 128.

What is the primary purpose of presentation for landscape architects? Is it to sell their ideas? Is it to show their ideas? Or is it to enhance communication with their clients? Landscape architects have always realized its importance and its surprising almost magical power. Presentations sometimes give audiences better impressions of designs than what

their contents might suggest. Some well-thought-out design ideas may not be acceptable to some juries because of the ways they are presented. Presentations raise very subjective issues because impressions differ from one audience member to another: for example, some may prefer computer graphics and some may not. Evaluations of presentations deeply relate to the audiences' taste. For this reason, it is difficult to find what is an effective presentation of a design and what is not. It seems that few studies of presentations have been done in the past in the field of landscape architecture. The emergence of interactive multimedia presentations brought by new media and technologies provides an excellent opportunity for landscape architects, because those presentations convey designers' ideas unconventionally. Also, although major aims in presentations are as to win competitions or to make sales. Although it is difficult to measure visual appeal, it is possible to assume that one of the most essential purposes of presentations in landscape architecture is to effectively convey design ideas, both visually and verbally, to their audiences.

As the past two decades have seen the rapid changes with the development of computer technologies, the profession of landscape architecture also has incorporated computer applications. According to Stephen M. Ervin and Hope H. Hasbrouck in *Landscape Modeling: Digital Techniques for Landscape Visualization* page 34, "many

computer graphics techniques can be traced back to Ivan Sutherland's original work at MIT, in the 1960's, which demonstrated the possibility and value of a graphical user interface for CAD (Computer Aided Design)." This was probably the dawn of the interaction between landscape architects and computers. Since then, the interaction has been growing greater than those first pioneers might have expected. In the early 1990's, the use of CAD systems became more popular among landscape architects. Landscape architecture firms began to adopt CAD in conjunction with hand drafting. What was then described as the "barren looking" computer-drawing has now been improved. It appears even ironic how seriously computers have been pursuing human tastes, because computers were supposedly designed to do more complicated tasks than human beings could not do. Robots and Artificial Intelligence (AI) are good examples. Some computer applications that landscape architects currently often use (e.g., Adobe Photoshop) have functions that allow adding freehand strokes to digital images. And landscape architects have begun making use of computer-generated 3D modeling software because that software has become more sophisticated and easier to use. Landscape architects have been using computers not just for digitizing large hand-drawn projects, but as methods for expressing their designs for a decade. As a result of many additional technical functions and significant increases of

machine power, computers seem to be more flexible for use in design work than what they used to be.

With the development of multimedia technologies, such as web sites and internet communication, designers have found that these new communication technologies, including animations and movies, are also useful to interactively express their ideas to clients, while making their products look better as well. The amount of information those movies and animations transmit are significant. People have never seen such significantly new communication methods like the internet offers. In what is sometimes referred to as “the information technology era”, it has already become common among graphic artists to exhibit their works on their own web sites. These new communication technologies have long been studied as new educational tools, and have recently been applied to the presentation methods in landscape architecture as well as manufactures and other designers have. Following 3D modeling applications, interactive multimedia presentations have added the fourth dimension-time-to landscape architectural presentations. Landscape architects now have an excellent opportunity to investigate these new presentation methods.

1.2. Objectives

The three main objectives of this thesis are: (1) to explore how landscape architects can use interactive multimedia presentations to convey the designer's ideas to an audience; (2) to document the process of creating interactive multimedia presentations; and (3) to make relevant observations for the future use of interactive multimedia presentations.

It seems difficult for most designers to convey their ideas and intent to viewers clearly. Can new communication technologies enhance the communication between them? Behind the stated objectives is the purpose of helping to close communication gaps between designers and clients by exploring interactive multimedia. In addition, the overall goal is to contribute to the development of the future presentation methods through the combined use of various media at the same time offering the chance to reconsider the essential meanings of presentations in landscape architecture.

Chapter 2
Background/Literature Review

2.1. Interactive Multimedia Presentations

2.1.1. Introduction

In Mark Von Wodtke's book, *Design with Digital Tools: Using New Media Creatively*, in his glossary of terms at page 248, he defines multimedia as, "Integrating more than one medium. Computer systems can enable the integration of electronic media combining text, graphics, animation, spatial modeling, imaging, video, and sound." According to his explanation, there are two kinds of multimedia presentations: one is passive such as videos and films, and the other is a kind of multimedia presentation that audiences may explore interactively, either online or by using laser disks. Some may say that videos and films are not multimedia presentations, while others may say since videos and films have two different kinds of media, pictures and sound. It is possible to regard them as multimedia.

Another author, Larry Elin, defines multimedia more narrowly and concretely. He says in his book, *Designing and Developing Multimedia: A Practical Guide for the Producer, Director, and Writer* at page 3, that "There are four characteristics of multimedia that set it apart from other media ["linear" media such as television and film]: it is

interactive, it is personal, it is digital, and it utilizes a computer. These characteristics cause the process of design and development to be very different from and far more complex than the process for most other media." He explains additional characteristics of interactive multimedia presentations: they are "computer-based products that are rich with sound, pictures, and text and that are commonly distributed on CD-ROM, which also can be applied well to other product forms, such as broadband interactive television and the Internet" (Elin, 4). Presentations commonly seen on web sites, including text, graphics, motion, animations, sounds, and navigation buttons are some examples of interactive multimedia presentations and are viewed as such in this thesis. The focus is on interactivity between designers, audiences, and computers, rather than passive, linear multimedia presentations such as slide shows or films before large audiences.

In the field of education, these multimedia computer technologies have been considered to be useful to include in educational instruction methodologies. There have been studies to investigate whether students learn more effectively with multimedia instruction, or whether multimedia instruction is applicable to education in general. These attempts have included testing hypertext and hypermedia that are fundamental functions of interactive multimedia. Timothy Green defines these features of technology in his book,

Multimedia Projects in the Classroom: A Guide to Development and Evaluation, page 4. In his description, hypertext is a nonlinear method of presenting text linked to another section of the document when it is clicked on. Hypermedia is the multimedia version of hypertext. Hypermedia uses a variety of media such as sound, images, and movies linked with each other in nonlinear fashion. The emphasis of hypermedia is located more on the link between media; for example, viewers can play and stop the sound when they click the button indicating the sound control on the web site.

According to Lisa Walker and Steve Blount's book, *Getting the Max from Your Graphics Computer*, page 91, there was interesting research in 1987 at Arizona State University. Students in the fifth grade were asked if they preferred using an interactive computer-aided lesson over the more traditional workbook, pencil, and paper and if they felt that they did well on the lessons when using the computer. Ninety seven percent preferred to learn using a computer-aided instructional program and almost ninety percent of the computer group said they would like to do another lesson. (Figure 2.1)

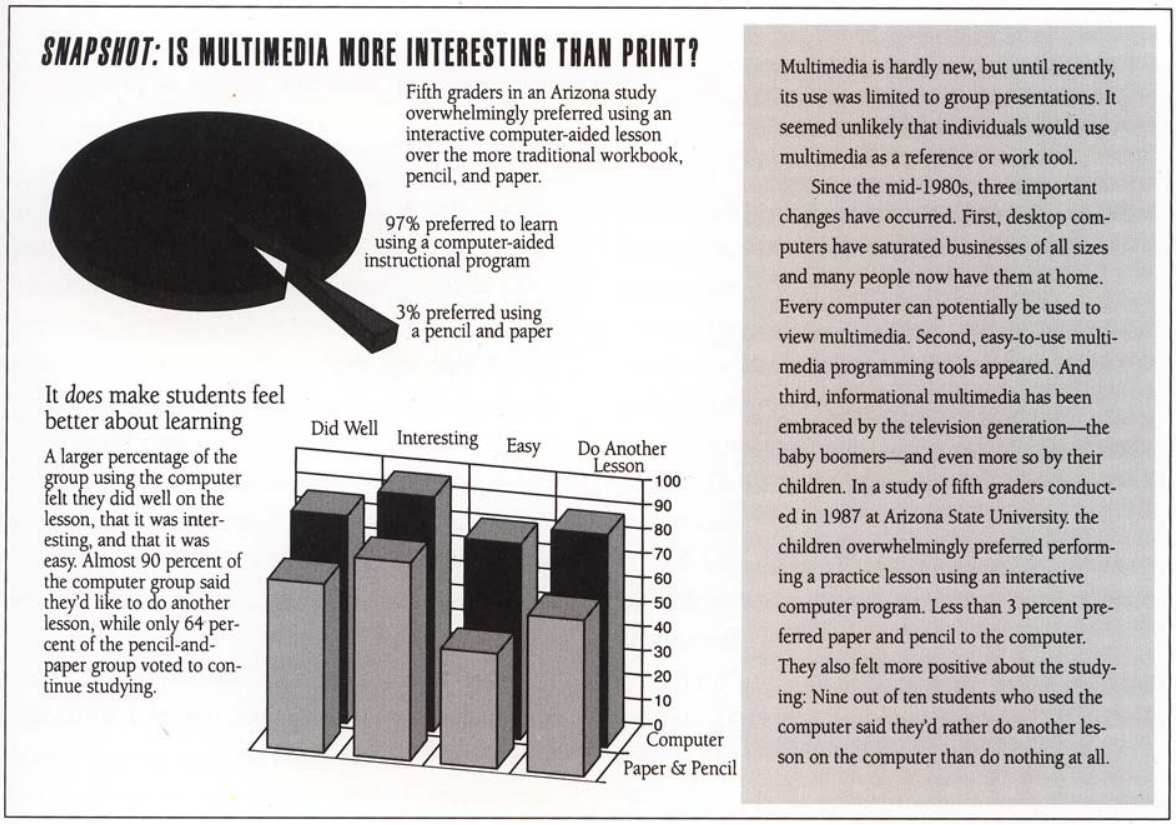

Figure 2.1 Survey on fifth grade students in 1987

The internet and web technologies have contributed to the development of multimedia computer applications as new communications media. One may find that web sites with animations, sounds, text dialogues, and virtual tours are interactive. Those interfaces and ways of presenting themselves are different according to the designers' purposes. Some web sites have only hypertext to link their sections, unless they have to show graphics, sounds and animations. On the other hand, you may find other interactive web sites rich with motion, animations, and sounds. Some graphic design artists' web sites

make it too difficult to find out how to navigate to other pages on the site, because too many things occur on one page, or the navigation buttons themselves are hidden. Other, commercial web sites, such as car dealers' sites, give visitors easy navigation so that prospective customers can easily comprehend the message, which typically lead to greater sales.

The larger the number of individuals and public corporations who establish their own home pages, the more user-friendly computer applications have become. Also more complicated and sophisticated interfaces have been achieved by the users. This chain reaction might provide landscape architects with an opportunity to take this technology into consideration as an effective presentation method, because presentations have commonality with educational instructions and web sites–they are all communications between more than two people. Communication is helped greatly by interaction as in conversation, when someone wants to express his or her ideas, and when the hearers want to understand them, they interact with each other by asking questions and responding to them.

