FROM PHYSICAL TO VIRTUAL
Extending the Gallery Experience Online

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ABSTRACT
This thesis is an exploration of the ways in which interactive features in the virtual space can be developed to complement physical museum exhibitions, as well as create opportunities for museums to reach broader audiences. I provide a critical analysis of current online museum exhibition features and how they support museum curatorial missions. As a case study, I describe from the viewpoint of a participant/observer, the design and development of the Web site for the exhibition *Pattern Language: Clothing as Communicator* at Art Interactive.

CHAPTER ONE: INTRODUCTION

Over the past decade the World Wide Web has reinvented the way information is stored, shared and displayed. In particular, cultural institutions such as museums and galleries have eagerly embraced the Web as a medium well-suited for the display of exhibitions in the virtual space of the Internet.[1] In 1993, the United States Library of Congress held the exhibition, *Rome Reborn: The Vatican Library and Renaissance Culture* displaying approximately 200 precious manuscripts, books and maps borrowed from the Vatican.[2] Some of the works from the exhibition were archived by the Library of Congress as digital image files and placed onto an Internet FTP Server. An unaffiliated Dutch scientist by the name of Frans Van Hoesel, discovered these digital files. Van Hoesel was an early user of the World Wide Web, an application which enabled the easy browsing and sharing of files over the Internet. Invented just two years prior by Tim Berners-Lee at the European Particle Physics Laboratory (CERN), the Web was still seldom used outside the scientific research community.

Van Hoesel took the digital image files from the the Library of Congress and organized them into a series of linked Web pages under the heading, *Library of Congress Vatican Exhibit*.[3] By doing so, he created the first museum Web site (Fig. 1). In his design of the site, Van Hoesel used the metaphor of the physical museum. The main page was entitled "Main Hall" and contained links to other pages which were referred to as "rooms." Each room had a theme, such as Archaeology, Humanism or Mathematics and contained thumbnail images and descriptions of pieces from the exhibition. Clicking on
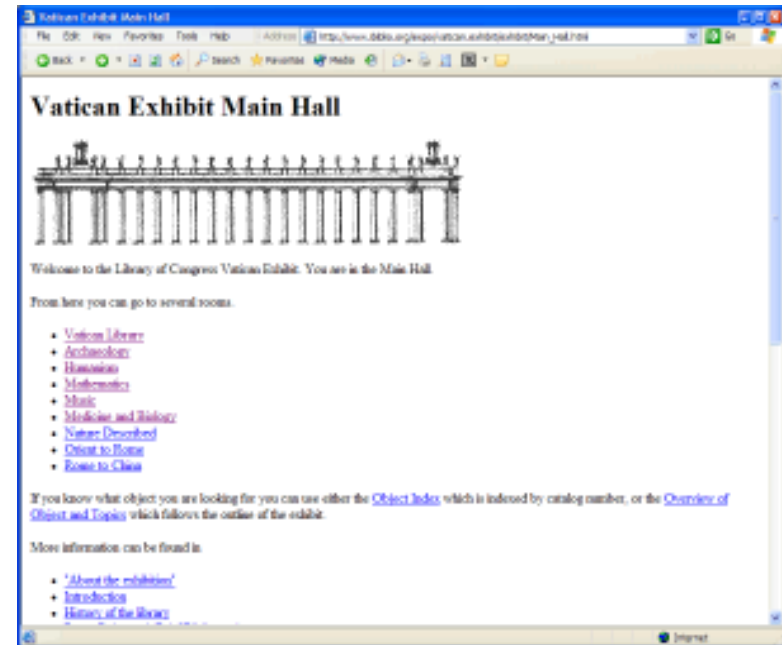
Figure 1: Frans Van Hoesel's *Library of Congress Vatican Exhibit*

the thumbnail image would bring the user to a hi-resolution digital image.

Van Hoesel's *Library of Congress Vatican Exhibit* soon became a popular destination on the World Wide Web. It even caught the attention of the Web's creator, Tim Berners-Lee, who enthusiastically described his first experience visiting the online exhibition:

> On my first visit, I wandered to a music room. There were a number of thumbnail pictures, and under one was an explanation of events that caused the composer Carpentras to present a decorated manuscript of *Lamentations of*

Jeremiah to Pope Clement VII. I clicked, and was glad I had a twenty-one-inch color screen: Suddenly it was filled with a beautifully illuminated score, which I could gaze at probably more easily and in more detail than I could have done had I gone to the original exhibit at the Library of Congress.[4]

While debates ensued about whether digital images could provide more detail than their real life originals as Berners-Lee proposed,[5] his reaction indicates the amount of enthusiasm that the new Web medium generated. The *Library of Congress Vatican Exhibit* illustrated that there was a lot of potential in using the Web as a virtual exhibition space. For example, it showed that museums could reach worldwide audiences using the Web. No longer would viewers have to physically travel to Washington D.C. to visit the Library of Congress during the hours of operation and fight potential crowds; they now could visit the exhibition from their own homes or offices at any hours they wished. Furthermore, the site showed that information sent over the Web had the potential to be organized and displayed in interesting ways. Van Hoesel's use of the museum architecture metaphor was one strategy of information design for online exhibitions; there would soon be countless others.

Today, a decade after the creation of the first online exhibition, nearly every museum in the developed world is expected to have some sort of Web presence. Researcher Maria Piacente has identified three general museum Web site types.[6] A museum Web site may contain elements of one or all three types. The most common type of museum Web sites are "Electronic Brochures."[7] These Web sites offer basic visitor information such as schedule, directions, hours and contact information. Secondly, there are "Virtual Museums" which aim

to take content directly from exhibitions and place it online. The third type of Web site which is referred to as the "True Interactive." True Interactive Web sites strive to take advantage of the Web medium's potential through creating online experiences which complement but are distinct from the museum experience. The use of the term "interactive" to describe hyperlinked digital media such as the World Wide Web is problematic because anytime a user engages with a media object, an interaction is occurring.[8] However, interactive has become an accepted term within museums and Web community and online exhibitions are commonly referred to as "interactive features." For this reason, this is the term I will use in this study as well. In a later chapter, I define interactivity in regards to online museum exhibitions. Furthermore, it should be noted that the interactive features that I discuss are not to be confused with exhibitions of artwork that exists solely on the Web, also known as net.art.

Over the past few years, broadband Internet usage has increased dramatically and will likely continue to do so for the foreseeable future. A recent study by the Pew Internet and American Life Project found that 48 million adult Americans (about a quarter of the adult population) have high-speed Internet access at home.[9] Just as museums were quick to embrace the World Wide Web as a new medium for exhibition in the early 1990s, they have also been quick to design for broadband. Through the use of multimedia file formats such as Flash, Shockwave and Java, online interactive features can now include not only graphics and text but also incorporate audio, video, animation and sophisticated user interactions. As a result, there is a growing trend among museums towards developing online interactive features in connection with exhibitions. With this growing trend comes

the question of how museum exhibition teams can design an interactive feature that will maximize the Web medium's potential and provide a worthy benefit to both the museum and its physical and virtual visitors. This thesis seeks to explore this question through a survey of current online exhibitions and a case study analysis.

Pattern Language: Clothing as Communicator is an exhibition to be held at Art Interactive, a small non-profit art gallery in Cambridge, MA in early fall 2004. *Pattern Language* is comprised of artworks that explore clothing, fabric and the body as means to communicate and interact between wearers, between wearers and their clothes, and between the makers of clothing and the fashion system. As the Web designer on the *Pattern Language* exhibition team, I am developing an interactive feature as an online companion to the show. My involvement prompted me to select this project as a case study because I am in a unique position to describe the design and development process of a museum exhibition Web site from the viewpoint of a participant and observer.

In developing the project, I used a method that can be characterized as design research, which author Brenda Laurel describes in her book *Design Research* as the "why" behind the design.[10] Laurel's driving hypothesis is that there is a "direct relationship between the quality of the design and the willingness of the designer to take on mindful explorations of what lies beneath a beautiful surface."[11] In conjunction with the design of the *Pattern Language* Web site, I researched how museums are designing Web sites for specific exhibitions. By trying to understand why certain features were developed and gauging how successful they were, I gained valuable insights to drive my own design. It is important to clarify my

design research did not occur solely before the start of the project. Instead, it continued throughout the duration of the project's development, providing an important basis for each design element and feature.

Therefore, this thesis study consists of two layers of research. From the designer's point of view, research is conducted into museums and the Web in order to inform the *Pattern Language* interactive feature design. This follows Brenda Laurel's notion of design research. As a scholar, my academic research for this thesis consists of an account of design processes, which encompasses the design research method.

In Chapter Two of this paper, I discuss the design research, which includes analysis of current literature on Web museology and interaction design, a survey of relevant works and exhibitions, as well as interviews with professionals and academics working in the field. A rich resource is the Museums and the Web Conference, held by Archives and Museum Informatics annually since 1997. The conference's Web site includes proceedings, full papers, and links to the museum Web sites nominated in the "Best of the Web" competition. I examined Web sites found through these links because they are considered by the museum community as setting a high standard. I also gathered information through interviews with professionals working as interaction and Web designers, museum curators and academics who focus on new media, as well as members of the exhibition team for *Pattern Language*. Furthermore, this thesis is concerned with the impact of a new media (the Web) on an older institution (the museum) and the works of Walter Benjamin and Lev Manovich provided a useful framework for examining this issue.

This literature helped me to locate the role of the interactive feature within the overall museum curatorial mission. In what ways do interactive features support the museum's curatorial mission? As these online projects become more common, does their existence in any way alter the museum or gallery's curatorial mission? I also sought to discover the specific characteristics of museum interactive features that create a compelling user experience. For example, in what ways can these online exhibitions act as communicative, educational and entertaining experiences? Finally, I looked at the relationship between the digital online exhibition and its physical counterpart. Which features are best suited for the Web, which features are best suited for the he museum gallery and which are successful in both? Once a collection goes online, it becomes deterritorialized. Is it possible to recreate a sense of place online? If it is not possible, what kind of space is created? Specific to *Pattern Language*, research was conducted into the exhibition's subject matter of art and fashion. Also, I tried to form an understanding of the exhibition within the context of Art Interactive.

In Chapter Three, I discuss how my explorations of these questions informed my work on the *Pattern Language* Web site. Working hands-on on the design and development of the *Pattern Language* project allowed me to test whether or not what I found successful in other museum Web sites could be applied to a different project. After the completion of the design process, I make a set of recommendations for museum exhibition teams who are developing interactive features. Through answering the questions of how an interactive feature can benefit a museum and its visitors as well as testing this question on a real project, my intention is to make this thesis document a useful resource for museums and galleries that are considering creating interactive features for their exhibitions.

FOOTNOTES

[1] It should be noted the distinction between the terms "Internet" and "World Wide Web." They are often mistakenly used interchangeably. The Internet refers to the networking structure that connects computers all over the world, as long as they are connected to the Internet. The World Wide Web, which exists as part of the Internet, is an information-sharing model. The Web utilizes browsers to view Web pages connected to one another through hyperlinks. The Webopedia's explanation of this difference can be viewed at <http://www.webopedia.com/DidYouKnow/Internet/2002/Web_vs_Internet.asp>

[2] The United States. The Library of Congress. *Rome Reborn: The Vatican Library & Renaissance Culture.* 1 July 2002. <http://www.loc.gov/exhibits/vatican/toc.html>

[3] Van Hoesel, Frans. *Library of Congress Vatican Exhibit.* <http://www.ibiblio.org/expo/vatican.exhibit/Vatican.exhibit.html>

[4] Berners-Lee, Tim. *Weaving the Web.* New York: Harper, 1999: p. 59.

