

VIRTUAL ART MUSEUM EXHIBITS ON THE WORLD WIDE WEB: A CONTENT
AND SURVEY ANALYSIS

By
Margaret J. Nystrom

A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Information Science.

Chapel Hill, North Carolina

November, 2000

Approved by:

Advisor _____

Table of Contents

Chapter 1	Introduction	2
Chapter 2	Literature Review	6
Chapter 3	Methodology	17
Chapter 4	Results	19
Chapter 5	Discussion	33
Chapter 6	Conclusion	46
Chapter 7	Bibliography	51
Appendix 1	Example of Marketing Exhibit	53
Appendix 2	Example of Replica of Physical Exhibit	54
Appendix 3	Marble Museum, Tourist Task Model	55
Appendix 4	Marble Museum, Art Student Task Model	56
Appendix 5	Marble Museum, Expert Task Model	57
Appendix 6	Survey Consent Form	58
Appendix 7	Survey	59
Appendix 8	List of Museums that Responded to Survey	62

Introduction

The purpose, or educational mission, of museums has remained essentially unchanged over the last two hundred years. Although somewhat variable in presentation, the main goal has been for museums to teach patrons about particular collections. Museums which were established in revolutionary America were mainly founded in order to promote democracy in the newly founded republic. Education in this context meant providing all citizens with an equal opportunity to learn. As Roberts (1997) notes, museums were responsible to the general public, in terms of, "... teaching citizens civic virtue, cultural nationalism, and love of God..." (4).

In the years that followed, the idea of "education for the people" has been interpreted in many different ways by museums. This fluctuation has been largely dependent upon the social and economic state of the country at particular times. A museum's concept of educating the public could range from, "...amusement to instruction to simple exposure" (Roberts, 1997, 5). In the 1920's and 1930's, along with the appointment of the first staff instructors, began the formation of museum practice guidelines. This in turn led to the concept of museum studies which focused on the role of the museum in terms of its materials and what visitors would learn from their presentation. This is evident by many of the early museum studies which emphasized the setting of the museum, for example, how the artifacts were laid out, how many items were displayed, etc.

At the end of the 1970's museum studies began to slowly change as more attention was given to the museum visitor. Instead of just focusing on the museum setting itself and what the visitor learned from their visit, studies began to pay more attention to the visitor and their experience at the museum. No longer were visitors simply viewed as vessels to be filled with specific information. Instead, education was thought of as a, "...two-way process whose outcome was unavoidably shaped by what the learner brought to it" (Roberts, 1997, 5). In other words, not all visitors were expected to view the museum in the same light as it became evident that each person comes to a museum with different backgrounds and individual experiences.

The shift to this more user focused view of museums has developed mainly because of criticism over museum texts. The text that museums provide with materials is often criticized for being too authoritative and at times rather patronizing. Walsh (1997) refers to this text, often created by a museum committee, as the "unassailable voice" (69). He believes that the ever-authoritative voice is negative because it alienates visitors and makes them feel ignorant. If museums provide just one "right" way of viewing things, then there is no room for interpretation. Furthermore, he believes that museums send the message that varying opinions are not welcome. Walsh goes as far as to compare this "Voice" with the detested, "...know-it-all who speaks in a polished, endless monologue and has no interest in the ideas and opinions of others..."(70). He considers this sort of "anonymous authority" a bore.

Not everyone is happy with the concept of the museum providing different interpretations for different people. Curators often feel threatened that interpretations might be made of art works that do not mesh with the way the museum might wish them

to be conveyed. Also, the media sometimes criticizes museums for trying to be all things to all people (Roberts, 1997, 6-7). So while some museums are starting to pay more attention to visitor interpretation and experience when organizing and displaying exhibits, old patterns of thought have been slow to change. As Roberts explains:

...old habits die hard--especially when they permeate the very fabric of an institution...To allow for and even to encourage alternative ways of interpreting and experiencing collections represents a challenge not only to museums' power and authority over the object and its display but also to the very basis and credibility of the knowledge that museums presume to possess (8).