In education, HyperCard, SuperCard, and Oracle Media Objects for the Mac, and Toolbook, Guide, Linkway Live, and Oracle Media Objects for Windows machines, are mentioned as multimedia production software packages in David Jonassen's *Learning with*

Technology: A Constructivist Perspective, at page 91. Paul F. Merrill provides a brief historical overview of these applications in his book '*Computers in Education*' at page 161: It all began when, "in 1987 Apple Computer, Inc. introduced a new software program called HyperCard, which significantly accelerated interest in and development of multimedia applications". Some popular applications for making multimedia interfaces are currently Microsoft PowerPoint, Sunburst Technology HyperStudio, Macromedia Authorware, Macromedia Director, and Macromedia Flash. They are generally called authoring software. Those applications' prices and characteristics vary according to their emphasis and purpose. Some applications such as Macromedia Director allow the creation and manipulation of animations. Other applications focus on more educational aspects. And still others aim at publishing for web site design. There are, of course, a number of other similar applications. Discussions of specific multimedia authoring software packages would not be very meaningful here, because the software is by nature so fluid, and to find appropriate specific applications for multimedia presentations is not the emphasis here anyway. (But the characteristics of the applications used for the interactive multimedia presentation discussed in this thesis, and several reasons why these applications are chosen, will be discussed in Chapter 2.)

On the whole, the term interactive multimedia presentation in this thesis refers to computer presentations that contain a combination of several media for conveying information from designer to audience whether via CD-ROM, the internet, or future digital media.

2.1.2. Interactivity

Interactivity is one of the most important characteristics of interactive multimedia presentations. First of all, interactivity is not a thing of today. Conversation, the most fundamental form of interactivity, has been practiced between people since human beings appeared on the earth. In order to convince others or to understand each other, we have to interactively exchange our ideas. Generally speaking, it is often said that interactivity makes understanding deeper than one-way arguments or presentations. For instance, it is obvious that students can understand lessons more clearly when they ask their teachers questions rather than only passively listening to the lessons.

But, why do we put special emphasis on interactivity in this computer communication era? It is because new multimedia technologies have greatly broadened the range and effectiveness of interactive communication methods. Hans Sleurink's book, *The*

Multimedia Dictionary describes the word “interactive” on page 154 as “User participation during program use. The user decides the tempo and sequence of the program. This also involves answering questions and choosing from options the program presents. The program is designed to respond to the widest range of conceivable situations, but the user decides what course the program will take.”

Larry Elin also clarifies, that, “It is interactivity that characterizes multimedia as we know it today....” (Elin, 4). He continues, “When designing linear media (even linear multimedia), the designer assumes and maintains control of the viewers, who become passive receptors of the message. When designing interactive media, the whole idea is to turn control over to the viewers and cause them to become engaged and active participants” (Elin, 6). As both authors describe, computer communication technologies are considered as inherent to providing people with interactivity and a variety of users’ modes of participation in the programs.

Susan Rodrigues quotes previous studies on the interactive instruction in her book, *Opportunistic Challenges: Teaching and Learning with ICT* (Information Communication Technology), at page 134: “Zirkin and Sumler’s (1994) research concluded the more interactive the instruction the more effective the learning outcome was likely to be. Najjar

(1996) cites four studies (Bosco 1986; Verano 1987; Fletcher 1989; Stafford 1990), each of which examined the use of interactive videodiscs in learning and concludes that it is the increased level of interactivity which results in a better learning achievement, retention of knowledge and better attitudes towards learning than traditional classroom lectures."

"Interactivity is a desired quality of communication systems because such communication behavior is expected to be more accurate, more effective, and more satisfying to the participants in a communication process," says Everett M. Rogers in his book, *Communication Technology: The New Media in Society* (Rogers, 5). He continues, "the most distinctive single quality of the new media is their interactivity, indicating their basic change in the directionality of communication from the one-way, one-to-many flow of the print and electronic mass media of the past century."

The result of this change in directionality is mentioned in Nathan Shedroff's book, *Experience Design 1*, at page 142. He says, "Interactivity is also comprised of many other attributes. Some of these include feedback, control, creativity, adaptivity, productivity, communications, and so forth. Many of these attributes are highly valued when designed well. Interactivity isn't necessarily better, but it usually does correspond with higher involvement by an audience." Shedroff additionally says that interactivity is somehow

nebulous, and it is hard to draw a line between passive and interactive, but it is probably possible to compare experiences as being more or less interactive.

2.1.3. Multimedia

2.1.3.1. Overview

Technology never stops evolving. The possibilities that technologies have brought to us today would have been beyond people's expectations only fifty or a hundred years ago. What designers can do today with interactive multimedia presentations will soon be obsolete and become a very small portion of what future interactive multimedia presentations can do. It is, nevertheless, significant in the context of this thesis to show some currently available techniques and potential brought by multimedia. In this section the focus is on more specific features of multimedia elements available for landscape architects–text, graphics, animation, spatial modeling, imaging, movie, and sound-involved.

2.1.3.2. Text

The role of text in interactive multimedia presentation is to provide users with information. Text also navigates viewers. Text is the most basic and fundamental communication medium in a multimedia presentation. It conveys verbal messages in

written form; therefore, it has a relatively stronger visual impression than spoken language. One of the most popular text functions in multimedia presentation is hypertext. Hypertext brings audiences to pages reached by the designers, designated links, which are often different sections of presentations, and lets them open movies and e-mail addresses. Users normally can see if the text has a link when their mouse cursor changes shape, indicating that the text is clickable. Text gives users essential information and provides a means of navigation. Popup text is also available in interactive multimedia presentations. When the audience may need further explanation, or when a detailed explanation could disturb the readability or visual impact of a presentation, popup text can be made to appear only when users click on an object. Also, a text dialogue box can give audience feedback to the designer by enabling audience members to type their responses in the designated space.

2.1.3.3. Graphics

Graphics are also indispensable elements in interactive multimedia presentations. Typical examples of graphics in landscape architecture are pictures that show the existing site conditions and images representing concepts. Both are common in both interactive multimedia presentations and traditional presentations as static graphics. In the interactive

multimedia presentation, however, designers can also give those originally static graphics varieties of movement; for example, pictures fading in and out like a slide presentation. Motion effects make it possible to change the shape of pictures. This is also called animation, which will be discussed next. Other graphics include symbols that are clickable navigation buttons. In addition, CAD drawings, hand drawings, paintings, diagrams, and spreadsheets are also important graphic elements designers use to express their ideas visually to the audiences in the presentations.

2.1.3.4. Animation/Movie

Animation is probably one of the most representative characteristics of interactive multimedia presentations. According to Hans Sleurink, animation is defined as a “technique to create the illusion that stationary objects are moving” (Sleurink, 23). Text and graphics are static; however they can be animated with motion effects with multimedia applications.

The process between the beginning and the end are critical in the any field of study. Showing it is, nonetheless, often neglected. Designers tend only to put before and after images before the audience, because showing the transition process would occupy a large amount of paper space. Animation straightforwardly can solve this problem. For example,

when students are being taught how to construct buildings, assembled transitional images created with animation can show them the process step by step.

Animation also has other interesting characteristics. Designers should be careful when dealing with animation because it can contain lots of information-sometimes lots of unimportant information-in a single scene. Lynda Weinman makes interesting remarks in her book, *Designing Web Graphics .2* at page 333: “Adding animation to a site can be great, but it also can have the reverse affect by appearing gratuitous and/or annoying to your audience.” She suggests her personal guidelines: “In most instances, animation that cycles or loops endlessly will eventually become annoying.”; “If designers use more than one animation on a single page, the effect may be overwhelming to the end viewer instead of impressive.”; and “Animation calls attention to itself much more than static images on a page.”

Animation includes movies exported from spatial modeling. According to Mark Von Wodtke, in *Design with Digital Tools: Using New Media Creatively*, at page 30, “Spatial modeling helps sort out observations of phenomena that have a spatial or functional order.... We can recognize textures, patterns, objects, spatial quality, orientation, sequences, and rhythms.” Integrating spatial models into interactive multimedia

presentations, people can actually experience walking through the virtual 3D spaces, which are typically created in 3D modeling software. Although those models are actually expressed two-dimensionally on the computer screen, they seem close as the way we perceive the world three-dimensionally because the camera in the animation represents people's sight. A movie is a continuous succession of pictures. It shows more sequences and much more information than a single picture; as a result, audiences can grasp the situations more clearly. Here is a brief history of video in computer applications. In Richard Wise's book, *Multimedia: A Critical Introduction*, on page 51, Wise remarks that Apple Computer, Inc. introduced the first video-quality moving images to the personal computer with an extension of the Macintosh operating system called QuickTime in 1991. QuickTime enabled the Macintosh to play audio, video or animation files without any additional hardware or software. Wise also mentions that compression techniques such as MPEG-1, established by the Moving Pictures Expert Group, have helped reduce file size with little or no loss of the quality (Wise, 71). The history of videos and movies on the computer is relatively new. Those technological changes have made it easy to manipulate videos and movies in interactive multimedia presentations.

2.1.3.5. QuickTime VR (Virtual Reality)

QuickTime VR (Virtual Reality) has three types of interactive movies. One is called Object VR, which contains three-dimensional objects that audiences can click and rotate to see their back side, front side and any other aspects normally hidden in the still images. Object VR is useful when industrial designers introduce their products to the consumer groups so that they can watch the products from any orientations in a movie. The other two QuickTime VR are Panoramic VR and Cubic VR. In those movies, viewers can see 360 degree panoramic views from a single standing point. The difference between Panoramic VR and Cubic VR is only that Cubic VR can contain upper and lower sides so that viewers can see the sky and ground. Panoramic VR is highly useful to show environments because users can experience looking around at their own pace. QuickTime VR has probably less information than linear walk-through 3D animation movies; however, it is more interactive. M. Saleh Uddin introduces QuiciTime VR with further features in his book, *Digital Architecture*, at page 72-74.

2.1.3.6. Web 3D (Self-Control)

In addition to QuickTime VR, web 3D technologies such as VRML (Virtual Reality Modeling Language) can be considered as one of interactive multimedia elements in the

future. “The still-evolving Virtual Reality Modeling Language (VRML) promises to go even further in turning the Internet into a three-dimensional space in which people can explore whole new places on-line. Even without virtual reality built into the Internet, the medium grows more and more ready to deliver streams of updated, ever-changing media that are infinitely deep and easily accessible.” says Nicholas V. Iuppa in his book, *Interactive Design for New Media and the Web*, at page 238.

VRML, because of its small file size for short downloading time and its fast rendering engine, enables viewers to experience walk-through. Users decide what they want to see next and how they walk in the virtual spaces. VRML integrates hot spots indicating there are some events if users click on them; for example, they play sounds, they show detailed pictures, and they display text information. VRML also controls collision between viewers and walls or objects in the space so that people can not pass through the walls or objects in front of them.