[5] With the introduction of new media inevitably comes a debate over whether it is better than the original. On one hand, a digital image of an artifact can be created at multiple magnifications, providing details that are unable to be detected by the naked human eye. On the other hand, other sensory characteristics such as the smell, weight, taste and sound of the artifact add details that may not be able to be fully described in the digital.

[6] Teather, Lynne and Kelly Willhelm. "'Web Musing: Evaluating Museums from Learning Theory to Museology." in Bearman, Daivd and Jennifer Trant (eds.) *Museums and the Web 1999: Selected Papers from an International Conference.* Pittsburgh, PA: Archives and Museums Informatics, 1999: p. 132. Teather and Willhelm reference Piacente, Maria. "Surf's Up: Museums and the World Wide Web." University of Toronto Research Paper, Master of

Museum Studies Program, 1996. I have been unable to obtain the original paper by Piacente.

[7] In a student-conducted survey of 33 museum Web sites in 1997, it was found that the largest percentage of respondents (30%) described the primary purpose for a museum Web site to be promotion/marketing. This is cited in Teather, Lynne. "A Museum is a Museum is a Museum...Or Is It?: Exploring Museology and the Web." Museums and the Web98 Papers. Archives & Museum Informatics, 1998. <http://www.archimuse.com/mw98/papers/teather/teather_paper.html>

[8] For a further discussion on the problems with the term "interactivity," please refer to the section entitled "The Myth of Interactivity" in Manovich, Lev. *The Language of New Media*. Cambridge, MA: The MIT Press, 2001: pp. 55-61.

[9] "Study: 2 in 5 Web users now have broadband at home." CNN.com, April 19, 2004. <http://www.cnn.com/2004/TECH/internet/04/19/broadband.study.ap/index.html>

[10] Laurel, Brenda. (ed.) *Design Research: Methods and Perspectives*. Cambridge, MA: The MIT Press, 2003: p. 16.

[11] Ibid. p.316.

CHAPTER TWO: MUSEUMS AND THE WEB

2.1 Supporting the Curatorial Mission

Before exploring the place of the Web in museums, it is important to first understand what museums are and the roles they fulfill within society. The International Council of Museums defines a museum in Article 2 of their Statutes as the following:

> A museum is a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment.[1]

It also later states in Article 2, section IV that "non profit art exhibition galleries, conservation institutes and exhibition galleries permanently maintained by libraries and archives centres"[2] are also included in this definition. Art Interactive in Cambridge, MA, the host institution for *Pattern Language*, falls into this particular category.

This definition of a museum was adopted in 1995, before the World Wide Web had a large impact on the field. The passage regarding the "material evidence of people and their environment" implies that analog and digital reproductions of artworks are not included. In a 2001 amendment, the Web was acknowledged by the expansion of the definition of museum to include "cultural centres and other entities that facilitate the preservation, continuation and management of tangible or intangible heritage resources (living heritage and digital creative activity)."[3]

There are several ways in which the World Wide Web can be used to promote a museum's mission, as defined above by the International Council on Museums. The museum is a visible, public institution in its community. It is a landmark that is a source of civic pride and provides a place where citizens can gather and hold special events. Museums also provide an economic benefit to their host communities by creating jobs, attracting tourists and business activity. For example, the Metropolitan Museum of Art in New York City attracts an impressive five million visitors every year.[4] To support this, Web site can generate publicity about the museum to potential visitors, employees, members and donors. Furthermore, some museums have begun selling gift shop merchandise online in order to generate revenue to cover the museum's operating costs.

Museums also serve as storehouses for precious cultural artifacts. Increasingly, electronic databases are used a tool to catalogue these artifacts. Metadata such as descriptions of the artifact, its creator, date, etc. can be entered into an electronic database to be easily searched and organized by museum professionals These databases can be made accessible on the World Wide Web, so that museum professionals from remote locations can work together in their research and in developing exhibitions.

Finally, the museum interfaces with the public through the exhibition of the cultural artifacts. Curators will select appropriate artifacts and organize them into meaningful displays accompanied by relevant information. Additionally, educational activities and programs for the public such as

tours, school curriculum, and lectures are often developed around the exhibitions. As a result, exhibitions provide a worthwhile educational and entertaining experience to visitors. The main focus of this thesis research is to explore how the Web can be used to support or enhance museum exhibitions through the development of interactive online exhibitions. These exhibitions are further described by Marc Tinkler and Michael Freedman of Plumb Design:

> ...a museum's web site should become an extension of the museum itself, and provide a virtual space for online exhibitions. It can use the Internet as a medium in and of itself, providing thought provoking exhibitions designed explicitly for the online experience. These exhibitions should exploit the qualities of the digital medium, and use them as opportunities to explore areas that would otherwise be impossible in a physical museum environment.[5]

Also key in the understanding of the effectiveness of the museum exhibition on the Web is to recognize who makes up the target audience of physical and virtual museum visitors. It would be impracticable to pinpoint each individual user's agenda, but some general observations have been made. In their paper, "Virtual Visits to Virtual Museums," Jonathan Bowen et al. refer to museums as "information providers" and their visitors as "information gatherers."[6] Once the museum (the provider) delivers the amount of information sought by the visitor (gatherer), a positive and memorable experience will be the result. Therefore, a museum must strive to provide the amount information that its visitors seek, even if it varies from person to person. It was suggested at the 1999 Museums and the Web Conference that these visitors can be separated into three general types—tourists, students and experts.[7] Tourists seek basic information that is clear and easy to understand, often in the form of spatial or graphical representation such as diagrams and maps. Often, a tourist's visit to the exhibition will be the first time that he or she has come across this material. Students, on the other hand, have a background understanding of the material and would like access to more detail information on a range of related topics. Finally, experts would like to have all information available and are capable of navigating through it themselves with little support from the museum. As with physical exhibitions, designers of the online exhibitions face the challenge of providing information that can appeal to and hold the attention of these diverse groups. In "Information Design in Informal Settings: Museums and Other Public Spaces," author C. G. Screven further articulates the challenges involved:

> ...an exhibit's content, organization, and presentation must (a) provide positive reasons for paying attention to them by creating personal connections, supplying shareable information, and presenting challenging tasks; and (b) minimize such negative reasons for avoiding exhibits as impersonal tone, passive formats, unfamiliar terminology, information overload, and confusing presentations.[8]

2.2 Comparing Physical and Digital Exhibition Features

Though a museum exhibition and its Web site may represent the same content, they provide different experiences. One cannot replace the other. Instead, the physical and virtual exhibitions can have unique characteristics that are different. In this section I examine features of virtual exhibitions and compare them to their physical counterparts, citing specific examples from current museum Web sites. Key features discussed include digital representation, global reach, contextualization, education and community. What are the

strengths and shortcomings of the virtual and physical exhibitions in relation to one another? How can the virtual and physical experiences be combined to provide a compelling and memorable experience for visitors? Finally, what can designers of interactive museum features learn from these examples?

Digital Representation

The clear difference between a physical and virtual museum exhibition is that the physical exhibition contains the actual artifact whereas the virtual is a representation of that artifact. Close physical proximity to an actual artifact provides the user with many senses such as scale, smell, touch and detail that is hard for a digital representation of that artifact to convey. For example, prior to my first visit to the Museum of Modern Art, I had seen countless reproductions of the Claude Monet's *Water Lilies*. However, the coffee table books, Monet calendars, mugs, umbrellas and the like did not impress me. However, viewing the actual painting changed my opinion. At the MOMA, a triptych of *Water Lilies* was hung on angled walls so that when a viewer stood directly in front of the middle painting, he or she would get the sensation of being surrounded by a pond filled with water lilies (Fig. 2). None of the representations could successfully recreate this sensation, the enormous scale of the pieces or the delicate light and shadows created by the paint texture.

In his famous 1936 essay, "The Work of Art in the Age of Mechanical Reproduction," Walter Benjamin would describe this as my experience with the aura of *Water Lilies*. For Benjamin, each work of art possesses an authenticity or aura that can only be experienced by a viewer through his or her

Figure 2: Monet's *Water Lilies* at the Museum of Modern Art, New York

physical proximity to the original. When that object gets reproduced, its aura becomes depreciated:

> The situations into which the product of mechanical reproduction can be brought may not touch the actual work of art, yet the quality of its presence is always depreciated...The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced. Since the historical testimony rests on the authenticity, the former, too, is jeopardized when the historical testimony is affected is the authority of the object.[9]

In this passage, Benjamin writes very nostalgically about the loss of aura. However, in the same essay he also acknowledges the positive impact of mechanical reproduction. He argues that once a new mode of mechanical reproduction becomes adopted, it is futile to debate whether or not it can be classified as art. Instead, the question that should be asked is how does it inherently change the nature of the art? For Benjamin, these techniques of reproduction liberate an artwork from its "parasitic dependence on ritual"[10], allowing this piece of cultural heritage to be disseminated to the masses. As a result of their access to reproductions, the

masses are empowered with a new significance in contemporary life. They can even become involved in the production of a work of art as an extra in a newsreel or as a self-publisher.[11]

While Benjamin was referring to photography and film, the new media of his time, these insights can easily be applied to the World Wide Web. With regard to museums, how can the Web affect the nature of the museum exhibition? With an expanded, global target audience, museums may adjust their curatorial missions to place increased priority on the creation of online exhibitions that feature digital reproductions of artworks. These reproductions allow viewers that cannot physically attend the exhibition to still enjoy the museum's collections. On the other hand, potential museum visitors may lose the desire to visit the exhibition and view the original artifacts because they have already seen the representation. In both of these cases, the reproduction acts as a substitution for the original. According to Benjamin, the proliferation of reproductions indicates "the desire of the masses to bring things 'closer' spatially and humanly, which is just as ardent as their bent toward overcoming the uniqueness of every reality by accepting its reproduction."[12]

This idea of the reproduction as a substitute for the original is taken even further by Jean Baudrillard who discusses the notion of the simulacra, where the original does not exist, only its representation. Thus, the representation becomes the original. He writes:

> It is no longer a question of imitation, nor of reduplication, nor of even parody. It is rather a question of substituting signs for the real the real itself, that is, an operation to deter every real process by its operational double, a metastable, programmatic, perfect descriptive machine which provides

all the signs of the real and short-circuits all its vicissitudes. Never again will the real have to be produced—this is the vital function of the model in a system of death, or rather of anticipated resurrection which no longer leaves any chance even in the event of death.[13]

In thinking about Baudrillard's simulacra in the context of museums and the Web, a relevant example is the Franklin Furnace, an experimental art gallery that operated for over twenty years from a physical space in downtown New York. In 1997, the physical gallery closed down permanently due to financial difficulty. Determined to continue the mission, the museum director Martha Wilson relaunched the gallery in an online virtual space (http://www.franklinfurnace.org) where it continues to showcase avant-garde digital artworks and Web casts of performance art.[14] This could be interpreted as an example of the simulacra, where the Web gallery is a digital representation of a non-existent physical gallery. However, as evidenced by the born-digital works showcased by Franklin Furnace, a more appropriate interpretation is that the Web site is a new type of gallery space that is distinct from the physical, and therefore is not a reproduction of the artifact but is the artifact.

Characteristics of Interactivity

For this study, it is important to identify what characteristics of interactive features make them interactive. The term interactivity has become an overused buzzword and its meaning debated. On one side, Lev Manovich argues in *The Language of New Media* that all art is inherently interactive. He writes, "All classical, even moreso modern, art is 'interactive' in a number of ways. Ellipses in literary narration, missing details of objects in visual art, and other representational "shortcuts" require the user to fill in missing

information."[15] On the other side of the debate, Chris Crawford in his book *Understanding Interactivity* uses the metaphor of a conversation in order to define interactivity as a "cyclic process in which two actors alternately listen, think and speak."[16] He takes a quote from Plato's *Phaedrus*, in which Socrates remarks, "I cannot help but feel, Phaedrus, that writing is unfortunately like a painting; for the creations of the painter have the image of life, but if you ask them a question, they remain silent."[17] According to Crawford, interactivity is the core idea behind computing, where a conversation occurs between a human and a computer.