As the Web became popular in the 90's, the controversy over how exhibits should be designed began to extend to the virtual medium. The questions being asked strongly paralleled those that surfaced around the design of physical exhibits. Should the web page provide information that is pre-interpreted for the visitor? Or, should the virtual visitor be allowed to have a unique experience while at their computer? The Web is a random-access medium, site designers cannot predict entry points to their site or ensure that people will follow a predictable path through their site. The user is in control and can choose to look at or skip over whatever information that they choose. Such freedom of movement is also evident in a physical museum as a patron can normally walk through the building at his/her own discretion, backtrack among the exhibits, etc. In the online case there is far less cost (in terms of the time and money invested in visiting a virtual exhibit being much less than that of a physical exhibit) associated with these activities and there is no guarantee that the user will enter through the "main entrance" as they would have to in a physical exhibit. Search engines often provide varying entry points to web sites, creating confusion as to the full scope of

content available. Thus, because of these factors, it is likely that a virtual visitor will feel less obligated to explore a web exhibit in its entirety.

A lot of new questions have begun to arise concerning the development and design of exhibits that were not formerly present before the advent of the Web. The next section of this paper will examine some of the varying perspectives that have arisen due to the increasing popularity of virtual exhibits. Literature will be cited which will discuss how text, navigation, and basic design elements are being utilized in order to create virtual art exhibits.

Literature Review

According to McKenzie (1997), “(a) virtual museum is an organized collection of electronic artifacts and information resources...”(77). This definition is rather broad, perhaps purposely, as there seems to be quite a bit of variation in what museum sites provide to their user.

Many museum web pages are created for marketing purposes. When viewing exhibits on museum web pages it is apparent that some are created solely to market the physical museum. Most of these types of pages are dedicated to providing a description of the exhibit(s), the location of the physical exhibit, fees, and a list of times and dates. A few images of the exhibits are included, but not too many, as the main goal of the web page is to entice people to visit the museum (Example, Appendix #1).

Another style of virtual museum is that which provides actual content from the physical museum to the patron (Example, Appendix #2). Museum exhibit pages which include displays from the physical museum are becoming prevalent but, “(t)he degree to which the representation of the museum on the Web should resemble its physical presence or ‘real’ presence is still a matter of debate” (Teather & Wilhelm, 1999, 4). Some web exhibits simply replicate the physical museum as much as possible. To many, a museum’s educational mission can be met on the Web if exhibits are presented in much the same manner as they would be in the physical museum. One of the most prevalent

arguments for this strategy revolves around access. Having a virtual exhibit available online allows arguments for this strategy revolves around access. Having a virtual exhibit available online allows those who would not otherwise get to see the exhibit have the opportunity to view them as if they were actually on site. There is an added bonus to virtual exhibits in that access is available twenty-four hours a day, seven days a week (Lord, 1999, 630). In addition, exhibits that are available online allow the visitor to have a close-up view that might not be available in a crowded museum.

A virtual exhibit can provide its visitor with a representation of the physical exhibit, but critics argue that this simply repeats the process of providing one perspective that does not appeal or relate to all visitors. Bearman (1995) suggests that too often museum web sites lead people down predefined paths. There are specific links provided in a specific order so that visitors are exposed to, "... a single, expert curator-scientist-driven version of the world" (Teather & Wilhelm, 1999, 6). It is suggested by Bearman (1995) that such a single-sided perspective is negative because visitors will not be able to have "an experience with personal meaning" when visiting the Web (4). If visitors can not relate to the material they view, then it is assumed that they will leave with dissatisfaction and no new knowledge. So the question becomes: How can we enable visitors of museum web sites to relate to the material?

There seem to be several different perspectives on how to achieve this. Fernström and Bannon (1997) imply that simply having information online can improve one's ability to learn and relate to material. If one is on site, then it is

necessary to share space with visitors. It is normally hard for visitors to concentrate on one area for too long. In contrast, a virtual exhibit can permit patrons to focus on specific collections that they find particularly interesting. Comparisons between different objects can be made with the click of a mouse instead of fighting a crowd to get from one end of a building to another. A well-designed virtual exhibit can help patrons become, "...more engaged, at their own pace" (Fernström & Bannon, 1997, 194).

Kydd and MacKenzie (1997) suggest that the way one designs a virtual web site can greatly deter or enhance one's learning. They believe hyperlinks can make or break the learning process. In some instances site organization can be a real hindrance to one's capacity to learn. They state that with hypertext links:

(a)ll we are doing is conceptually placing one page in close physical proximity with another as the curator does in creating an exhibition display. We are forcing the visitor down our path, telling only our chosen story just as we do in the physical museum: We are subjecting the visitor to the "tyranny of the button (Kydd & MacKenzie, 300).