Other similar or even much more sophisticated technologies currently include Macromedia Shockwave 3D, ViewPoint, Cycore Cult3D, TurnTool, E-craft Sola and NavisWorks. Of course, there are more web 3D technologies available and they are different to use, publish and navigate; for example; TurnTool is a plug-in for 3D modeling

software packages such as Discreet 3D Studio Max and Autodesk VIZ, and facilitates the production of interactive self walk-through movies directly exported from those 3D applications. Other interactive web 3D technologies require 3D modeling first, and designers export files as their particular file format such as VRML, Shockwave 3D, and ASCII. Then, designers use those web 3D software packages to publish on the web. One of the major differences between these web 3D technologies and passive computer generated animation is an extent of freedom. Users have more choices in web 3D even if they have less quality in appearance.

2.1.3.7. Sound

Sound includes music, sound effects, and voice narrations. Audiences can listen to background music, and they can control the volume and turn it on and off with one click of an icon displayed on the screen. Sound effects, for example, include natural sounds such as birds singing or a running stream. Or they can be artificial sounds such as traffic noises and people chatting as well as electronically synthesized music. When an audience member is walking through a virtual site, he or she can listen to various kinds of sounds, in relation to the place where the viewer is standing or watching, (which is controlled by the movement

of the “visitor’s” mouse cursor). Navigation buttons can also have sounds. When a user clicks the button, he or she can hear a short sound confirming the button click. Designers easily download free sound materials from web sites. They typically have loop sounds for background music, and sound effects for events when navigation buttons are clicked. Recorded voice narrations can also be added to the interactive multimedia presentations in order to deepen users’ understandings in addition to written text.

2.2. Traditional Presentation

2.2.1. Historical Aspects

The history of landscape architecture is relatively new, and the traditional presentation methods in landscape architecture seem to have been modeled after those precedents in architecture. Generally speaking, people have located more focus on the design methodology, and there have not been so many means of presentation; for example, they are plans, sections, and perspectives. As a result, only a few non-technical aspects such as history of landscape architectural presentation have been done even though there are hundreds of technical presentation manuals in the book store today.

Mark Von Wodtke points out that “centuries ago landscape architects, such as Capability Brown, would work directly with the land” (Wodtke, 60). Indeed, it is commonly said that Japanese traditional gardeners had designed Japanese gardens, manipulating the location of the rocks and contemplating the composition of the natural elements such as trees, rocks and ponds; and structures such as bridges, islands, lanterns, and stepping stones on the garden sites. The actual land was considered as a place to design the landscape. It is hard to imagine how much work it took to design gardens. It, however, appears that they did not need landscape architectural representations such as plans, sections, and perspective drawings.

According to George C. Beakley, an author of *Architectural Drawing and Design*, at page 3, the ancient people who lived in the caves or simple man-made shelters did not need the formal architectural drawings for their constructions because the construction technologies themselves did not require the architectural drawings. After formal shapes of architecture such as the pyramids in Egypt appeared, there was a lack of documentation methodology, so no early architectural drawings remain today. The oldest sample in existing architectural drawings was drawn in the ninth century and is a copy of an earlier

drawing that was destroyed. The plan drawing below is an idea for a Carolingian imperial abbey, ca. A.D. 820. (Figure 2.2)

Chip Sullivan makes an interesting remark in his book, *Drawing the Landscape*, on page 195 that linear perspective drawings were initiated during the Italian Renaissance by painters such as Masaccio (1401-1428) and architects such as Fillippo Brunelleschi (1377-1446). According to Daniela Bertol's *Designing Digital Space: An Architect's Guide to Virtual Reality*, on page 6, first clear perspective laws were written in 1435 in *Leon Battista Alberti's treatise Della Pittura*.

Sullivan compares those paintings in the Renaissance to those in Chinese landscape paintings at page 199. He says that "By contrast, Chinese landscape painters during the Sung dynasty developed a much different approach to rendering perspective. Rather than using a central viewpoint, the artist relied on parallel perspective rather than linear. In this system, receding lines are drawn parallel to one another, without converging upon a vanishing point, to give the viewer the feeling of seeing a series of views almost simultaneously. As a result, great panoramas of time and space could be illustrated in a single drawing." (Figure 2.3) (Figure 2.4)

Ancient Egyptian paintings appear to be elevation drawings and plan drawings combined together. Also drawings in India show the view above and front mixed in one scene. From those paintings from the past, each civilization and culture had a different perspective on the representation of landscape. Humphry Repton, a landscape gardener, drew two perspective drawings showing before and after in a single picture. Viewers flip the part of the before drawing to see the after drawing. His attempts gave the clients opportunity to interactively observe the design. This idea can be stemmed from the essence of interactive multimedia presentations today in terms of user participation. (Figure 2.5) (Figure 2.6) (Figure 2.7)