Taking these two interpretations of interactivity into account, when a person physically visits a museum and looks at an artifact, he or she will interact with it as Manovich describes, through a psychological interaction of filling in, forming hypotheses, and identifying. The digital representation of an artifact viewed on the computer screen allows the viewer to experience these same psychological interactions through the site. In addition to that, the computer allows users to begin a conversation that Crawford describes, by looking at, listening to or reading the information presented on the screen, making a choice about what he or she wishes to encounter next, and having the computer respond to that choice. While I acknowledge both interpretations, in the context of the World Wide Web, it is appropriate to define interactivity as this feedback loop that is characterized by the action and reaction between computers and users.

In his essay "Information Interaction Design: A Unified Field Theory of Design," Nathan Shedroff looks at the specifics of interactivity which includes feedback and control, productive and creative experiences, adaptive experiences and communicative experiences. Feedback and control refer to the amount of feedback the interface gives to the user and the amount of control a user has over that outcome. For example, the homepage of the Museum of Modern Art (http://www.moma.org) presents the user with ten different main links to choose from. These are Calendar of Events, Exhibitions Schedule, The Collection, Visiting the Museum, about MOMA, MOMA Learning, Research Resources, Publications, Support MOMA and Online Store. Selecting any of these main categories presents the users with further sub-categories of options. Therefore, through selecting particular links, the user creates his or her own non-linear path through the Web site.

Productive and creative experiences further engage users by allowing them to produce or create something. For example, the "Interactive Coloring Book" at the Keith Haring Kids Web site that allows users to produce and create their own Keith Haring-inspired compositions. In this feature, users can select several Haring doodles, compose them, color them and print out the results.[18]

Adaptive experiences refer to those experiences in which the behavior of the user can affect what content is shown to them. This is achieved through intelligent agents that report the user's behavior back to the program, which processes that data and displays user-specific tools and content. A good example of an adaptive experience is the popular e-commerce site, Amazon.com. When a user logs onto the Amazon site and browses for or purchases certain products, the program will remember which products he or she showed an interest in. Taking this information, Amazon will then recommend other products for the user to look at. In this case, the content is adapts itself for each specific user.
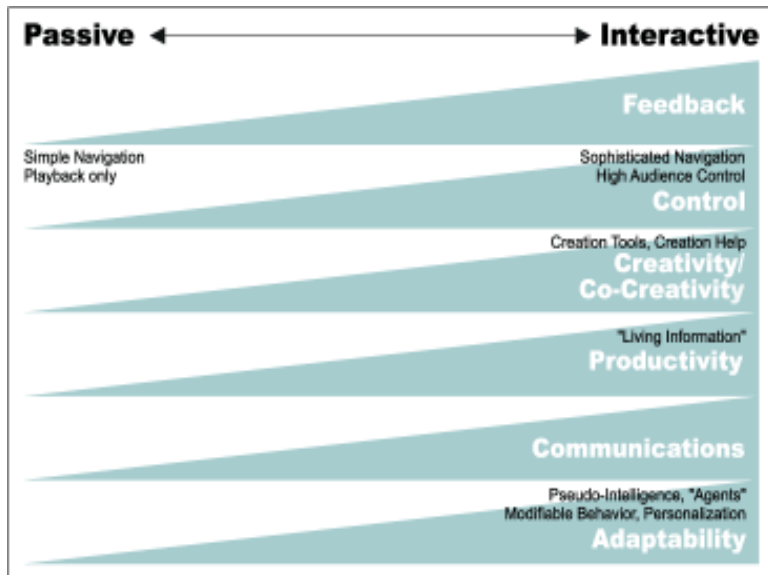
Figure 3: The Interaction Spectra

Communicative experiences allow users to interact with one another. At the Massachusetts Institute of Technology, the Metamedia research group is developing a shareable archive that allows teachers and students to communicate and learn via digital content.[19] For example, a media object (text document, image file, audio or video clip) will be posted into the archive. A user may view the file and post comments about it, as well as enter an online discussion with other users about that object.

Shedroff graphs these different characteristics of interactivity along a continuum, as illustrated in the Interaction Spectra (Fig. 3).[20] He notes that where the product or experience falls along the continuum does not make it good or bad; rather it should be judged on whether or not the amount of interactivity used is appropriate for achieving its goals. Therefore, an interactive feature for a museum exhibition need not incorporate all characteristics described above to be effective. Instead, in designing an interactive feature a museum exhibition team needs to determine the appropriate amount of interactivity specific to exhibition content that will provide visitors with the most appealing and engaging experience.

Reaching Audiences

Currently, museums deliver interactive content to audiences in several formats including kiosks, CDroms, the World Wide Web and recently, handheld computers. The kiosks and handheld computers require computer equipment that belongs to the museum and therefore, does not leave the galleries. In order to use the CDrom, a user needs to get their hands on a physical copy either through borrowing one from a library or purchasing one at the museum store. In contrast, the World Wide Web enables museum to deliver interactive exhibition content to an audience of millions for a relatively low cost. According to a survey conducted by Jupiter Media in September 2002, there are approximately 605 million people in the world with Internet access, with that number constantly growing.[21] Taking advantage of this, an online museum exhibition can overcome the geographical and time barriers to educate and entertain a global audience. Likewise, with so many exhibitions now online, museum visitors are no longer limited to experiencing content from museums that they can visit in person. For example, a medical student in the United States may not have the time or money to travel to Taiwan to view a special exhibition on traditional Chinese illustrated medical treatises. Instead, the student can still view and learn about these artifacts because the National

Figure 4: The National Palace Museum offers Traditional Chinese, Simplified Chinese, English, Japanese, Korean, French, German and Spanish versions of its site

Palace Museum has created a Web site for that describes and showcases works from the exhibition.[22] For people that do visit the museum, the interactive feature can be a way for them to extend their experience. The entrance fee to the museum may discourage someone from visiting an exhibition multiple times, but there is no limit to the number of times he or she can go to the Web site.

In developing Web sites intended for a global audience, barriers of language and access should be considered. In the physical world, museums that attract many international visitors will often provide exhibition brochures, audio tours and even guided tours in several languages to cater to the international crowd. Following this, an online exhibition can also be created in several different languages (Fig. 4).

On the other hand, it is harder to overcome the problem of universal access. Factors that limit people's access to the World Wide Web include a lack of network infrastructure, insufficient funds to purchase computers and accessories, lack of technical know-how, illiteracy and disability. The demographic of the 605 million Internet users is thus swayed towards the wealthier, educated population. Of these users, not everyone will be interested in accessing a museum exhibition's interactive feature. To get the most mileage out of their work, the designers should identify the audiences around the world that would be interested in and excited by the exhibition content and create a feature that best speaks to their interests.

Creating a Context

> Museums are essentially compromises…Their weakness is that they are necessarily homogenized—emptied of all connotations other than art. And that is, finally an artificial situation.
> -William Rubin, curator of the Museum of Modern Art Department of Painting and Sculpture from 1967-1988[23]

As Rubin suggests, an artificial situation is created by removing an artifact from its original context. For example, many masterpieces are the product of artists who were troubled, complex individuals living in the midst of turbulent times. Unless the exhibition is a retrospective of a particular artist's work, a singular piece only provides a small snapshot into an artist's world, with minimal information on the artist's other works, life, and influences before and after the piece. A singular piece may hold meaning to students or experts

already familiar with the subject matter. However, without mediation from the museum, it would be hard for visitors that have never seen the work before to grasp it fully. A lack of understanding about the artifact and its context may result in the viewer's lack of interest and a missed opportunity to educate the viewer about the artifact's importance. Interactive features are a way to evoke this missing context and relate the story behind the artifact.

Current contextualization devices employed by physical museum exhibitions, such as wall labels and guided tours have several advantages and disadvantages in comparison to an interactive feature. Mounted next to exhibition pieces, wall labels are limited in size so as not to be visually distracting. Wall labels are only a few paragraphs at best and seem definitive. It becomes a great challenge for curators to decide the tone of these descriptions. Should they speak to visitors who are unfamiliar with the work and want clear, concise information or to students and experts who want access to deeper theories and texts? Also, a viewer needs to stand close to the wall in order to read the small text on a wall label and are therefore unable to see the artifact as a whole while simultaneously reading its description.

An interactive feature, on the other hand, does not have the same space limitation as wall labels. Although the computer monitor has a limited screen size, information can be layered deeper into the Web site. For example, the first screen of an online exhibition can contain a digital image of an artifact with its basic information such as title, date and creator. This can link to additional screens that reveal more information, appealing to the three categories of viewers (visitors, students
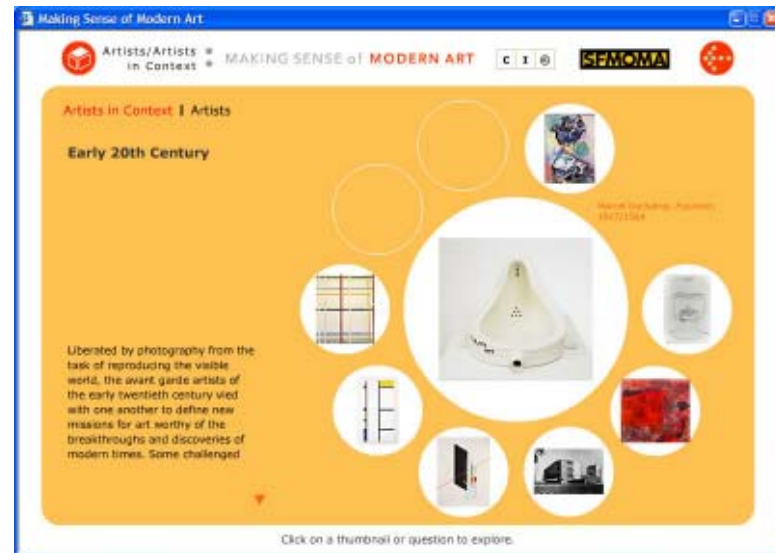
Figure 5: SFMOMA's *Making Sense of Modern Art*

and experts) by giving them the ability to choose how much of the story behind the artifact they wish to explore.

The San Francisco Museum of Modern Art uses this approach in the interactive feature, *Making Sense of Modern Art* (http://www.sfmoma.org/MSoMA/).[24] This feature takes individual works from the museum's collections and allows the viewers to zoom in on each one, by viewing details, watching related video footage, and listening to commentaries by artists, curators and collectors. It also demonstrates how these works relate to one another and within the greater cultural context. Visiting *Making Sense of Modern Art,* it is apparent that any one artifact is an infinitely rich source of historical and educational material.

Figure 6: SFMOMA's *Making Sense of Modern Art*

At the *Making Sense of Modern Art* Web site, I chose to zoom in on one particular piece that was displayed, Marcel Duchamp's *Fountain*. On the screen that I first found this piece, it was surrounded by thumbnail images of other Early 20th Century works such as a Matisse, a Klee and a couple of Mondrians (Fig. 5). This gave me a sense of what other influential works were being created during that time period. The only information listed about *Fountain* I received was its title, creator, date and image. At this point, I can decide that I now have all the information I want about this artwork, or elect to explore it further.

Clicking on the thumbnail of *Fountain* takes me to another next screen.   Here, there is a larger image of Fountain and more information. Clicking on the larger image launches another screen, with an even greater enlargement that can be panned and zoomed. There are also several questions designed to get viewers thinking about the piece, all of them linked to more information. One of these questions is, "*Fountain* is called a 'ready-made.' What's that?" Clicking on this leads to yet another screen where I can listen to archive audio of Duchamp himself discussing ready-mades and view video of related works by Duchamp (Fig. 6).