However, Kydd and MacKenzie (1997) do believe the constraints can be minimized depending upon the amount of navigational freedom the hyperlinks provide. For instance, having more hyperlinks on one page can provide the visitor with a greater ability to determine their own path and focus on what they find most interesting. In addition, Fernström and Bannon (1997) point out that hyperlinks give the visitor more ways to traverse a collection than is possible with a physical exhibit. Of course, this is only the case if there are more hyper-paths available than there are physical paths.

Although Kydd and MacKenzie (1997) see the placement of links as an important issue, they believe the ultimate goal is to avoid imposing rigid links on the user. They think patrons should be able to ask the questions that they most want answers to. This might be accomplished through interactive maps, searchable databases, or dynamically created pages. As they point out, web sites no longer have to be static, and thus it should be easier to create pages dynamically to meet the particular needs or interests of virtual exhibit patrons.

Many experts are leaning in the same direction as Kydd and MacKenzie by suggesting that virtual exhibits should no longer be so static. Bearman (1995) states that it is important for us, "...to recognize that the networked environment is interactive, and therefore can be user driven. It enables us to respond to the visitor rather than pump information at him" (4). The argument for providing interactive experiences is largely associated with the fact that not all audiences are the same and that not all individuals will respond to representations of collections in the same way. Certainly it is recognized that, "...it is a challenge to represent knowledge in a way that can satisfy multiple perspectives and 'domains' of knowledge" (Bearman, 1995, 7). For this very reason it is much easier for web designers to provide material in a monolithic fashion. However, Bearman argues that designers who choose this path will only appeal to a very narrow audience and isolate those with more sophisticated queries.

In response to the need to create virtual exhibits that appeal to more than one type of audience, some museums have aimed to make their systems more adaptive. Marable (2000), who was responsible for designing an engaging web site

for an art museum, learned through early prototypes that a site which is easy to navigate does not necessarily allow its viewer to experience the “spirit and energy” of a physical exhibit (2). In order to emulate the spontaneity of navigation that often comes with the touring of a physical visit, Marable and his fellow web designers decided to scale down the amount of text-navigation found at their site. Instead, they chose to allow viewers to navigate space by focusing on the visual works. They created what is called an “exploration bar” that combines text and images that can be scrolled over by using the mouse. This unstructured approach is referred to as “sight lines” by Marable (2000). He describes it as a vision, “...well thought-out by the exhibit designers to encourage a flowing exploration of the exhibit’s content” (2). This type of flowing navigation is intended to allow the virtual art museum patron to make spontaneous discoveries which would not be possible with strict textual navigation.

Another example of a web site that pays particular attention to the needs of its audience is the Marble Museum, located in Carrara, Italy. This is an example of a virtual exhibit that has chosen to present an adaptive museum interface. According to Paternò and Mancini (2000) an adaptive system is one that will “...tailor information to the user and may guide the user in the information space to present the most relevant material” (5). In this example, the web page is organized so that a particular user profile is established. Once the user chooses what profile they belong to, the system modifies its behavior so as to fit that user’s needs.

After conducting many interviews and analyzing questionnaire results, the Marble Museum decided to create three user models: tourist, student of art, and expert. In each instance these models are "...characterized by a fixed set of 'topic-value' pairs, and the user assigned to a stereotype inherits all these properties" (Paternò & Mancini, 2000, 6). The three profiles are each characterized by what is perceived to be the goals, knowledge level, and interest of particular individuals. It is assumed that tourists want basic information that is clearly presented and is organized spatially. Students, on the other hand, have a bit more knowledge of the subject and so want more topics to choose from with more available detail. Finally, experts want access to all information that is available on subjects. They have much more knowledge and want to be able to formulate requests more flexibly.

The three profiles also differ in the way they provide initial access to information. It is assumed that the tourist probably does not know initially what they want to look at and so they are given four topics to choose from: city information, museum information, a city map, and a map of the gallery (See Appendix #3). Students are expected to have more of an idea of what they are looking for, so they are given lists from which to make selections (See Appendix #4). The experts are assumed to need minimal support (See Appendix #5). They are given query boxes in which to enter queries based on sculptor, definition, century, work, or material name (Paternò & Mancini, 2000).

Another component that differs for profile is the information provided for each object. After having selected an object, the tourist is usually provided with the following elements: title, description, author, material, and general dating.

Information is intended to be presented in a clear fashion and not be too detailed. According to Paternò and Mancini (2000) the tourist just wants “basic and distinguishing information” so as not to get overwhelmed by too much information at once (11). The student profile has a slightly different presentation style. First, the font used is not as large and the exact date is given instead of general dating. Second, “other information” is available which can include things such as: subject, address, dating elements, work stage, state of conservation, and author bibliography. In contrast to the tourist and student, the information presented to the expert is not as simplified and it is more detailed. For example, the assumption is that a definition is not necessary with this profile. Also, precise dimensions of the work are provided along with the exact date of completion. Additional information and author bibliography are provided if the user chooses to view them.