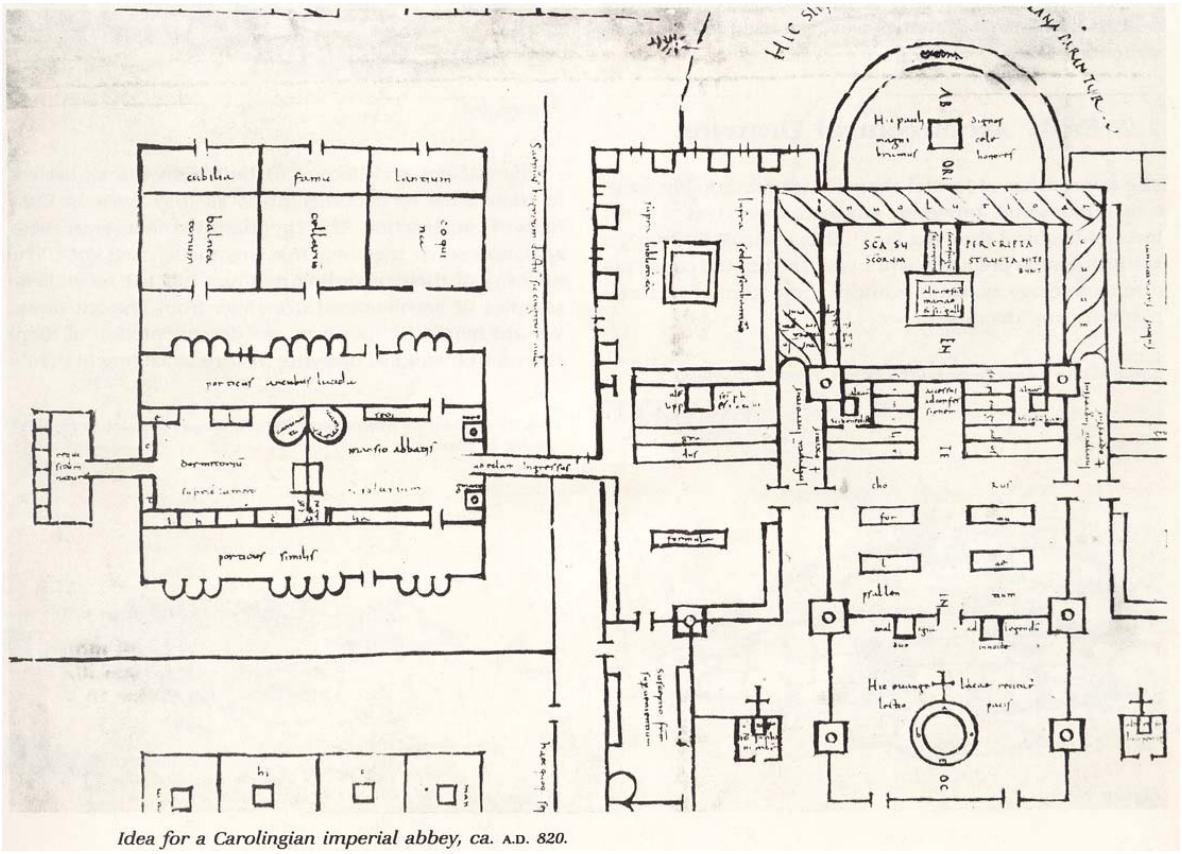

Figure 2.2 Idea for a Carolingian imperial abbey. A.D. 820

Figure 2.3 European painting

Figure 2.4 Chinese painting

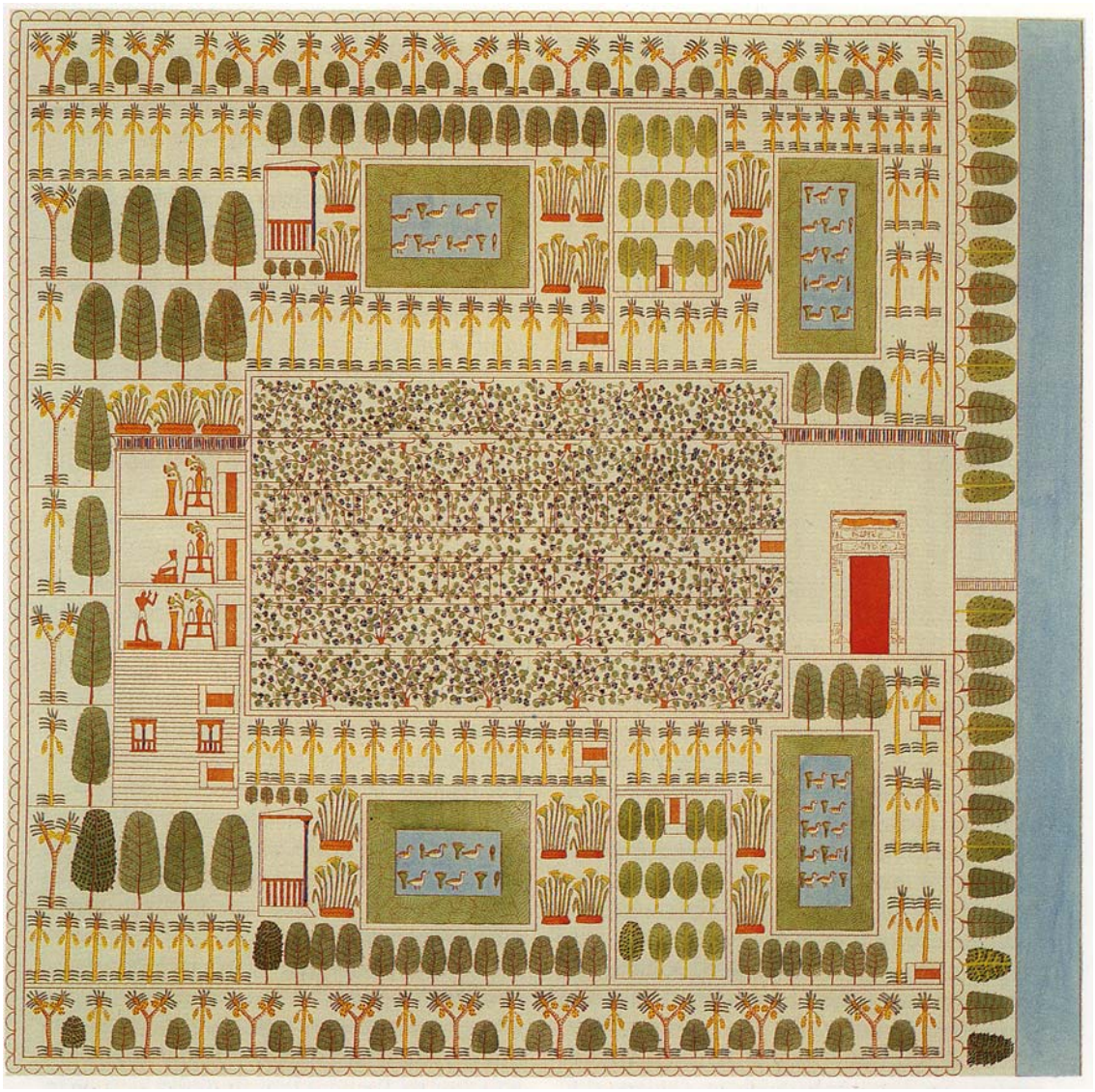

Figure 2.5 Egyptian painting

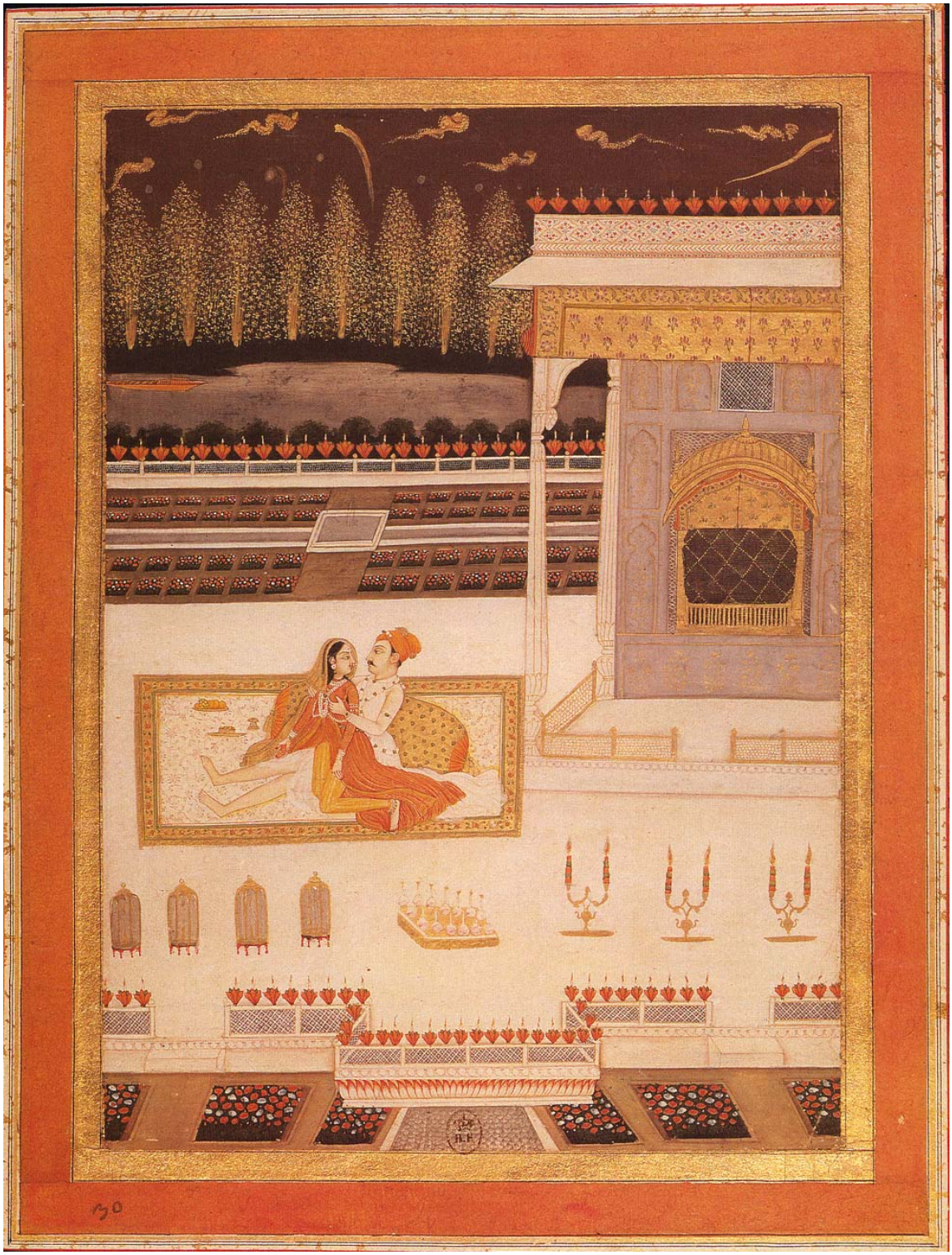

Figure 2.6 Indian painting

20 *Rivenhall Place*, with and without overlay, from *Sketches and Hints on the Theory and Practice of Landscape Gardening* (1795). Yale Center for British Art, Paul Mellon Collection.

Figure 2.7 Humphry Repton's before and after drawings

2.2.2. Conventions

For two centuries of modern landscape architectural history, the components of traditional presentations have been typically recognized as site analyses, concept diagrams, images and pictures, plans, sections, elevations, perspective drawings, and study models. Paul Laseau summarizes traditional architectural representation methods into three main types in his book, *Architectural Representation Handbook: Traditional and Digital Techniques for Graphic Communication*, at page 27-62. The first one is orthographic projection, the second one is paraline projection, and the third one is perspective projection.

According to Leseau, orthographic projection can be divided into elevation, vertical section, plan elevation, and plan section. Those drawing methods keep the objects' relative existing scale. A 7' by 3' door is drawn exactly 7 to 3 proportions. Plan drawings show projections from above while section and elevation drawings show projections from the position parallel to the sides. Section drawings cut out the objects to show inside structures with a particular line, whereas elevation drawings are projections from outside to show building facades. Chip Sullivan says that "the primary methods for representing landscape concepts and designs are with plans, elevations, and sections. These are the fundamental

tools used to illustrate ideas about the environment. The plan, elevation, and section are extremely useful for analyzing the natural features of the ground plane." (Sullivan, 226.)

Paraline projection includes Axonometric, and Isometric. Paraline projections are drawn in scale, while expressing a plan view and elevation view at the same time with a sense of three-dimensionality. According Chip Sullivan, paraline drawings have been used traditionally by architects and have recently enjoyed renewed popularity after declining during the Beaux-Arts movement (Sullivan, 256). They are not commonly employed by landscape architects as a rendering tool, though they have unlimited potential for expressing landscape and design analyses. Clients usually can read a paraline drawing easily with a complete landscape scene.

Axonometric is drawn from an orthographic plan projection (plan drawing) tilted up to favorable angular to a horizontal line, which is either 45 degree or 30 degree. Vertical lines are added to scale. Unlike perspective drawings, there is no converging vanishing point, parallel lines remaining parallel in paraline projections. Sullivan mentions that "Axonometric were used to full advantage by Garret Eckbo in his book *Landscapes for Living*. He used them very artistically and with great flourish to study the relationships of plants and groundscape in his plans. Eckbo developed a unique vocabulary of vegetative

forms. Plant forms were abstracted into simple but strong silhouettes expressing the essence of the plant."(Sullivan, 260)

The difference between axonometric and isometric is a plan drawing used as a base. In isometric drawings, according to Alan Pipes's book, *Drawing for 3-dimensional Design: Concepts, Illustration, Presentation*, at page 64, isometric projections were developed by Sir William Farish in 1820 as a form an derivative of orthographic projection. Base plans are distorted both x-axis and y-axis have 30 degree to the horizontal line, which means original 90 degree between x-axis and y-axis become 120 degree. Vertical lines are drawn parallel to each other; as a result each axis (x, y and z) has equal degree between axes.

"Perspective projections deal more with the actual experience of three-dimensionality; they do not concern themselves with a constant scale but rather reveal relative scale as seen in space" (Laseau, 27). He continues on page 47 that "Perspectives are also commonly associated with elaborate renderings for the benefit of clients and their promotional need. These are generally representations of the building design after the design process is completed and the final idea is fixed." Perspective drawings are useful because people see the world in perspective; as a result, Perspective drawings show almost the same views as people perceive. The problem is that it generally takes long time to

produce perspective drawings. These conventions have been used as communication tools between designers, and also between designers and clients.

2.2.3. Other Media

With the development of computer technologies, landscape architects seem to have more presentation methods today than what they used to have. Interactive multimedia presentations are included in one of those methods. Some computer graphics software packages include Adobe Photoshop, Adobe Illustrator, Macromedia Freehand, Corel Draw and Corel Painter for presentation layout; and Adobe Pagemaker, Adobe InDesign and Quark Express for project documentation.

Graphic layout software has facilitated the appearance in landscape architectural presentations. It is useful to organize text and images, and to manage the lines and colors. Montage and collage can be also easily produced with computer graphic software. Graphic software also allows designers to render drawings. Photoshop rendering techniques sometimes have been introduced in *Landscape Architecture* magazine, the monthly publication of the American Society of Landscape Architecture (ASLA). 3D modeling software provides alternatives to perspective drawings. Once the model is built in the

program, one can easily produce the different perspective drawings. Accuracy is dependent upon the skills and the machine power; however, still it appears difficult to make especially natural elements such as trees and people because of shape irregularities.

In addition to those two types of computer graphics, the introduction of Geographic Information Systems (GIS) must be mentioned as one of the most influential technologies. Stephen M. Ervin and Hope H. Hasbrouck mention that “The late 1960s and early 1970s also saw the development of GIS at several places around the world, but notably at Harvard University’s Graduate School of Design, where Professor Carl Steinitz oversaw a series of projects in computer-aided landscape planning and design, some of which are directly responsible for today’s GIS software and capabilities” (Ervin and Hasbrouck, 34). GIS applications allow users to layover several different types of site conditions, and produce a convincing site analysis obtained from combinations of existing site conditions.

2.3. Selection of the Applications

There are mainly two types of computer applications used to create multimedia interactive presentations. One is 3D modeling software to produce 3D animation, interactive QuickTime VR movies and perspective drawings. The other is authoring

software to combine images and sounds, to add motion effects and to produce a branching structure with buttons and navigators on the interface of interactive multimedia presentations. Since computer applications vary according to users and purposes, there are many application software packages these days.