Physical museums may offer to mediate the visitor's experience through tours guided by docents, audio devices or more recently, hand-held computers. The strength of the docent tour is the opportunity for personal interaction with both the docent and other visitors on the tour. Visitors can ask questions about the exhibition as they occur to them and get immediate feedback. Unlike the wall labels, the viewers can stand at an optimal viewing distance from the exhibition piece while listening to its description.

It is hard for digital media to provide a satisfactory substitute for face-to-face, real-time interaction but several features can recreate aspects of the guided tour. There can be audio clips of docents, curators or even the artists themselves discussing the work. There is also the option to set up online chat events around certain exhibitions, though that would require a lot of pre-chat promotion to recruit participations, as well extra work in moderating discussions.

Of course, the guided tour has its limitations. Firstly, the visitor must follow the docent's pace. If there is a work that a particular visitor is not interested in, it would be harder to get the docent to stop discussing it, especially if the other visitors on the tour are interested. On the Web, sites can be set up to give viewers a choice over what they explore.

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Audio tours, because they are self-guided, offer the museum visitor more flexibility. In an audio tour, a visitor carries a headset and controller through the gallery to listen to pre-recorded descriptions of artifacts. The visitor has control over which pieces he or she wants to learn about via fast forwarding, skipping or repeating. Like the docent tour, the audio tour allows viewers to see the work while listening to its description. Unlike the docent tour, visitors cannot ask questions. Additionally, an audio tour will can have several language options to accommodate a wider range of users.

For both types of guided tours, descriptions of pieces must be kept to a reasonably short length because visitors get physically tired from standing too long. They are only offered at during museum hours, whereas the Web site can be viewed from the comfort of one's home or office and accessed 24 hours a day.

In summary, one of the interactive feature's strengths is that it allows museums to provide multiple levels of content about exhibition artifacts that are not subject to the physical limitations of traditional contextualization devices such as wall labels and audio tours. The amount of information uncovered by the users is a direct result of how much they choose to engage with it. Thus, a more complete story about the significance of the artifact and its place within a greater cultural context can be revealed through a multiplicity of representations and interpretations.

Education

Collections of artifacts are a rich resource for education and it is up to the museum exhibition curators to discover the best ways in which to unlock this potential. The World Wide Web has provided museums countless new ways to present information for educational purposes as well as expand their reach to much broader audiences. The Web's support of the museum's educational initiatives lies at the intersection of two extensive topics—museums and education and digital media literacy. For centuries, museums have played an educational role in society.[25] In the past decade, pedagogical debates have developed over how to use digital materials as part of media literacy initiatives in the classroom.[26] Although a full inquiry into these two areas is beyond the scope of this paper, I will touch on a few points relevant for this thesis study.

As I have discussed earlier, this includes interactive features that can provide a context around museum artifacts and give visitors an awareness of why they are considered significant to their culture and histories. To further engage visitors with this content, museums also may offer a wide range of programs within their facilities—artist talks, lectures, conferences, tours, demonstrations and workshops. With the Web, programs do not have to be limited to visitors that can physically go to the museum. Instead, description, transcripts, audio and video of events can be accessed online.[27] Museums can also play a role in schools, by developing and distributing curriculum guides around exhibitions. The Web acts as a distribution channel that allows museums to reach many more schools. Coupled with an exploration of an interactive feature, online curriculum guides allow teachers and students from remote locations to learn from the museum's collections as well.

In developing educational curriculum around exhibitions, it is crucial for museums to understand the needs of teachers and students. By partnering with teachers, museums can develop

material that best serves targeted age groups and meets national education standards. For example, teachers interested in presenting modern art in a classroom environment felt that they had the insufficient tools to explain the unfamiliar concepts to students. They looked to the Tate Modern in Britian for support. In turn, the Tate identified the Web as the ideal medium in to deliver these learning experiences. Toby Jackson, the Head of Interpretation and Education for Tate Modern, describes:

> We felt that the internet would be the ideal platform for this resource due to the greater availability of computers within schools, but mainly because of the enormous potential of this medium to bring about innovative and exploratory approaches to learning.[28]

In late 2001, the Tate Online launched a series of interactive features that focused on specific works of contemporary art and contained educational content. The first project in the series is the interactive feature built around an installation by the artist Damien Hirst, *Damien Hirst: Pharmacy* (http://www.tate.org.uk/pharmacy/).[29] The Web site features a 360 degree panorama of the installation where notable objects highlight as the user mouses over them and can be clicked to reveal more information about that object (Fig. 7). Also included are a biography of the artist, images from installations of Pharmacy at other galleries and a section for educational activities.

The activities section contains questions that are intended to generate thinking and discussion about the art work. It is directed towards two audiences—families and school. The discussion questions in the family section are more general, in order to promote interaction by children and their parents around the subject matter. Questions include "What is the

Figure 7: 360 Panorama from *Damien Hirst: Pharmacy* Web Site

difference between a real pharmacy or chemist and Damien Hirst's *Pharmacy*?" and "Do you think this is an unusual subject for art?"

In the Schools section, the questions are more specific because they are geared towards children of certain key stages, the British equivalent of grade levels. Discussion questions are centered around themes for the different key stages—"Health and Healing" for Key Stage Two, "Mortality" for Key Stage Three and "The Idea of Installation" for Key Stage 4.

Another, more subtle way of presenting educational material to students is through fun and game activities. Physical museums often have activity and game areas where children can learn through playing by reading, drawing, building and touching objects of relevance to the museum's collections. On the Web, these activities manifest themselves as online games. In the activities section for *Damien Hirst: Pharmacy* is an arranging game where users can create compositions by arranging images related to medicine and pharmacies. Also on the Tate Online is the *Tate Art Detective* (http://www.tate.org.uk/detective/mysteriousobject.htm), where visitors go on an interactive mystery caper, solving clues about

Figure 8: *Tate Art Detective*

"mysterious" artworks from the museum (Fig. 8). At the Haring Kids Web site, users can play games such as picture puzzles, tic-tac-toe and hangman that feature the artwork of Keith Haring. These are just a few of the many examples of online educational games developed by museums.

Community

Museums foster sense of community by providing a place where people can physically gather to meet and interact with one another. With the Web, the potential exists for museums to connect people remotely and create a virtual community via online tools such as message boards, forums and chats. In conversations with several museum professionals and academics as well as in literature published about museums and the Web, I've found that the idea of building a community is considered by many to be compelling and a future direction to be pursued. Yet, I've found few examples of online public communities dedicated to museum exhibitions.[30] The greatest impediment is the amount of funding and resources needed to build and maintain an online community. Technical

infrastructure needs to be built and community managers must be hired to monitor the discussions. Therefore, the building of online communities by museums would need to happen on a larger scale, rather than around specific exhibitions.

A useful model for encouraging an online interactions and discussions around collections is Metamedia, a digital archive and learning application currently being developed by a research team at the Massachusetts Institute of Technology.[31] Metamedia is an online digital repository in which teachers and students can create collections of media objects such as text, image, audio and video files to organize, annotate and share with others. Users are given the ability to leave comments about individual objects or groups of objects, encouraging an ongoing discussion about the content. While many museums may not have the funding or resources to develop technically complex frameworks, it is possible to seek out mutually beneficial partnerships with universities. Museums can then draw upon a university's technical expertise while in exchange, offering access to the museum collections for educational use in classes and libraries. In fact Metamedia is currently developing archives with the Marais Museum in France and the Deutsches Museum in Germany.

Other Considerations

Other key consideration in looking at museums and the Web include maintenance and archiving. For museums, the maintenance of a Web site could be a blessing or a curse. Web sites do not have the same type of finality as print media. Therefore, content can get updated, added and errors can fixed. On the other hand, if something becomes out-of-date, museums may feel more pressure to keep content current and

Figure 9: The Metamedia digital archive framework allows users to create discussions around objects in the archives.

this may occupy valuable manpower in institutions with limited resources.

Another issue to be considered in regard to the use of the World Wide Web is that of archiving. For the short term, the online exhibition is an excellent way of providing a record of temporary exhibitions. Viewers can continue to view and learn from the works after the exhibition has dispersed and all the pieces have returned to their respective homes. However, this will only be useful so long as the museum takes on the responsibility of migrating the interactive features to be compatible with the latest online file formats.

A larger issue is archiving works for the long term. Today, all types of information are being stored and distributed via digital formats. Rapid obsolescence of computing hardware and software poses a large obstacle to creating a lasting archive for digital works. For example, in Britain in the mid 80s, the BBC Domesday Project archived a great deal of material onto video discs that are incompatible with today's computers.[32] If a data storage technology becomes obsolete in only a few years, how can it be saved for the long term?

While no perfect solution to this question has yet been found, many institutions are launching initiatives, such as the United State Library of Congress National Digital Information Infrastructure and Preservation (NDIIPP) program and the Guggenheim Museums' Variable Media Initiative to address this problem. Designers of interactive features can contribute to the solution by creating detailed documentations of their works for the benefit of future users or archivists. This includes providing project screenshots, writing a description of the project and how it should run, what files formats are used, and the type of hardware and software that is required to run them.

2.3 Relating Physical to Digital

In designing an online interactive feature as a complement to a physical museum exhibition, many questions arise about how the physical and virtual spaces relate one another. To what extent should the Web site's structure and design reflect the physical exhibition? Which features should be copied from one venue to another and which should be abstracted? In different cases, different solutions are appropriate. In this section, I examine three diverse strategies used for

Figure 11a and 11b: *Yin Yu Tang* physical and virtual exhibitions

incorporating the physical with the digital. I look at the Peabody Essex Museum *Yin Yu Tang, A Chinese Home*, where there is little connection between the physical and digital. Next, I will look at the SFMOMA's *010101: Art for Technological Times*, where celebrating the physical/digital connection was a guiding design principle. Thirdly, I look at a fuller integration of an interactive feature with a physical exhibition in Tate Modern's handheld computer-guided tours.

Peabody Essex Museum Yin Yu Tang
In 1997, the Peabody Essex Museum in Salem, Massachusetts acquired an historic Chinese home, Yin Yu Tang. Yin Yu Tang was dismantled from its original location in China and re-erected as the centerpiece of a large new expansion for the Peabody Essex Museum that opened in the summer of 2003. As part of an exhibition on Chinese culture, visitors can tour the house as well as accompanying galleries that display artifacts that are related to the house and its history.

To accompany to this prominent new exhibition, the interactive feature *Yin Yu Tang, A Chinese Home* was designed (http://www.pem.org/yinyutang/) by the museum exhibition team in conjunction with Second Story Interactive Studios. This Web site, which has gone on to win several design awards, provides a multimedia experience that includes images of the house and its artifacts, audio commentary by curators, restorers and former inhabitants of the house, video footage from the province that the house came from, 3D reconstructions, animations and Quicktime VR through the house and its neighborhood.

The physical and virtual exhibitions offered two very different experiences (Fig. 11). At the museum, visitors to the Yin Yu

Tang house are only allowed into the house as part of a guided tour and cannot linger inside afterwards due to the fragile nature of the house. The web site consists of 5 different themed "tours" of the house—Orientation, Construction, Ornamentation, Belongings and Preservation. Therefore, an online visitor can experience the house in several ways and stay as long as he or she likes rather than in the singular, timed fashion of the physical visitor. The exhibition design of the galleries is very neutral (white walls, wood floors, glass cabinets) so that the focus can be on the artifacts. In contrast, the design of the interactive feature interface is very noticeable, using color coding to indicate different sections and elaborate Chinese-influenced graphics. The only allusion to the Web site in the physical space occurs in the gallery's reading room where there are two computers with the interactive feature on them. However, because the actual artifacts are in the museum, few people were looking at the virtual representations of them.

In an email correspondence with Jim Forrest, the Web Creative Director at the Peabody Essex Museum, I learned that the few shared connections between the physical and virtual *Yin Yu Tang* exhibitions were intentional. A visitor should have different experiences when visiting either exhibition. For example, my visit to the museum was a one-time, special event. My boyfriend and I took the train from Boston to Salem and spent an enjoyable afternoon roaming the museum galleries and discussing what we saw. As an interaction and Web designer, I consider the *Yin Yu Tang* on the Web to be an exciting work that I return to again and again for inspiration. A friend of mine is also using the Web site as a resource, not for interactive design inspiration, but for information on her studies of Chinese architecture. Therefore, I believe that if

both the physical and virtual spaces uphold the overall exhibition's intent (in this case, to educate people about the architecture of a Chinese house and how it was lived in), then it is unnecessary to mimic each other in structure and design.

010101: Art for Technological Times
In 2001, the SFMOMA launched an ambitious show about the impact of technology on our lives. The exhibition, *010101: Art for Technological Times* included animated "paintings," virtual reality art, cyborg sculptures and net art. When exhibition planning started, San Francisco was at the epicenter of the dot-com boom. There was an atmosphere of enthusiasm for and the desire to experiment with the Web as an exhibition space. Therefore, the museum exhibition and Web site were considered equally important venues and one firm, Perimetre-Flux, was hired to do the design for both. Stephen Jaycox, the Website designer from Perimetre-Flux, described the challenge this posed:

> …this was the area of unfamiliarity for us—was to figure out how to bridge the relationship between the gallery space and that web site, such that it was meaningful and not just necessarily based on similarities that were only surface characteristics.[33]

There were two main ways this relationship was highlighted. The first was through the Think Texts feature. On the Web site, visitors were able to post their comments in online discussions about the exhibition. These quotations (i.e. Think Texts), along with critical texts about the exhibition, would be stored in a remote database. Random quotes would be pulled from this database and displayed in computer screens around the gallery. By making both the physical and Web exhibitions pull content from the same technical infrastructure, the

Figure 12a and 12b: *010101: Art for Technological Times* physical and virtual exhibitions

designers hoped to erode the perceptual threshold between the two experiences.

The actual installation of the Think Texts in the gallery ran into countless difficulties which caused them to not fulfill their original design intent. The Information Systems and Services team planned for the computers to be networked through a wireless connection. The exhibition designers created metal boxes to contain and display the computers. A lack of communication between the two teams caused them to discover too late that the wireless signals could not penetrate the metal boxes. At the last minute, it was decided not to network the Think Texts. Instead, Think Texts played locally off the machines and did not pull quotes from the remote database.[34]

Another way that the relationship between the physical and digital was highlighted was in the decision not to show the works of net art in the museum gallery. Instead, visitors were given the URL to the *010101* Web site. The exhibition curators reasoned that the net art pieces were not meant to be viewed in a museum space but rather individually, from one's home computer. By not allowing visitors to view the works, it sent the message that the exhibition Web site was not just a representation, but a primary exhibition venue as well. The experimental interface design for the Web site was intentionally not very transparent. Just as visitors to the physical museum had to maneuver through the building in order to see the art work, the Web site visitors would similarly need to maneuver through the unconventional virtual spaces to find the net art pieces. This generated criticism of the Web site's usability and even one of the creators of a net art piece was concerned that users would not be able to find it and posted its URL on

the Nettime discussion list in order to bypass the *010101* Web Site portal.[35]

When both the physical and virtual venues for *010101* launched, they were the first of their kind. The exhibition team took a risk and decided to challenge visitors notions of exhibition by attempting to blur the boundary between the museum and the Web. In this aspect, the exhibition was a valuable experiment, as well as major milestone for new media art.

Tate Multimedia Tour

A third strategy for the relating the interactive feature to the museum exhibition is practiced by the Tate Modern in their development of a multimedia tour.[36] Since 2001, the Tate Modern has been developing multimedia tours in which visitors are given network-linked mobile devices to accompany them through the museum galleries (Fig. 12). Like the online interactive features I have discussed, the feature contains text, images, audio and video, as well as interactive features such as games and limited text-message communication between visitors taking the Multimedia Tour. The difference is that both the physical and virtual are experienced simultaneously, with the design of the interactive feature wholly dependent on the user's physical presence in the galleries.

A visitor locates an artwork through one of two ways—through an interactive map on the mobile device which shows where to find artworks discussed in the tour or by locating a special multimedia tour symbol and number next to an artwork and using the device's keypad to enter that number in. Once in front of an artwork, the interactive feature will typically present images accompanied by audio. If video clips are used, they

Figure 12: Tate Modern Multimedia Tour

are kept short so as not to detract the user's attention away from the physical artwork for too long. The designers of the tour found that zooming into details of an artwork on the digital screen was a successful way of helping people to locate those details in the physical work.

In the several iterations and trial runs of this tour, the feedback from users was overwhelmingly positive and the Tate Modern plans to continue development of the tour with the end goal of instating it as a permanent museum activity.

The use of mobile devices in museums is an interesting area to pursue and may represent a future norm. However, in the context of this study on online interactive features, the multimedia tour is limited by the fact that it is solely intended

for physical visitors to the gallery. Because the content is digital, it is very easy to place it online. As a suggestion, perhaps visitors can email to themselves or friends the interactive tour they followed to view again on the Web, thereby extending their museum experiences. Taking advantage of the devices' network capabilities, it would also be interesting if the interactions by visitors in the gallery could affect what is displayed in a Web component and vice versa.

The *010101: Art for Technological Times* exhibition and The Tate Multimedia Tour illustrate the relevance of Benjamin's "The Work of Art in the Age of Mechanical Reproduction" when looking at museums and the Web. In *010101*, the online feature is considered a separate but equal exhibition venue to the physical one. For visitors to the Tate Multimedia Tour, the digital component occupies a central role in the user's experience of the artwork. In both of the examples, the digital is considered the artifact and designed to be reproduced an infinite number of times over an infinite number computer screens. Without a clear authentic original, digital exhibitions are liberated from the traditional notion of aura and begin to impact the nature of the exhibition itself. This impact was indicated by the International Committee of Museums decision to amend their definition of a museum to include "digital creative activity."[37]

In this chapter, I described the design research I conducted, as per Brenda Laurel's model. This included the examination of several characteristics of interactive features, looking at how they are used to support museum curatorial missions and comparing them with their equivalents in the physical galleries. Additionally, I looked at three different strategies employed by museum exhibition design teams for relating the physical to virtual exhibition spaces.

This research benefits my work on the design of an interactive feature for the Art Interactive exhibition *Pattern Language: Clothing as Communicator*. Art Interactive is a small gallery whereas the majority of Web sites that I looked at were created by large, well-established museums such as the Tate in Britian and the San Francisco Museum of Modern Art. Due to the fact that these institutions are able to attract large amounts of funding, they have more resources to develop new and innovative interactive features. However, I believe smaller museums can draw upon valuable and at times costly lessons from learned the larger museum's attempts to build and improve upon this established body of work.

FOOTNOTES

[1] The International Council of Museums. "ICOM Statutes." 6 July 2001. <http://icom.museum/statutes.html>

[2] Ibid.

[3] Ibid.

[4] The Metropolitan Museum of Art Web. New York, NY, 2004. <http://www.metmuseum.org/visitor/faq_hist.htm>

[5] Tinkler, Marc and Michael Freedman. "Online Exhibitions: A Philosophy of Design and Technological Implementation." Museums and the Web98 Papers. Archives & Museum Informatics, 1998. <http://www.archimuse.com/mw98/papers/tinkler/tinkler_paper.html>

[6] Bowen, Jonathan, Jim Bennet and James Johnson. "Virtual Visits to Virtual Museums." Museums and the Web98 Papers. Archives & Museum

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[9] Benjamin, Walter. "The Work of Art in the Age of Mechanical Reproduction" in *Illuminations*, trans. Harry Zohn. New York: Schocken, 1968: p. 221.

[10] Ibid. p. 224.

[11] Ibid. pp. 231-232.

[12] Ibid. p. 223.

[13] Baudrillard, Jean. "The Precession of the Simulacra." in Wallis, Brian (ed.) *Art After Modernism: Rethinking Representation.* New York: The New Museum of Contemporary Art, 1984: p. 254.

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[15] Manovich, Lev. *The Language of New Media*. Cambridge, MA: The MIT Press, 2001: p. 56.

[16] Crawford, Chris. *Understanding Interactivity*. Chris Crawford, 2000: p. 6.

[17] Ibid. p. 9.

[18] Keith Haring Interactive Coloring Book. Haring Kids Web site. <http://haringkids.com/coloringbook/index.html>

[19] Metamedia. <http://metaphor.mit.edu>

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[21] Jupiter Media Corporation. "How many online?" Sept. 2002. <http://www.nua.ie/surveys/how_many_online>

[22] National Palace Museum. *Life is Worth More than Gold: A Special Exhibition of Ancient Medicinal Classics.* Taipei, 2003. <http://www.npm.gov.tw/exh92/medicinal9207/english/index.html>

[23] Newhouse, Victoria. *Towards a New Museum*. New York: The Monacelli Press, 1998.

[24] San Francisco Museum of Modern Art. *Making Sense of Modern Art.* <http://www.sfmoma.org/MSoMA/>

[25] The Museum of Alexandria, founded in the early third century B.C. by King Ptolemy I, was a campus for scholars of literature and science. The Ashmolean museum, which became the first public museum when it was established in 1683, was part of the University of Oxford. For an overview of museum history, see "Museum." Microsoft Encarta Online Encyclopedia 2004. <http://encarta.msn.com/encyclopedia_761557357/Museum.html>

[26] More information about media literacy can be found at the Center for Media Literacy Web site. <http://www.medialit.org/default.html>

[27] For more information about the Web casting of museum events, see the paper written by Noel Wanner about the efforts by the Exploratorium in Wanner, Noel. "Live@Exploratorium." Museums and the Web99 Papers. Archives & Museum Informatics, 1999. <http://www.archimuse.com/mw99/abstracts/prg_1132.html>

[28] "Tate Modern Awardee Profile." *Nesta*. March 2003. <http://www.nesta.org.uk/ourawardees/profiles/3435/index.html>

[29] Tate Online. *Damien Hirst: Pharmacy*. <http://www.tate.org.uk/pharmacy>

[30] Many private online communities around museums exist, but my focus is on the public ones.   Because museums exhibitions are often planned by people working remotely, it is common for a listserv or bulletin board to be set up to allow team members to communicate during the development of the exhibition.   For example, Art Interactive has a password-protected intranet.

[31] I am currently a graduate research assistant on the Metamedia research group.   For more information about this project go to the Metamedia Web site, http://metaphor.mit.edu

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CHAPTER THREE: PATTERN LANGUAGE:
CLOTHING AS COMMUNICATOR

3.1 Project Overview

As a designer/producer, it was important for me to find a hands-on project for where I could apply the knowledge I have gained through a survey of museum exhibitions on the Web. In this process of design research, critical analyses of related works play a guiding role in the design planning and development in order to produce a richer final result.

As a case study, I look at *Pattern Language: Clothing as Communicator,* an exhibition that brings together works of art dealing with fashion. *Pattern Language* is being organized by Art Interactive in Cambridge, where it will first be exhibited from August 20 through October 31, 2004. After this date, the exhibition will travel to several other venues through 2005. In this chapter, I discuss my experience as the Web designer on the exhibition team, where I spent several months designing and developing an interactive feature to accompany the show.