Software for 3D modeling can be divided into two characteristic types. One is called CAD (Computer Aided Design) software used to draw vector-based lines so that users can achieve precise technical drafting and construction documents. Autodesk AutoCAD, Bentley Microstation, and Nemetschek VectorWorks are well-known in landscape architecture. Even though CAD software also has simple lighting and rendering functions, there are lots of software packages especially aimed for 3D modeling. Unlike CAD software, 3D modeling software is designed to reflect the reality of the 3D world, and creates complex 3D shapes, realistic materials, light and shadow. Also, cameras can be placed to render the scenes and to produce still images and animations. Currently those 3D modeling software packages include auto·des·sys form·Z, Robert McNeel & Associates Rhinoceros, Newtek LightWave 3D, Maxon Cinema 4D, Alias Maya, Avid SoftImage, Autodesk VIZ, and Discreet 3D Studio Max. Some software packages such as auto·des·sys form·Z are good at 3D modeling; others are the best for photorealistic rendering. Software

packages such as Alias Maya and Avid SoftImage are used to create 3D CG (Computer Graphic) for films while Autodesk VIZ is mostly used by architects. Because there are various other software packages for 3D modeling and those software packages are fluid, it is difficult for landscape architects to choose one of those; for example, @Last Software SketchUp has attracted designers' attention for its easy manipulation. SketchUp achieves neither photorealistic rendering nor complicated 3D modeling; however, it is priceless and saves a lot of time when the design is fixed or when the designers only want to see the volumes in their projects.

Here Autodesk VIZ is chosen to use as a 3D modeling application because of its popularity in business and education, Autodesk's future supports, and its data compatibility with Autodesk AutoCAD (which is currently one of the most popular CAD software packages).

On the other hand, several authoring software packages are listed to produce interactive multimedia presentations. Macromedia Authorware and Microsoft Powerpoint are eliminated, because Macromedia Authoware is the software designed for the computer instructions in education, and Microsoft Powerpoint is well-known as a presentation software package easy to use, but its presentations are not interactive enough. There are two

highly interactive and currently popular authoring software packages. One is Macromedia Flash. The other is Macromedia Director. Nicholas V. Iuppa makes a brief remark on Macromedia Flash and Macromedia Director. “Macromedia Flash is a technology that allows you to create simple yet effective animations and play them on a Web page. Flash is often used for user interface elements like animated buttons and menus, and is frequently used to present content and advertising in interesting and compelling new ways. Animations are in the form of vector graphics, which feature a small file size (and therefore a short download time) when compared to GIF or JPEG format graphics.” “Macromedia Shockwave is more sophisticated technology that can be used to create more advanced animated and interactive elements for your Web pages. Shockwave is often used to create interactive multimedia product demos and training, merchandizing applications, and rich-media multiplayer games.... Shockwave files can be created using the Macromedia Director. Macromedia Director is the industry’s leading multimedia authoring platform” (Iuppa, 108-109).

In fact, it is very difficult to decide which one is better for interactive multimedia presentations. Even though Macromedia Director offers the more professional manipulation and the more sophisticated integration of sounds, movies and animation, Macromedia Flash

is chosen here because designers might find there are more opportunities to learn Flash and it is easier to use for the first time. Also interactive multimedia presentations published from Flash are relatively smaller in file size, so it is easy to distribute Flash presentations through internet. In addition, the price of Macromedia Flash MX 2004 is $499 and Macromedia Flash MX 2004 Professional is $699, whereas Macromedia Director MX 2004 is $1,199 on November 2004.

2.4. Author's Computer Literacy

It is important to write about the author's computer literacy, because the purpose of the thesis is to facilitate the use of interactive multimedia presentations. The author first touched the computer in 1995 while obtaining his bachelor of architecture degree in a Japanese university. He was educated to use basic office applications such as Microsoft Word (word processor), Microsoft Excel (spread sheet) and Microsoft Powerpoint (presentation). Also he gained the basic skills to use Adobe Photoshop and Adobe Illustrator, and most landscape architects today are familiar with those graphic applications. He also learned Autodesk AutoCAD and Bentley Microstation. These CAD (Computer Aided Design) software packages are fundamental in both the fields of architecture and

landscape architecture for drawing the construction documents, master plans, and sections. The author learned how to make 3D models in both Autodesk AutoCAD and Bentley Microstation by himself. Once users learn two-dimensional drawing, it is not so difficult to learn how to draw in three-dimension. In addition to 3D modeling, the author had the experience of rendering 3D models in Bentley Microstation to create perspective images. Although Macromedia Director was introduced and actually used to make a simple interactive multimedia presentation in one of the classes in the university, the author did not have any experience to produce interactive multimedia presentations and 3D models in Macromedia Flash and Autodesk VIZ, which are used in this thesis.

Chapter 3
Methodology

3.1. Overview

The master plan of Hilltop arboretum, which is a small public education facility, owned by the school of Landscape Architecture, Louisiana State University, was chosen for the sample of interactive multimedia presentations in this thesis. A master plan, a planting plan, and three section drawings were previously required to propose the landscape design for the entrance part of the arboretum in the earlier planting design class. The plan was drawn with Autodesk AutoCAD and rendered by hand with markers. Three section drawings were free-hand drawings also rendered with markers. This project was selected because it is possible to show the details of the proposed landscape design clearly in the 3D animation, and there are varieties of plants and spaces.

Based on this design proposal and previously produced drawings, an interactive multimedia presentation was actually created. The interactive multimedia presentation for this thesis is shown on the computer screen and designed with Macromedia Flash. It contains an opening movie which introduces the overview of the landscape design. Design concepts and important background information about the arboretum are explained with text and voice narrations. Five main spaces in the proposed landscape design are fully

illustrated with the hand-drawing plan and sections, computer-generated perspective drawings, QuickTime VR movies, text, and voice narrations. The interactive multimedia presentation is affluent with interactivity, motion effects and animation. Eleven-minute 3D walk-through animation shows the overall landscape design including the existing architecture in the arboretum. This interactive multimedia presentation is distributed on the CD-ROM and DVD-ROM attached to this thesis.

The production process is mainly divided into two parts: one is to create 3D models in order to obtain computer-generated perspective drawings, 360 degree panoramic QuickTime VR movies, and 3D walk-through animation. The other part is the interface design in which designers organize multimedia elements such as text, still images, movies, and sound. And then, they publish them as an interactive multimedia presentation. Autodesk AutoCAD and Autodesk VIZ 2005 are used for 3D modeling, rendering, and exporting images, QuickTime VR movies and 3D walk-through animation; Macromedia Flash is used for the interface design. The navigation buttons let users choose the part of the presentation which they want to see; in other words, there is no order of the presentation and audience members can learn about the design at their own pace. (Figure 3.1)

Production Process

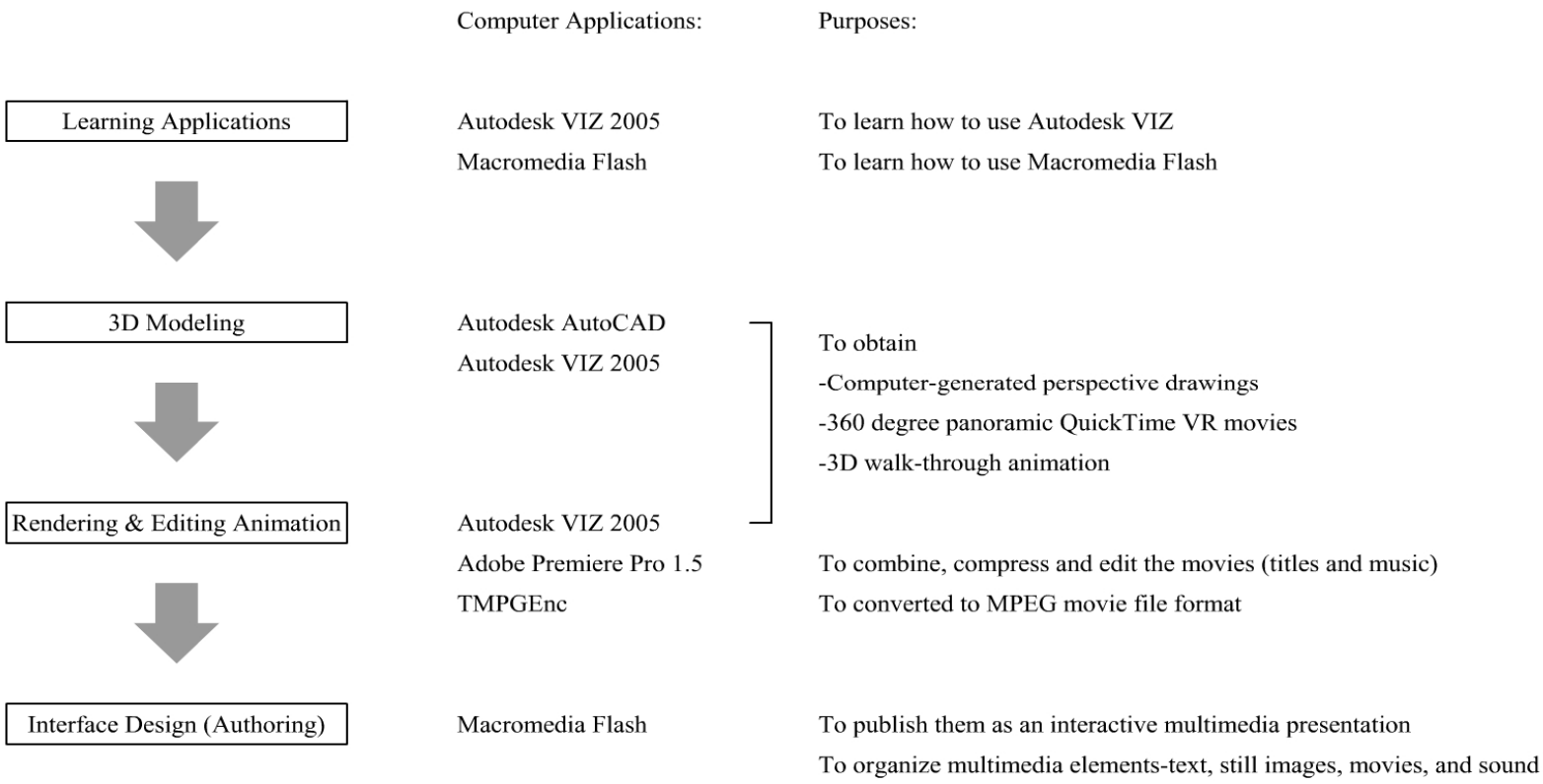

Figure 3.1 Production process

3.2. Learning Applications

It is necessary to learn how to use Autodesk VIZ and Macromedia Flash to produce the interactive multimedia presentation. First of all, the author read a tutorial included in Macromedia Flash program. The tutorial is very simple and easy to follow; however, it gives users basic skills and ideas about the interface design. The author spent one week on the tutorial. Users have to know the general concepts of the program such as how to draw objects, change the shapes, locate text, manipulate timeline, and add the motion effects in the program. A unique computer language called ActionScript controls over the Flash movies. Users have to understand some basic ActionScript; for instance, it is required to write ActionScript to stop the movie or to have various complicated motional events. The author also took a Flash class in the department of Art where graphic students can learn how to create interactive homepages for a semester long (twice a week for three hours for fifteen weeks).