Institutional Context

Over the past several decades, artists have been embracing new digital technologies. As a result, there is a growing intellectual and artistic trend towards interactivity. Art Interactive, a non-profit art gallery located in Cambridge, Massachusetts was founded by Emanuel Lewin and Irene Buchine in 2001 to address this. The gallery provides a space where artworks that explore the meanings and possibilities of interactivity can be exhibited. The Art Interactive curatorial mission statement further describes the growing dialogue that surrounds the notion of interactivity:

...is interactivity confined to the artist/object-viewer relationship? How is the visual experience of the work impacted by viewer interaction? How does intentionality and indeterminacy impact the work? What obstacles does interactivity pose once works become collected objects and their preservation precludes the possibility of viewer participation?[1]

Thus, the visitor is an active participant in the artwork. It is through engagement with visitors that the works become complete. When designing the Web site for the *Pattern Language*, it is important to adopt a similar user-centric stance in which visitor engagement is given prominence. In my design, I am mindful of the need to express both the intent of *Pattern Language* exhibition and of the hosting institution, Art Interactive.

Art Interactive is situated about halfway between the Massachusetts Institute of Technology and Harvard University in Cambridge. The gallery's proximity to two of the nation's leading universities is an advantage. There is an especially high concentration of professionals and academics in the neighborhood. Such technology-savvy and knowledge-hungry individuals are likely to support the gallery by visiting exhibitions, making donations and volunteering. As a gallery that is just starting out, Art Interactive's success is highly dependent on the support it receives from the community.

All exhibitions at Art Interactive are guest-curated. The curatorial committee, which oversees the exhibition program and schedule, invites curators to submit proposals to the

gallery. The curatorial committee then decides which exhibitions to pursue.

Pattern Language: Clothing as Communicator

In the spring of 2003, Art Interactive Director Emanuel Lewin asked independent curator Judith Hoos Fox to submit an exhibition proposal. Soon after, Judith Hoos Fox suggested the showing the works of artist Patrick Killoran. However, many of Killoran's works are large scale and meant to be exhibited in exterior public spaces. This was not appropriate for Art Interactive, which is a small gallery space. While a solo show for Killoran was declined, several of his pieces deal with clothing and the body. Art Interactive's Associate Director, Winnie Wong suggested to Judith to develop a show around clothing and fashion. As a result, *Pattern Language: Clothing as Communicator* was born.

Pattern Language deals with clothing, which people interact with on a daily basis. Following Art Interactive's curatorial mission, the exhibition aims to make people rethink these interactions and see their relationship with clothing and the body in new ways. Visitors will also have the opportunity to try on garments, as well design and create their own. The description for the exhibition reads:

> The many functions of clothing vary culturally, geographically and through history. This exhibition investigates clothing as expression and fulfillment of human needs, here and now—needs of the mind, body and soul. It highlights works in which artists go beyond the everyday utility of clothing, and instead use clothing, fabric and the body to invent new forms of communication and interaction between wearers, between wearers and their clothes, and between the makers of clothing and the fashion system. The artists here have used the format of garments to critique standard notions about clothing, fashion and society. In

many of these works, artists use the familiar nature of clothing to help us imagine the impossible. The works in the exhibition are in most instances either unique or editioned pieces. The exhibition includes historical work, contemporary work and new proposals, as well as interactive and wearable editions, some commissioned specifically for this project.

At the time of this writing, there will be 32 works from 36 different artists in the show. Example pieces from the exhibition include Chris Burden's *L.A.P.D. Uniform* (1993), which consists of 30 enlarged L.A.P.D. uniforms, created in response to the 1992 Los Angeles riots. Alicia Framis' *Dior Dress from Anti-Dog Fitting Room* (2003) is a replica of a Christian Dior ball gown made out of a dog, fire and bullet-proof material, alluding to the dangers that women face in society. Yoko Ono's *Cut Piece* (1964 and 2003) is a video of a performance piece in which the artist's garments are cut from her body piece by piece, exposing her emotionally and physically.

Given Art Interactive's limited resources, organizing the *Pattern Language* exhibition is very challenging. In order to meet this challenge, Judith Hoos Fox has gathered a talented and dedicated team of individuals to collaborate on the exhibition. All team members are working on a volunteer basis and are motivated by a shared enthusiasm for the show and the desire to make it a success. As the exhibition planning gains momentum and interest develops, the exhibition team is growing. Currently, the team is comprised of Judith Hoos Fox, the lead curator, an assistant curator/exhibition coordinator, a fashion consultant, a media coordinator/development officer, three exhibition designers, a Web designer (my position), a textile conservator and an intern.

Members of the Art Interactive staff are also involved in the exhibition planning.

When I first learned about the *Pattern Language* in November 2003, there were no plans in place to create a Web site for the exhibition. Rachael Arauz, the assistant curator/exhibition coordinator and Stephanie Davenport, the media coordinator/development officer, asked me to create a promotional piece to inform potential funders and future venues about the show. Initially, they had discussed creating a video piece. At the time the exhibition checklist was still in a state of flux and they did not have images of all the works in the show. Because of the show's in-progress state, I suggested that they do a Web site instead. A Web site would allow them to reach a wider audience and could be constantly updated as new pieces were added to the show and when images came in. In addition to representing the works from the show, I proposed that the Web site that would be a well-developed interactive feature and would be a compelling experience to complement the physical exhibition. We presented this idea to Judith Hoos Fox, who was equally excited about it and the project was born.

The Pattern Language Web site will be housed on the Art Interactive Web site server and be linked to from the main site. This will be the first online interactive feature for an exhibition at Art Interactive. In the past, Art Interactive has generally not placed exhibition content online because the staff has focused on using the Web site to get people to come into the exhibition to get involved with the art physically and interact with one another. The philosophy adopted by the exhibition team for Pattern Language is that an online exhibition will encourage people who have not yet seen it to come, as well as reach a broader audience beyond the Boston area. This is already happening with the national press the show is beginning to receive.

3.2 Design Objectives and Parameters
There are two main objectives for the *Pattern Language* exhibition Web site. First, it would provide publicity for the exhibition and attract sponsors and visitors. Secondly, there would be an interactive feature to provide viewers with a thought-provoking and engaging experience around the rich content from the exhibition. This would be achieved through providing greater background information about the exhibition pieces and providing a context for the works within the exhibition and in a larger cultural context. To accommodate these objectives, the Web site was developed in two phases.

Promotion and Development
The first phase fulfills the objective of providing publicity for the exhibition. The exhibition team is trying to raise enough funds to make the exhibition happen and the Web site is used as a way to reach out to potential donors. Because of the pressing need for fundraising, I completed this part of the Web site in December 2003. It contains exhibition information, a press page and an online gallery of works to be included in the show. The exhibition information consists of the show's description, location, dates, exhibition fact sheet and check list. The press page contains downloadable press release about *Pattern Language* and hi-resolution images of works in the exhibition for use by journalists in articles. For now, a static online gallery contains images of artworks from the show accompanied by descriptions. This will later be replaced by the interactive feature.

Because the main objective of this phase was to generate as much publicity as possible about the exhibition, I chose to build this part of the Web site in HTML, which is accessible to the widest audience, with images that are not bandwidth-intensive. The HTML site is also easy to update, which is important because new content from artists continues to arrive.

Phase I of the Web site proved to be successful tool for the development and promotion of *Pattern Language*. The Web site aids in the request of artwork loans from museums, private collections and artists for the exhibition. Potential lenders are more receptive because the Web site allows them to immediately grasp the content of the exhibition and the context in which their work will be shown. In discussing projects and brainstorming with colleagues, the exhibition organizers can simply email the exhibition Web link instead of sending cumbersome attachments or lengthy explanations. Also, I organize and post additional content from the artists onto the Web site as they come in. As a result, the site also functions as a central place where the exhibition team keeps track of the pieces from the show.

The Web site is also low-cost and efficient way for the exhibition team to promote about the show. The press section reaches out to journalists interested in covering the project. Based on it, *Sculpture Magazine* has commissioned Judith Hoos Fox to write an article and *selvedge*, a new British publication has decided to dedicate an entire issue to the exhibition. Additional press inquiries about the exhibition were received by journalists who discovered the exhibition through an Internet search. Furthermore, the exhibition team received several compliments on my design of the Web site from

Corporate and private funding sources, including Urban Outfitters and Pompeii AD. In response to the Web site's success, Judith Hoos Fox remarked, "This is the first time that I have had a website for an exhibition in some 32 years of curatorial work and henceforth I will, always have one to help the promotion and development of future exhibitions."[2]

Interactive Feature

The overwhelmingly enthusiastic response to the first phase of the *Pattern Language* Web site further convinced me that this show provided a perfect basis for an interactive feature. The second phase of the Web site development is the interactive feature that will provide users with an entertaining and educational experience around the exhibition content. A much larger undertaking than the first phase of the Web site, this is the primary focus of my thesis case study. The features design and working prototype of the interactive feature will be completed in early May 2004 and are discussed in this paper. The interactive feature will be completed in time for the launch of Pattern Language in August, when it will be added to the existing promotional/information section of the Web site.

There are several objectives to keep in mind when designing and developing the interactive feature. Firstly, it must offer more than simply a representation of the exhibition. It should offer viewers a different but complementary experience from visiting the physical museum. The feature should also reflect the exhibition intent of *Pattern Language* to get viewers to re-examine their relationships to clothing and the body, as well as reflect the curatorial mission of Art Interactive to explore the notion of interactivity.

The design of the features is influenced by my research into museum Web sites as discussed in the previous chapter. These features take the form of several layers of information that create a context around the artists and their work and providing education activities and resources. Like the majority of museum Web sites I looked at, I will be building the interactive in Macromedia Flash because it is a rich media platform that is ideal for graphics, animation, interactivity, sounds and video.

The target audience for the Web site consists of visitors to Art Interactive and people who are interested in the exhibition content but cannot physically attend the exhibition. While Art Interactive does not keep detailed demographics on its visitors, Director Emmanuel Lewin told me that the audience generally consists of students, academics, professionals and many families. Families enjoy bringing children to the gallery because of the children have fun interacting with the works. It will be important for the feature to convey the interactive nature of the art works to encourage these physical visitors. The Web site will also be a way for them to revisit the exhibition in a virtual space. For those that cannot go to *Pattern Language*, the interactive feature allows them to access and interact with to the exhibition's rich content. Having familiarized themselves with Art Interactive through the Web, they may elect to visit the gallery in person if they find themselves in the Boston area in the future. The *Pattern Language* Web site will continue to be hosted on the Art Interactive server, thereby creating a lasting record of the show.

Undoubtedly, there are several challenges to be faced in developing this Web site. Due to the fact that *Pattern*

Language relies entirely on volunteers, one large constraint is the shortage of manpower. I am the only person on the exhibition devoted entirely to the Website, whereas museums with larger budgets are able to hire fulltime employees to work on their Web sites.[3]

A disadvantage of being the sole Web site developer is that the project becomes limited by my technical skills. My expertise is in content development and front-end graphics and production. I am less familiar with back-end programming, which means that I will be unable to incorporate features such as search, comment upload, dynamically-generated pages and a backend database to organize content. However, these development-intensive features are usually reserved for projects with large amounts of content, perhaps an entire library or museum collection. Because *Pattern Language* contains a small and finite number of artworks, would be easy for me to manage and build features around them for users with the intended experience.

An advantage of being the sole developer of the Web site is that I have been given a large amount of design freedom. The other members of the exhibition team have placed a lot of trust in my research for and development of the interactive feature. This may be less likely to happen in commercial projects where paying clients push for tight deadlines, rather than take the time and risk of trying new things.

It will also be a challenge to determine in what ways the virtual exhibition should reflect the presence of the physical gallery exhibition. I will not have the opportunity to see the gallery exhibition in its complete physical manifestation until immediately before the August show opening. Initially, I hoped

to be able to meet with the exhibition designers to get a sense of the plans they have for the space. However, at the time of this writing, the exhibition design has not yet begun. The team is comprised of volunteers who have full-time jobs and are thus very busy. This type of collaboration may still occur closer to the opening of the exhibition in August but major site design changes will not be possible. Instead, I will design with an interpretation of the physical exhibition gained through looking at documentation of how both exhibitions at Art Interactive as well as the individual artworks from the show have been installed in the past. From there, I can determine the best way to express the physical/digital relationship in either the feature's graphical look and feel or more likely, through shared interpretive goals. Art Interactive has been struggling with this issue for some time in its own development of exhibition collateral such as brochures, posters and Web sites. Associate Director Winnie Wong described, "We always had this problem with all of our graphic dept. — how can a single graphic tell you at a glance that this is an art exhibition you should go to? It's a really difficult challenge."[4]

3.3 Process

The design process for the *Pattern Language* Web site consisted of research, idea development, design solution, feedback and discussion, completion of deliverables and testing. Throughout this process, support from exhibition's two curators Judith Hoos Fox and Rachael Arauz was critical. They helped me to understand the mission and significance of the *Pattern Language* exhibition. In return, I familiarized them with concepts behind the Web design and development, plus shared the knowledge I had gained from researching museums and the Web. Through this mutual knowledge-sharing we could determine the message that we wanted the interactive feature to convey and the best way to achieve that.

During project brainstorm sessions, we came up with numerous ideas for Web site features. Because of our limited resources, we had to prioritize the features we wanted, weighing each feature's value against the feasibility of developing them. Like the SFMOMA's *Making Sense of Modern Art*, a key objective for Pattern Language would be to provide a context to the works in the exhibition. This would be achieved by layering more information about each artwork, its creator and relevant links into the interactive feature, to be uncovered by users. Other key features we decided upon were the ability to organize the works by themes, a timeline, and classroom activities. Some interesting ideas that we came up with but decided not to pursue due to lack of time were a virtual jukebox that played songs related to fashion and costume analysis of famous works of art.

Several team members would be contributing to the content for these features. Judith Hoos Fox gave me a list of several themes that related to works in the show. The intern, Nina Brilliant would research artist biographies. The show's fashion consultant and teacher at the California College of Arts, Galya Rosenfeld taught provided feedback about the educational section. Judith Hoos Fox was also in contact with other faculty at fashion design programs to suggest collaborations with the both the physical and online exhibitions.

In addition to the research I conducted into the medium of online interactive features, I conducted research specific to *Pattern Language*. It was important to familiarize myself with the exhibition content in order to inspire the design. The first

Figure 13: Issey Miyake Web site

Figure 14: Maharam Web Site

way for me to do this was to look at the artworks. This was easy because it became my responsibility to collect images and videos of the artwork. This also allowed me to interact with several of the artists displaying work in the exhibition and see some of their other work. For the artworks and artists that were less accessible, I was able to find information about them online. In fact, many of the artists have their own Web pages. The curators also provided me with a bibliography of texts that guided their thinking in assembling art works for the show.

Because the show deals with garments and fashion, I had to think about the issue of representing fashion in a digital setting. Fashion deals with notions of touch, the body and scale. These are all difficult to represent on a flat computer monitor. The exploration of this issue would constitute a

separate study in itself, so I will not go into too much detail about this research. Two interesting approaches to this are displayed in the Websites of the fashion designer Issey Miyake and the textile company, Maharam. Each season, Issey Miyake launches a new Web site that provides a virtual experience around the fashion collection (http:// www.isseymiyake.com). The site lacks a clear navigation or description. Instead, compelling graphics and animation encourage visitors to explore. Almost everything in the feature reacts when touched by the cursor. The digital tactility of the feature acts as a metaphor for the physical tactility of the fashions. Many different scales are represented. For example, an image of a model may be juxtaposed with a large close-up of a tailoring detail from the outfit that he or she is wearing (Fig. 13).

Maharam's Web site (http://www.maharam.com) also uses this strategy of digital touch and experimentation with scale. It features close-up images of textiles and the user can touch these with the cursor to have them move and zoom (Fig. 14). Looking at these sites inspired me to incorporate touch and scale in *Pattern Language*.

The development of the interactive feature was an iterative process where I would come up with design solutions and then email my progress to the curators for comments and suggestions. Successive designs would respond to these comments. The design has also been presented to a wider audience of Art Interactive staff members, classmates and professors for feedback.

3.4 Interactive Feature Design

In this section, I provide a tour through the *Pattern Language* interactive feature. This will consist of screenshots from the online exhibition accompanied by my thoughts on the design and issues that arose. In the current prototype, I tried to make the look and feel of the interface to be as neutral as possible so that the user's focus would be on the content. The exhibition's graphic designer has not yet started on the design for the exhibition. Once she has, I may choose to incorporate elements from her design into the interactive features so that there is some visual overlap. However, this is not vital to the project's success. Following the design philosophy of the Peabody Essex Museum's *Yin Yu Tang* site, I believe the interactive feature should not attempt to duplicate the physical exhibition but provide a unique experience that takes advantage of the Web as a medium. I find it more important to reflect the Art Interactive mission of providing interactive experiences around art. Therefore, in my design, nearly all elements are moveable, expandable and react to the cursor's touch. As a feature, it cannot stand on its own but relies on the user to engage with it in order to uncover its several layers. I designed the feature to be easy to use, with a clear navigation and tools to help the user uncover the complete information architecture. There is a parallel relationship between the digital interactions in the online feature with the physical interactivity that happens in Art Interactive's gallery between the viewers and the artwork.

Interactive Feature Main

When a user first launches the interactive feature, they will come to an introduction page with an overview of the interactive exhibition and an explanation of how to navigate and interact with it (Fig. 15). This reflects my previously stated desire to make the interactive feature transparent to users, so that they may focus on exploring the content rather than trying to figure out where it is hidden.

The user can then close the introduction page to access the main interface for the interactive feature. In the main screen area, there are 27 thumbnail images, each representing an artwork from the exhibition. These images take the form of a dress form graphic, so that it appears as if the screen is filled with dress forms. I carefully considered my choice of using the dress form. I wanted to use some fun graphic that was highly recognizable as related to fashion. The show is about rethinking what is fashion, so that the user would click on what they believed to be a familiar image, only to be surprised by what they see—works of art that break down and question those familiar notions. There were concerns that the dress form was that it was a too traditional representation for the

Figure 15: Introduction to the interactive feature

Figure 16: Rolling over a thumbnail image

exhibition. However, upon visiting the fashion design studios at the California College of Arts I was able to see that it is still very much in use by designers and artists. Also, one of the core challenges in creating garments is relating it to the scale and shape of the body and the dress form is simply a tool to give designers a sense of the scale. Another concern was that the female form may conflict with some of the artworks that deal with feminism. Accordingly, I tried to make the graphic gender-neutral, without obvious male or female characteristics. From feedback I've gotten, I've found that people generally assume that dress forms are female, yet male dress forms exist and continue to be used on a frequent basis by tailors.

Layering of Information

When a user rolls over a thumbnail image, the thumbnail image becomes highlighted and the name of the artwork, the date it was created, and the name of the artist appear (Fig. 16). This

is the first, most basic layer of information about an artwork in the show. For next level of information about that artwork, the visitor clicks on the thumbnail to launch a menu of additional content.

In this menu, the first screen that appears has a larger digital image of the artwork, as well as curator-provided description. This is also linked to additional images of the artwork and any related audio or video files. For example, Galya Rosenfeld's *Object Un Dress* is a dress that is constructed of one continuous zipper. As such, the act of zipping and unzipping the garment is as important as the completed artifact. Providing a video will give the user a better understanding of the artwork (Fig. 17). A visitor can also learn more about the background of the art work by accessing the artist's biography and links to related works within and beyond the exhibition, as well as the artist's Web site. This layering of information is designed to accommodate varying the levels

Figure 17: Layering of Information

Figure 18: Menu Options

of information seekers in the intended audience—visitors, students and experts. The visitors may be satisfied to see the representation of the work. However, with links to related works, I also give students and experts the opportunity to dig deeper should they desire.

The layering of information is not only appropriate to the Web medium, but also serves as a metaphor for the layering of clothing. Several of the artworks in the exhibition deal with the theme of revelation. This includes the unzipping of the dress in *Object Un Dress* and a video of Yoko Ono's performance piece, Cut Piece, her garment is cut piece by piece from her body to expose her emotionally and physically. As the user navigates through the information in the interactive feature, they begin to reveal the context behind the artworks as well as the exhibition's larger message about the depth of our relationships with clothing and the body.

Menu Options
To the left of the main screen area is an expandable menu (Fig. 18). From this menu, visitors can access the other features of the online exhibition. These include a themes menu, timeline, classroom activities and resources.

Themes
The themes menu is an important feature that demonstrates what the virtual exhibition can do that the physical cannot. For the *Pattern Language* exhibition, there are several relevant themes including brotherhood of humanity, emotional need, feminism, future and survival, the origin of clothing, performance, personal identity among others. Any single piece of artwork in the show will relate to several of these themes. This results in a Web of shifting relationships between works. In the physical exhibition, once the artworks have been installed, they will not move. In the virtual exhibition, a user can launch the themes menu to see all the themes. A visitor

Figure 17: Layering of Information

Figure 18: Menu Options

can easily roll over the different themes and highlight its related works (Fig. 19). This provides a visual representation of the overlapping web of relationships between the works. When a theme is clicked on, all the pieces related to that theme stay highlighted and the viewer is presented with some questions to make them think more about that theme. For example, when a viewer selects "brotherhood of humanity," viewers are ask to contemplate their relationships to one another and how garments can reflect that relationship. Each theme provides a mini-guided tour within the exhibition. Additionally, because the dress form thumbnails are draggable, users can begin to reconfigure, rearrange and cluster the works to their liking. In this manner, they can begin to create their own exhibitions. A future consideration would be to allow viewers to save the configuration of works they have created to be viewed the next time they log onto the site.
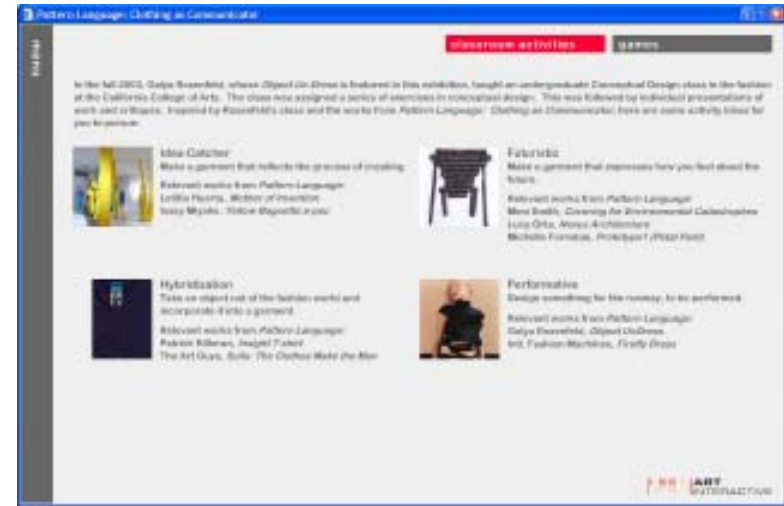
Classroom Activities

The intention of *Pattern Language* to be used as an education resource is reflected in the Classroom Activities section (Fig. 20). When creating educational content, it is helpful for museums to partner with teachers. Galya Rosenfeld made the exhibition content an integral part of the Conceptual Design Course she taught at the California College of Arts in the fall. The artworks provided inspiration for students as they worked on assignments designed to make them question traditional notions of fashion. For example, in two different projects, students were asked to create garments that reflect the process of creating, and expresses how they feel about the future. These assignments are posted onto the Web site for Pattern Language along with examples of related work. The intent is that visitors would be inspired to create their own garments inspired by works from Pattern Language. A future possibility that the team has discussed is for visitors to be able to submit images of their works to be posted onto the

site. This would create a sense of a community of creators around the show. While this is an intriguing idea, it is a bit complicated logistically for the team to carry out immediately.