The author took an architecture class where students can acquire basic ideas of 3D modeling software, which included Autodesk VIZ, auto·des·sys form·Z, and @Last Software SketchUp. The class mainly taught Autodesk VIZ from the introduction of the application to how to make a brief animation. The class was twice a week for one hour

and half for fifteen weeks. After the class ended, the author read Stephen J. Ethier and Christine A. Ethier's book, *Autodesk VIZ Fundamentals: Using Release 4*, and followed all exercises. It took six weeks to finish this book.

3.3. 3D Modeling

A lot of essential elements for the interactive multimedia presentations can be obtained from 3D modeling software such as perspective drawings, QuickTime VR movies and 3D walk-through animation. Initially the existing site plan and architecture of Hilltop arboretum was provided in the AutoCAD drawing format. The proposed landscape design was already digitized two-dimensionally. Designers can do 3D modeling either in Autodesk AutoCAD or Autodesk VIZ. The author modeled the complicated 3D structures such as beams in architecture in Autodesk AutoCAD because the author has been long used to the application. It took eight weeks to fix CAD data and complete 3D modeling of the proposed landscape design including the existing architecture. It was necessary to go to the site to measure architecture elements such as column spans, the size of hand rails or the locations of the windows to produce the

precise architecture in the 3D model. It occupied almost five weeks of the total eight weeks to make the 3D architecture.

After completing 3D modeling, materials such as wood surfaces for architecture columns and hand rails; metal surfaces; ground surfaces such as sand and grass; water for ponds; and sky dome should be applied to the objects. Most of materials can be found in the material library which originally comes with the software package, but some of materials have to be created or edited to achieve reality. Light sources should be also located to create realistic shadows and reflections. There are several types of lights such as spot lights or omni lights in the program so that users can use different lights for different effects. The intensity and color of lights also can be adjustable. Some materials such as water and glass are “ray-trace” materials which can be adjusted for the transparency and reflection in the material editor. This process took about fifteen days.

Cameras are useful when rendering the scene. If a camera is located properly at human eye-level, it is possible to have images from the camera view equivalent to the human perspective. Cameras have to move around the site according to the timeline in order to create 3D walk-through animation. The movement of the camera is defined with the line path located in the 3D space. Designers define how many frames the total 3D

walk-through animation has, and the camera takes pictures at each frame while moving around the site on the defined line path. Those consecutive still images are assembled in the rendering process to produce animation. It took another 10 days because it should be carefully considered what course the camera should take to effectively show the proposed design to the audience members in 3D walk-through animation.

Trees and people are not easy for 3D modeling. There are three possible ways to create trees and plants. The first one is to locate polygon trees. Although there are several kinds of polygon trees originally available in the software, those polygon trees might make the file size too large because all leaves and branches are made from polygons. Also since the proposed landscape design for Hilltop arboretum includes several unique plants, the number of types of those polygon trees is not enough to cover all kinds of plants in the planting plan. The second way is to use ArchVision RPC plug-in. RPC stands for Rich Photorealistic Content, and RPC contents include 3D objects such as trees, plants, people, and cars made from photos with remarkably smaller file sizes than polygon files. Users simply attach them into their 3D models. The price is, however, not very cheap for students. One of the university professors owns RPC contents for walking people, and “walking people” seem to be actually walking on the defined path in the 3D

model in accordance with the animation timeline. Since there are several kinds of unique plants and trees in the proposed landscape design, and RPC contents cost some money, it is a reasonable way to locate trees and plants by manually using real cut-out photographs of plants and trees. They are, however, two-dimensional trees, when taken as photographs. Since trees have rounded shapes, the same cut-out photographs are rotated at 72 degree intervals around a center of the tree trunks. Several possible degrees such as 90, 60, 45 and 30 were tested, but 72 degree showed the most naturalistic and aesthetic forms of trees. Designers have to gather pictures of plants. It is a hard work to obtain cut-out photographs of trees. About twenty varieties of trees and three different kinds of flower beds were located in the 3D model. This process took twenty days. (Figure 3.2)

3.4. Rendering & Editing Animation

3D models have to be exported as computer-generated perspective still images, panoramic QuickTime VR movies, and 3D walk-through animation, all of which are the most important elements in the interactive multimedia presentation. “Rendering” is the final process in 3D modeling to produce animations and still images. The original 3D models are wire-frame or solid shapes. After materials, light sources, and cameras are

appropriately applied to the 3D models, rendering process enables to output the images with affluent color and texture. Rendering can automatically assemble consecutive still pictures taken from the camera inside the 3D models, and export 3D walk-through animation as a final outcome.

First, panoramic QuickTime VR movies need to be exported. Those QuickTime VR movies require six different images, which are front, back, right, left, above and below of the camera. The author exported about fifty panoramic views from different spots on the site so that viewers can see various aspects of the proposed landscape design. About 50 perspective still images were also rendered. It took twenty days to render and to learn the rendering methods.

On the other hand, the author used twenty five computers for two days and three nights for rendering. It is more efficient and faster to have those twenty five computers render at the same time, because each computer could be assigned to export twenty five different scenes for 400 frames, and the total length of animation was 10000 frames in this case. The twenty five movies are later combined together. The computer specification was Windows XP Professional Intel Xeon Processor CPU 2.40 GHz, 2.0 GB of RAM, one of fastest and the best computers currently available. The rendering

engine called “Mental Ray” was used for the faster rendering time. It took three days to obtain twenty five pieces of 3D walk-through animation.

Each 400-frame piece of 3D walk-through animation movie had to be combined and edited in Adobe Premiere Pro 1.5. Some title text and background music were added to the movie. The final 3D walk-through animation was exported as a QuickTime movie with the Sorenson Video movie compressor. This QuickTime movie is a regular passive movie, while QuickTime VR is a special type of movies. Three types of movie file formats are available, which are QuickTime movie format, AVI (Audio Visual Interleaving) movie format, and MPEG (Moving Picture Experts Group) movie format. QuickTime movie was originally delivered by Apple Computer. Both the Macintosh and Windows computer can play QuickTime movies with QuickTime player. AVI movie are generally only for Windows.

The movie compressor is important because the non-compressed 3D walk-through animation in this project had 10 GB (Giga Bytes) of file size. Several types of the compressors were actually examined to see the balance of the quality and the file sizes. The Sorenson Video compressor showed the good quality and the allowable file size. Movies compressed with other compressors have smaller files in size, but lose a lot of

quality at the same time. Also since AVI formatted movies might not be played on the Macintosh computers, a QuickTime movie with the Sorenson Video compressor was selected as the outcome. The 3D walk-through animation was compressed to 2.0 GB in file size (which is one fifth of the original size). However, since it still should be smaller to play in most of computers, it was converted to MPEG movie file format with free software “TMPGEnc” downloadable from the internet. The final 3D walk-through animation is eleven-minute MPEG movie with 680 MB (Mega Bytes) of the file size. Editing animation and exporting the final 3D walk-through movie took seven days.

3.5. Interface Design (Authoring)

After all multimedia elements such as plans, sections, perspective drawings, panoramic QuickTime VR movies, 3D walk-through animation, background music, and voice narrations are prepared, it is time to design the interface of interactive multimedia presentations. This process is generally called authoring or interface design. First, designers make branching structures of interactive multimedia presentations, including what kinds of menus and submenus are essential, how to show the proposed landscape

design, how to integrate multimedia elements in the presentation, what the presentation should look like, and how to navigate the viewers.

Four buttons were designed on the main menu. Those are Introduction, Concept, Design, and 3D Animation. The introduction movie (opening movie) was designed at the beginning of the interactive multimedia presentation in order to show audience members a brief overview of the proposed landscape design of Hilltop arboretum. The opening movie consists of several still images and pictures related to Hilltop arboretum and its proposed landscape design with the background music and text. Each essential space in the landscape design is introduced as a piece of a puzzle. Those images are animated with motion effects showing each small piece of a puzzle gradually combined to make one drawing which includes the overall master plan of the landscape design.

After the opening movie, the main menu containing four titles appears. Each title has an own submenu. The Introduction button has submenus including Opening Movie, History, and Purpose. The Concept button has two main concepts of submenus, Learning Opportunity and Interaction. The Design button has a submenu for Plan, Section, Magnolia Entrance, Plaza & Market, Agriculture & Terrace, Colonnade & Classroom, and Other Places. The 3D Animation button has a submenu for Fly & Walk through.

These buttons are also animated; when a mouse cursor is placed over the buttons, they go down to show that they are pressed. When any of the four main titles, Introduction, Concept, Design, and 3D Animation is clicked, it brings audiences to the indicated section.

In the Introduction, the Opening Movie button replays the introduction animation. The History button shows a historical background of the arboretum. The Purpose button shows viewers the purpose of the arboretum. Text synchronized with voice narrations explains the arboretum's history and purpose. The Learning Opportunity button and the Interaction button within the Concept title are also designed to show two significant concepts with text and voice narrations. Grayscale plan drawings are provided to show the conceptual maps. Colored concept diagrams on the grayscale plan visually show the design ideas.

The Design button takes audience members to the most significant part in this interactive multimedia presentation, where the detail proposed landscape design is presented. Users see the buttons of Plan, Section, Magnolia Entrance, Plaza & Market, Agriculture & Terrace, Colonnade & Classroom and Other Places. The Plan and Section buttons show the plan and section with scales. The Magnolia Entrance, Plaza & Market,

Agriculture & Terrace, Colonnade & Classroom, and Other Places buttons show magnified partial plans for each place with panoramic QuickTime VR movies and the positions of cameras for views in perspective. They also show comments which describe the design intent on upper sides of the screen. The before and after perspective images are presented at lower right sides of the screen. The before perspective views are pictures taken on the existing site; the after views are computer-generated 3D images. The panoramic QuickTime VR movies are linked to the movies with the eye-shaped buttons. When audience members click on the next buttons below the perspective images, the before and after images at the different locations of the site are shown; the camera symbols on the plan indicate their locations. The 3D Animation button brings audience members to a submenu of Fly & Walk through, which allows users to watch the eleven-minute computer-generated 3D walk-through animation of the proposed landscape design. (Figure 3.3)