Additional Features

An additional feature will be a menu that contains the names of all the artists whose work are in the exhibition. It will work similar to the themes menu, where users can roll over the name of the artist and his or her works will highlight. Clicking on the artist name will launch the biography information about the artist.

There will also be a timeline that locates the art works within the greater cultural context. The artworks span 5 decades and the timeline will be organized by the decades. Parallel to the artworks, there will also be a timeline of notable art and fashion movements that occurred at the same time.

In summary, the full impact of the Pattern Language interactive feature will not occur until it has launched. Thus far, the current prototype has been received positively by the exhibition team and colleagues working in Web design and museums. While the basics of the information architecture and features are in place, it will continue to be developed up until the start of the exhibition in August.

FOOTNOTES
[1] Art Interactive. "Curatorial Mission Statement." <http://www.artinteractive.org/curatorial.shtml>

[2] Hoos Fox, Judith and Rachael Arauz. "Re: thesis//website report."
Email Correspondence. March 31, 2004.

[3] I learned from a March 1, 2004 interview with Peter Samis, Associate Curator of Education, Program Manager, Interactive Educational Technologies at the SFMOMA, that the museum a core staff of four employees who develop interactive features. Outside design firms are hired do the graphics and a large number of interns conduct research.

[4] Wong, Winnie. "Re: Thanks." Email to Moneta K. Ho. April 14, 2004.

CHAPTER FOUR: CONCLUSION

A final objective of this thesis study is to document the research and design process for an interactive feature, to be used as a resource for future teams embarking on similar projects. Nathan Shedroff writes about the importance of building this collective body of design knowledge:

> The time it takes to consider and document our design processes can make the difference between success and failure on a project. Certainly, well-documented methods improve consistency within organizations and greatly reduce training time. They can also help us to create better solutions. But, most important, they make us better designers because they reorient our attention, focus and concerns in meaningful ways.[1]

In the following section, I describe the lessons I've learned and recommendations I make. In speaking with professional and academics working on museums and the Web, as well as in my experience with *Pattern Language*, I found that the biggest constraint on projects was financial. Non-profit organizations such as museums run on tight budgets that do not always allow for the hiring of additional graphic, Web design and development staff. Also, the development of interactive projects is extremely time intensive. Curators and other exhibition team members must commit to the extra work in the development of content for the Web. There are several ways to work around these limitations to create a successful project.

The first challenge is to put together a team of capable individuals who can thoughtfully design and develop the interactive feature. A good idea is to draw from academic contacts and partnerships with universities. Many students of new media art and design would be interested in developing Web sites in exchange for the portfolio and resume-building experience, school credit, or references and contacts that the museum can offer. In the case of *Pattern Language*, media coordinator Stephanie Davenport, a recent MIT alumna, contacted me about working on the exhibition. At the same time, I was looking for a design project that I could incorporate into my Master's thesis in the MIT Comparative Media Studies about design practices on the Web. It was a perfect match. In fact, these kinds of museum-academic partnerships are quite common. In 2001, another graduate student from my department, Margaret Weigel along with Communications and Development Officer Alex Chisholm, worked with the Computer Museum History in Mountain View, CA to conceptualize a framework and develop a preliminary prototype for the museum's online presence.[2] Another example is the Tate Online's interactive feature *Cold Dark Matter: An Exploded View* (http://www.tate.org.uk/colddarkmatter/) was developed by Tessa Meijer, an Imaging Co-ordinator at the museum as part of her MA course in Digital Art History at Birkbeck College.[3]

In order to get the most out of their partnerships with schools, a museum exhibition must be willing to give up some design control of the project. Student developers must not be made to feel like simply mouse-operators, but rather equal partners who can think critically and share the goal of making the project the best it can be. I chose to work on *Pattern Language* specifically because the exhibition team gave the room to explore and invent. I feel a strong ownership of the project and am very enthusiastic about my role.

If a partnership with a school is not possible, museums can look to other museums to share resources. For example, smaller museums could pool their funds to hire designers and developers to develop one digital template that can be shared amongst the group. The SFMOMA's Interactive Educational technologies team has taken this idea even further in the development of Pachyderm, an open-source authoring and publishing tool that will allow museum curators to maintain and build features themselves.[4] Like the several museum Web sites featured in this study, SFMOMA favors the Macromedia Flash platform to develop interactive features. However, they realize that hiring Flash programmers to build each new project from the ground up would be very costly. With Pachyderm, museum staff can upload media materials and text descriptions via simple Web forms. Pachyderm then populates Flash templates with the content and publishes the completed Flash files on the Web or to a museum kiosk.

In 2003, Pachyderm received a large grant to fully develop the tool with the eventual goal of making it available to a large number of museums. The team now includes educational directors and curators from five major museums, software development teams from several universities, and digital library experts from Canada and the U.S.[5] In the near future, Pachyderm will be an option for museums looking to develop interactive features with limited resources. Once a museum has secured the resources to build the interactive feature, team members need to agree upon the design objectives and outline a realistic strategy to achieve those objectives. This means that the team may not be able to develop every exciting and innovative feature they come up with in brainstorm sessions. Instead, they need to prioritize which features provide the most benefit. For example, perhaps only a few

artifacts from the exhibition need to be highlighted, leaving the rest for visitors to discover upon their physical visits to the museum.

To help in the features design, Web Designers should familiarize themselves with the content by asking the curators to describe the exhibition to them, looking at the exhibition artifacts and researching the artists. It is not necessary to become an expert on the subject matter of the exhibition but the designer show know enough to be able to treat the content in an appropriate manner.

Early in the design process, a plan for the execution of the project should be decided upon by all team members. Tasks and responsibilities should be distributed and a means by which team members would communicate should be identified. Due to the busy schedules of the Pattern Language team members, the easiest way to communicate was via email followed by the occasional face-to-face meeting. Other museum exhibition teams may set up online message boards to aid in the communication and planning process.

It is also useful to look at existing literature and documentation of museum Web sites. There is a wealth of literature available online. In my experience with this project, I've found that members of Web development teams at museums are extremely open to meeting and discussing their work. This usually involves sending an email to the contact listed on the interactive feature's credits section. Multimedia is usually one of the newer and less-established departments in museums and these professionals relish the opportunity to promote awareness of the work they are doing. By learning about what other museums are developing, an exhibition team can benefit

from their successes and failures. For example, I recounted in Chapter 2 the problems that occurred with *010101: Art for Technological Times* exhibition in networking the computers in the gallery. A museum exhibition team looking to create a similar network could study *010101*'s project documentation in order to avoid the same mistakes.

Creating enthusiasm for the show will also help in recruiting new team members to help out on everything from design and technical work to research for the interactive feature. This tactic proved successful for *Pattern Language.* I completed the promotional section of the Web site and posted it online nearly 9 months before the launch of the exhibition. The Web site link was sent to potential funders and venues, artists and museums lending pieces to the exhibition, journalists and friends. This generated buzz and an interest in the project. Our artists and museum lenders acted quicker to contribute content for the site. More volunteers were recruited to work on the exhibition team upon seeing the Web site. If it's not possible to create an entire Web site, a teaser poster or image can be created to be posted on the museum's main Web site. I also showed unfinished prototypes of the interactive feature to museum professionals, designers and academics for feedback. I found that enthusiasm for the interactive feature increased with each new design iteration. People would offer feedback and suggestions on how to improve the design, which was extremely helpful. If enough enthusiasm is generated, it may lead to more volunteers to work on the project.

Once a working prototype or version of the interactive feature is complete, a museum exhibition team may want to conduct some user testing. There are a couple of ways that user testing can be carried out. Feedback can be gathered about the Website's design content and usability. For content, the Web site can be shown to exhibition curators other experts on the exhibition content. Usability testing involves recruiting people to try out the Web site and provide feedback on how easy it is to navigate and use. Some completed museum Web sites include online surveys to gather user's feedback. While this would not help too much during the development of an interactive feature, it can be applied to the next feature. Developing Web sites is an iterative process and museum exhibition teams can apply what they have learned through previous projects to new ones.

In this study, I have described my experience designing and developing an interactive feature for a museum exhibition, Art Interactive's *Pattern Language: Clothing as Communicator*. Using a method of design research, I explored current work being done with museums and the Web, the context of the exhibition, as well as its subject matter to determine the best ways to develop the project, including which features to include. Furthermore, reflection on the impact of the digital artifact on the museum helped me to understand how the interactive feature could benefit the exhibition. In particular, it allows a broader audience to enjoy and learn from the exhibition content and play a participatory role through the ability to create unique experiences when visiting the Web site.

Overall, I've found that the Web holds a lot of potential for museums to deliver new types of information and content to visitors. The Web will never replace the physical exhibition, but creates a complementary and distinct experience. Museums should continue to take advantage of the potential that the Web offers in order to share its wealth of knowledge

with the world. Developing an interactive feature for an exhibition is a large but worthwhile undertaking. As technology continues to develop, museums should continue to take advantage of this to create compelling experiences.

FOOTNOTES

[1] Shedroff, Nathan. "Research Methods for Designing Effective Experiences." in Laurel, Brenda. (ed.) *Design Research: Methods and Perspectives*. Cambridge, MA: The MIT Press, 2003: p. 163.

[2] Chisholm, Alex and Margaret Wiegel. "The Computer History Museum Center Cyber-Museum Project." Cambridge, MA: MIT Comparative Media Studies Research Paper, 2001.

[3] Tate Online. *Cold Dark Matter: An Exploded View.* <http://www.tate.org.uk/colddarkmatter/>

[4] Wise, Susie. "The Why, What and How of a Custom Authoring and Publishing System: The Creation of Pachyderm." *Spectra*. Winter/Spring 2003. pp. 30-33.

[5] The Pachyderm partnership now includes the San Francisco Museum of Modern Art, the California State University Center for Distributed Learning, the University of Arizona, Case Western Reserve University, the University of Calgary, the Metropolitan Museum of Art, the Cleveland Museum of Art, the Berkeley Art Museum, and the Fine Arts Museums of San Francisco. See "NMC Awarded Major MLS Grant for Pachyderm 2.0 Project: Press Release." New Media Consortium. September 23, 2003. <http://www.nmc.org/about/news/2003/PR-IMLS_grant.pdf>

WEB LINKS

Art Interactive. *Pattern Language: Clothing as Communicator*
<http://www.artinteractive.org/shows/patternlanguage/>

Franklin Furnace Archive
<http://www.franklinfurnace.org/>

International Council of Museums.
<http://icom.museum/>

Issey Miyake.
<http://www.isseymiyake.com>

Keith Haring Foundation. *Haring Kids*.
<http://www.haringkids.com>

Maharam.
<http://www.maharam.com>

National Palace Museum.
<http://www.npm.gov.tw>

Peabody Essex Museum. *Yin Yu Tang, A Chinese Home*.
<http://www.pem.org/yinyutang>

San Francisco Museum of Modern Art. *010101: Art for Technological Times*
<http://010101.sfmoma.org/>

San Francisco Museum of Modern Art. *Making Sense of Modern Art*.
<http://www.sfmoma.org/MSoMA/>

Tate Online. *Cold Dark Matter: An Exploded View*.
<http://www.tate.org.uk/colddarkmatter/>

Tate Online. *Damien Hirst: Pharmacy*.
<http://www.tate.org.uk/pharmacy>

Tate Online. *Tate Art Detective*.
<http://www.tate.org.uk/detective/mystriousobject.htm>

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<http://www.ibiblio.org/expo/vatican.exhibit/Vatican.exhibit.html>

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