Process of 3D Modeling

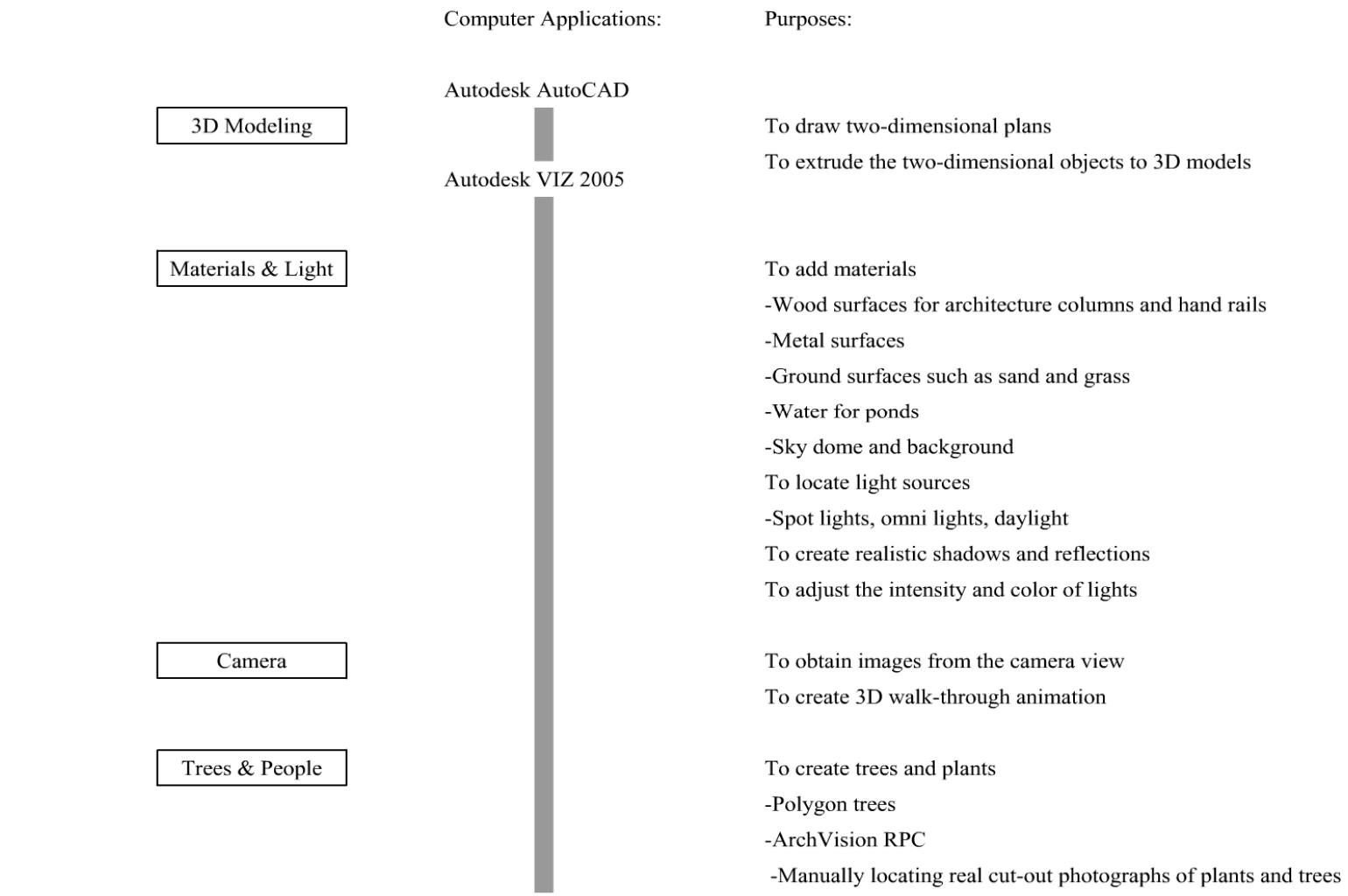

Figure 3.2 Process of 3D modeling

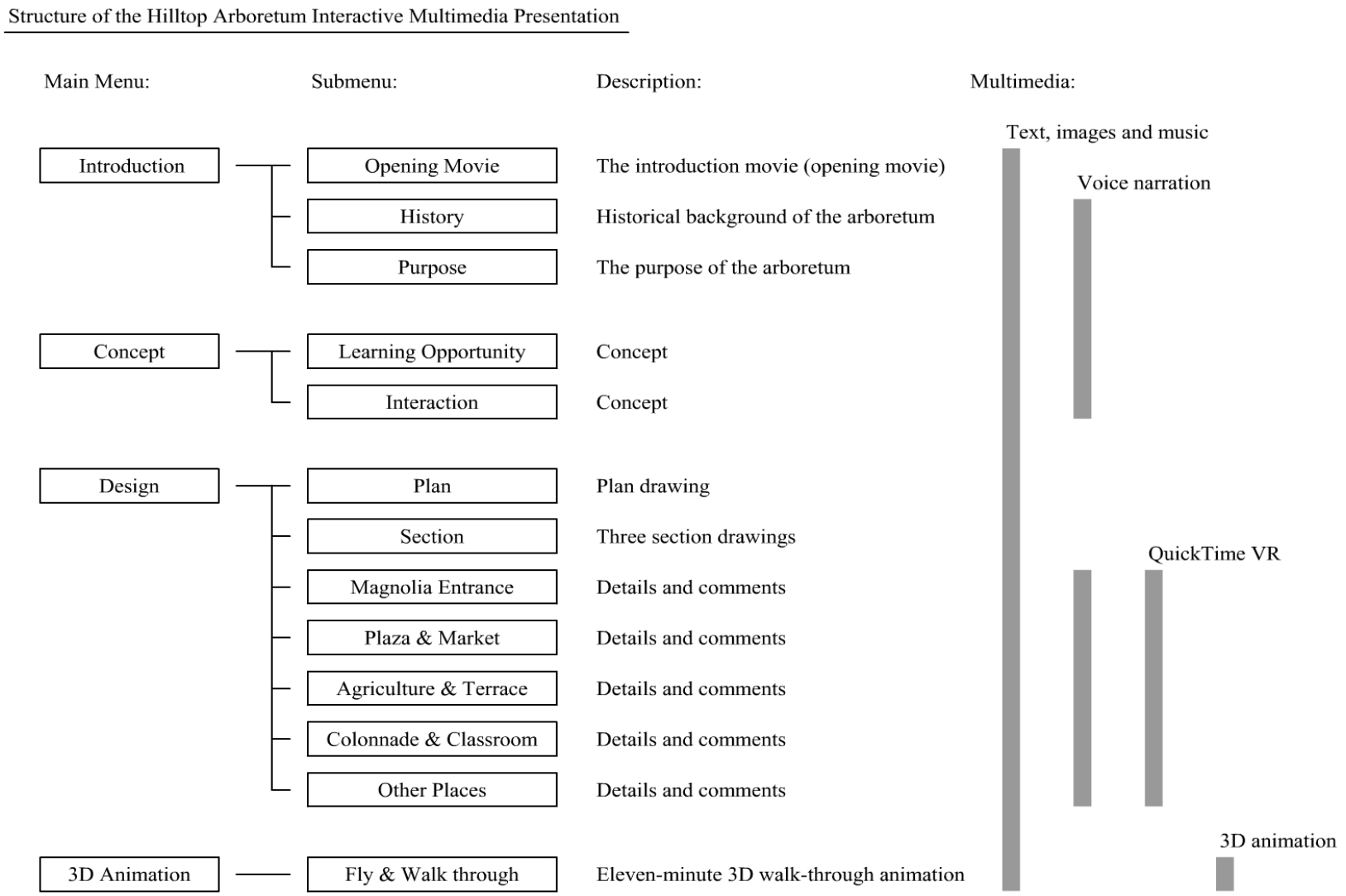

Figure 3.3 Structure of Hilltop arboretum interactive multimedia presentation

Chapter 4
Observation/Findings

4.1. Hardware/Software

4.1.1. File Size

It is very important to manage the file size of digital projects. The larger the file size, the slower the computer runs while making and presenting the projects. Even with one of the best computers available today such as Windows XP Professional Intel Xeon Processor CPU 2.40 GHz 2.0 GB of RAM, a lot of problems such as freezing occur due to the exceeding file size. 3D models generally tend to have larger file sizes when they are designed very realistically. Especially trees or objects containing a large number of polygons cause the extremely large file sizes. It is a good idea to simplify 3D modeling in the spaces which are not to be seen.

The exported 3D walk-through animations are relatively large files. When the interactive multimedia presentation contains long 3D walk-through animations with large file sizes, some old computers may not work properly. This causes problems in distribution, because it is ideal for the presentations to be shown in the most of computer environments. Since one of the benefits of interactive multimedia presentations is to

distribute the presentations to a large number of people through internet or with CD-ROM or DVD-ROM, designers should always care the file size.

4.1.2. Physical Limitation/Benefits

Because the interactive multimedia presentations are presented on the computer screen, there are some physical problems. One of them is the size of computer screen. Unlike the traditional presentation boards, viewers cannot see the overall plans or sections at the large scale on the small computer screens. However, because of the portability of laptop computers and the increasing methods of distribution such as CD-ROM, DVD-ROM, and internet, interactive multimedia presentations facilitates the potential for informing more people. Also unlike the traditional presentation boards, there are unlimited spaces inside the interactive multimedia presentations, because they are digital images which can show the unlimited different things on the same computer screen one by one.

4.1.3. Problems in 3D Modeling

When designing 3D models, designers might encounter a lot of problems and limitations. Those problems include (1) the compatibility of CAD software and 3D

modeling software when transferring and exchanging the data between them, (2) trees and people, and (3) the unexpected troubles caused by new technologies.

Importing files from CAD software packages such as Autodesk AutoCAD into 3D modeling software packages such as Autodesk VIZ is one of the examples. Even if both applications are the same Autodesk products, designers find they do not import and export the data as well as might be expected. In most cases, the objects created in CAD software packages have some surfaces inside out when exported into 3D modeling software packages; for instance, when rendered, the applied materials are not shown because the other hidden sides of the surfaces show the applied materials. Also, when the complicated objects with many polygons are imported into 3D modeling software, some solids shows only lines without faces. In these cases, there are several ways to fix these problems; for example, “flip normal” and “two sided rendering” solve the flipped face troubles; and trying to export in different file formats may solve the latter troubles. It is, however, highly recommended that designers import a little bit at a time while trying to render the objects to make sure everything is correctly imported.

Most 3D modeling software packages have drawing functions, so it is possible to draw plans and extrude those surfaces to make 3D models. In fact, it is possible to make

3D models without CAD software packages; however, the CAD software packages are well designed to draw plans more efficiently. Plans used in the projects are typically in the CAD file format. Those CAD software packages also can build the 3D models. In short, it really depends on the designers which applications they use for 3D modeling. Using both applications simultaneously often avoids the unexpected problems on transferring the objects between 3D modeling software packages and CAD software packages.

Another large problem landscape architects might have in 3D modeling may be depicting trees and people. Since trees and people have rounded irregular natural shapes unlike architectural buildings, they will cause the file size to be much larger when they are modeled with polygons. It is difficult and takes a long time to model trees and people in 3D. Designers can buy those already created models. For instance, Bionatics Easynat deals with polygon plants. There are the other way to make trees and people instead of using polygons. As described in the previous chapter, ArchVision RPC (Rich Photorealistic Content) offers opportunities easy to create trees, plants, people, and cars made from photos with remarkably smaller file sizes than polygon models. Also because trees have rounded shapes, it works well to locate the pictures of trees and to rotate them

constantly so that the trees appear the same at any angle. This is a reasonable way to make trees in 3D models, but it takes time to take the pictures and to cut out the trees from the pictures. The problem of locating trees and people makes the file size much larger. If there are many trees and people, 3D modeling software might operate very slow or freeze during rendering because of memory restrictions.

Still developing technologies offers more efficient and superior 3D modeling; however, designers have to realize these new technologies sometimes cause unexpected troubles. For example, there will be more rendering engines available in the future. Autodesk VIZ 2005 has Default Scanline Renderer and Mental Ray Renderer. Previous versions of Autodesk VIZ do not have Mental Ray rendering engine. It is very fast when there are many ray-trace objects such as trees, water, and glass. However, when rendered with Mental Ray Renderer, ArchVision RPC objects do not appear correctly in Autodesk VIZ 2005. Designers should have some experience to avoid unexpected incidences.

4.1.4. Problems in Interface Design (Authoring)

When designing interfaces of interactive multimedia presentations, designers may have several choices for authoring software packages. In fact, choosing the appropriate

authoring software packages for interactive multimedia presentations is a very important process, and a lot of designers may realize Macromedia Flash is convenient and easy to learn, but not as powerful as Macromedia Director. For instance, Macromedia Flash does not let designer integrate QuickTime VR directly into the presentations. Also, if the 3D walk-through animations have the large file sizes, Macromedia Flash might not play the movies very well inside the program. The solution is currently to call the web browsers such as Microsoft Internet Explorer which those animations are embedded in; however, the result does not look better than when all animations are integrated in one presentation. Designers should carefully learn how to integrate the multimedia elements into the presentations before choosing the authoring software packages.

The interface design is a significant process in the interactive multimedia presentations. It is similar to the process when landscape architects layout their drawings on the presentation boards; nevertheless, it is a more complicated and creative process, because designers have to control various media. As a result, the interface design takes a longer time than the layout design on the traditional presentation boards. Also, most authoring software packages have their own programming languages. Even though those

software packages have become user-friendly these days, it is necessary to obtain the basic understandings of the programming languages.

4.1.5. Distribution

Although there are some physical limitations because of the size of the computer screens in interactive multimedia presentations, the distribution methods are one of the most attractive aspects. Distribution through internet may be the most distinctive way to show the designer's ideas to an unlimited audience throughout the world; in fact, web sites have been the places where artists and designers express and exchange their works and ideas interactively.

Because of the increasing capacity of the digital media such as CD-ROM (700 Mega Bytes), DVD-ROM (4.7 Giga Bytes) and new generation large capacity media HD-DVD and Blu-ray disc (About 30 Giga Bytes), designers will be able to put larger files with good quality of animations on small compact discs at a reasonable cost instead of large traditional presentation boards. Also, laptop computers make it easy to present the interactive multimedia presentations to the client anywhere. These duplication methods

facilitate the communication as well. It is possible to expect the larger capacity of the digital media, and the more flexible distribution through internet in the future.

4.2. Process

4.2.1. Time Consumption

Time consumption issues probably are considered as one of the biggest problems to deal with when producing interactive multimedia presentations. First, it takes time to learn two kinds of computer applications-3D modeling software packages and authoring software packages. Today, it is possible to assume that CAD software packages are common applications among the landscape architects. Likewise, the future educational opportunities on the computer literacy will probably reduce the time consumption to learn those applications. In addition, designers might care how long it takes to produce interactive multimedia presentations. Actually producing interactive multimedia presentations takes a long time especially for the first time; however, designers do not always have to make photo-real 3D models for 3D walk-through animations, and there are a lot of ways to cut off the production time. As professional painters quickly draw perspective images by hand, getting used to creating interactive multimedia presentations

reduces the time required. Moreover, designers will be able to spend more time on creating interactive multimedia presentations because they may efficiently reduce the distribution time.

4.2.2. Learn Design from 3D Models

One of the most impressive findings when producing this interactive multimedia presentation was that designers can learn more about their designs from 3D models. Unlike using only plans, sections, and elevations in traditional presentations, creating 3D models is the equivalent of actually building the proposed design on the site or making study models by hands. Texture, materials and details of the designs are significant. Designers can confirm their designs while making 3D models. It is an excellent idea to start 3D modeling still in the deign process. 3D models can be used not only for the final 3D walk-through animation, but also for checking the designs as sketchbooks.

Actual study models built by hands can replace the computer-generated 3D walk-through animation. The possible media do not have to be fixed. Designers can creatively find their own ways of using multimedia. Multimedia does not have to be made from

digital. It is significant to express the ideas three-dimensionally in order to visualize the designs for clients and designers.

4.3. Product

4.3.1. Navigation

Navigation is a very important issue in interactive multimedia presentations. Since interactive multimedia presentations are non-linear and interactive, designers should provide for clear navigation, and presentations should be easily navigable. In fact, it was observed during the examination of the Hilltop arboretum interactive multimedia presentation that some audiences did not even notice the buttons linked to the panoramic QuickTime VR movies or text comments because they were not outstanding enough to attract their attention. In short, it is very important to design the proper symbols for the navigation buttons and easy navigation systems, and to carefully test and observe how audience members use the interactive multimedia presentations before the distribution. If users ignore a lot of the designers' intent, the interactive multimedia presentations themselves will not make any sense. To avoid this ignorance, it is recommended that designers locate the instruction which users read before they proceed to the presentations

and provide navigation buttons that are animated, because animation usually attracts people's attention.

4.3.2. Opening Movie

Opening movies introduce the overview of the interactive multimedia presentations; they are also often called intro movies. They are effective when they are well designed because they can give audience members strong visual impressions in a short time. A lot of interactive web sites have opening movies, and those opening movies typically provide the first impression of the contents in the web sites. As a result, it is important to design the opening movies attractive enough to represent the designers' ideas clearly at the proper time. Designers should carefully treat with the length of the opening movies so that they will not be too long for the viewers. Also it is significant to provide skip and replay buttons for the audience members' choices. A lot of audience members might skip the opening movies when they watch the interactive multimedia presentation for the second time. Opening movies can be one of the most impressive parts in the interactive multimedia presentations, and can convey a lot of animated text and graphics at the same time with background music. Opening movies are not always

necessary; however, the interactive multimedia presentations become more attractive when they have well-designed opening movies.

4.3.3. Motion & Animation

The motion effects and animations are very effective to attract people's attention. These animations are different from 3D walk-through animations. The 3D walk-through animations which will be mentioned next are linear passive walk-through movies, but these animations here are text and images with motion effects. Animated images such as blinking arrows or text are useful to tell the audience members to click the indicated areas when it is effective to highlight the location of navigation buttons, the hidden events, and the important design contents, Text with motion effects may give the viewers deeper impressions than still text because it makes viewers read more carefully. Designers should, however, be careful when they use the motion and animations, because too many animations at the same time will annoy and confuse the viewers.

4.3.4. 3D Walk-through Animation & QuickTime VR

3D walk-through animation and QuickTime VR visually show the audience members how the proposed design is going to appear. Unlike the motion effects and

animations previously described, the purpose of 3D walk-through animation and QuickTime VR movies is to clearly convey the visualized proposed design itself to the audience members. In a sense, these movies are the most essential elements in the interactive multimedia presentations. The goal of the interactive multimedia presentations is to be able to integrate these movies in one presentation. Traditional paper board presentations never achieve this.

QuickTime VR movies provide the 360 degree panoramic images of the proposed sites. Perspective drawings used to be very effective presentation methods in traditional paper presentations. QuickTime VR adds another dimension to the still perspective drawings. Viewers can look around the front, back, left and right sides and above and below themselves at their own pace. Panoramic QuickTime VR movies provide the more realistic ways of seeing the new design and experience standing on the proposed site.

On the other hand, 3D walk-through animations are not interactive. They are passive movies, but they can show the proposed design interactively as if the viewers were walking and flying through them. The more realistic new experiences are offered in 3D walk-through animations. They also will show the details and overviews of the spaces and the relationships between the designed spaces visually. It used to be very difficult to

represent the transitions between spaces in traditional presentations; however, 3D animations make it possible to visualize the transitions of spaces in three-dimensionally. Those QuickTime VR movies and 3D walk-through animations convey much more information than the plan, section, elevation, and perspective drawings.

4.3.5. Sound & Voice Narration

Interactive multimedia presentations have very powerful media, which is voice narrations and sounds, to deepen the viewers' understandings of the proposed design. Traditional paper presentations only can appeal to audiences' visual sense; however, interactive multimedia presentations can offer auditory experiences. Since human beings communicate and perceive the world not only with their eyes but also with other senses-auditory, smell, taste, and touch, landscape architects should take the other methods of informational transmission into consideration. The different and effective experience is often achieved with the sounds. Designers have long ignored or could not do anything with sound in presentations even though they realized its importance. Sound adds another sensual impression; voice narrations also facilitate the transmission of information.

Chapter 5
Recommendation/Conclusion

5.1. Designers & Audience Members (Clients)

Landscape architects should not be content with the existing presentation methods. As the technology is being developed, various kinds of new possibilities become available. Landscape architects are not just artists on the two-dimensional paper boards. They are the designers of three-dimensional space. Their creative designs will eventually exist in the world. It is necessary to clearly convey the design ideas to clients and viewers in the landscape architectural presentaions. Even though it requires some efforts to produce interactive multimedia presentations, it is designers' duties to accurately inform clients of their designs in a manner that clients also easily understand them. Between the different professions such as landscape architects, architects, interior designers, and civil engineers, interactive multimedia presentations are also useful to communicate with each other and to exchange design ideas over long distances. Combinations and assimilations between traditional and interactive multimedia presentations will result in the higher level of presentation methodologies. Landscape architects should make the most use of this excellent opportunity.

5.2. Multimedia Environment

Since the multimedia technologies are still evolving today, there are some difficulties in creating interactive multimedia presentations. The current development of the new communication technologies seems to continue, and landscape architects will soon have more choices for their representation methodologies as the computers has drastically changed people's life. The multimedia environment also will be enhanced including computers, 3D modeling and authoring software packages. As well as the hardware and software, more educational opportunities on the multimedia technologies are important. As students these days are required to take AutoCAD class, the schools may offer the classes to learn how to utilize multimedia not only for the presentations but also means for communication.

5.3. Visions for Future

This first exploration for interactive multimedia presentations illustrated a small public arboretum, but this should stimulate the testing of the other types of projects such as residential designs, regional designs and urban planning. Interactive multimedia presentations will be the communication tools not only between the designers and clients but also between the allied professional users. Exchanging 3D models between landscape

architects and architects instead of two-dimensional CAD drawings may help the confirmation and understandings of each design, and promote the unity of design. Interactive multimedia presentations could be a construction documents which the site engineering people bring to the sites with their laptop computers and communicate directly from there. 3D models are much easier to understand than typical construction details. In the educational situations at school, interactive multimedia presentations will be useful to deepen the understanding of design. Interactive multimedia can be used not only for the final presentations but also for the representations of the design process.

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Vita

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