The last component that varies depending on user type is navigation. The main difference here is the style that is used with the tourist versus that which is used for the student or expert. The tourist is provided with structured navigation that is spatially represented. Once they have navigated to an item they are provided with more links than are available with the other two user groups. They have the option to go back to the start of the web page, get a list of other works done by the particular artist they are looking at, or simply move on to the next work included in the section. The student and expert do not have such structured navigation as they are expected to have enough knowledge to formulate their own query and then deduce where it is they need to go next without further guidance. At all times, a pull-down menu is provided so that a user can change their profile during their

virtual visit. This feature is assumed to be beneficial if, for instance, a tourist feels they need more detail and feels confident enough to move up to the student or expert level. On the other hand, if an expert or student wants a quick and simple perspective, they can quickly navigate around using the tourist interface.

The Marble Museum is unique because it provides a virtual exhibit that is considered largely user driven. An experience is available to the user that is different from that which would be provided in the museum's physical setting. There is the opportunity to choose different formats and presentation styles according to one's interests instead of having these things dictated entirely by the curator and/or web designer. This particular exhibit would likely be considered a success by some simply because its format is not constrained by trying to reiterate the physical museum's exhibit's presentation style (Argoski, 1995). Many sites try to reconstruct the feel of the physical museum by trying to maintain the same layout or even by constructing levels which match the floors of the museum. This is thought unnecessary by critics as many virtual visitors will likely never even see the physical visit and thus the layout will not provide any additional meaning. Argoski (1995) expresses the need for virtual exhibits to be considered, "a totally separate entity" from the physical exhibit (3). The Marble Museum seems to follow such advice as it uses the Web to tailor information to different types of users instead of simply duplicating a physical display which is likely to appeal to only one user group.

Although the Marble Museum does a nice job of appealing to different users, one might argue that it doesn't allow the visitor to create their own

individual experience. This seems to be a criticism of many a virtual exhibit found in the museum literature. A “single truth” is presented by most curators and thus the visitor is not encouraged to interpret a work of art in any way but that which is already provided. According to Teather and Wilhelm (1999) who discuss George Hein’s (1998) education theories, this way of presenting information could be compared to the didactic, or authoritative way of teaching. This is the tendency of web sites to provide one option of viewing artwork and giving one interpretive point of view. Visitors are not encouraged to question “truths”, but instead are expected to simply process facts (Teather & Wilhelm, 1999).

Another type of learning that Hein (1998) mentions is called discovery learning. With this type of learning the authority is less prevalent and students are encouraged to participate in hands-on or interactive experiences. Instead of being presented with the “truth,” visitors to a web site might be encouraged to *find* the “truth.” This does allow the student to be more involved in the learning-process, but according to Hein, in the end the student is still expected to find the “right” answer (Teather & Wilhelm, 1999). When considering virtual exhibits, an example of discovery learning might entail the visitor being presented with a game or even a quiz which asks questions about a certain piece of artwork. The user is encouraged to study the work and questions might be posed for the visitor to consider. The desired result is that the virtual visitor spends time pondering the artwork and will be more likely to remember the work and/or will learn more about how the piece relates to other works; where the work originated, who the artist was, and so forth. It emphasizes learning by doing, but the knowledge

learned is that which is pre-established by the museum curator. Or as Hein (1998) explains it, “(u)sually the emphasis is on exploration – asking questions and being able to have experiences with materials – rather than on arriving at conclusions or learning something in particular” (31).

The third theory of learning that Hein discusses is that of constructivism. In this instance, the learner is more involved in the knowledge that he or she constructs. The virtual patron would be able to use their own life experiences in order to relate to and understand works of art. According to Teather and Wilhelm (1999), the constructivist web site is one which would, “...employ a wide range of active learning approaches, present a wide range of points of view, and provide many entry points, with no specific path and no identified beginning and end” (16). At this point in time, it is rare to find a site that adheres to most of the criteria mentioned above. The Marble Museum is one which provides several entry points and allows the user to select a custom profile, but virtual exhibits which provide a wide range of views are still rare.

It is certainly much easier for a web designer to create a virtual exhibit that is geared towards an unspecified audience. Yet time and time again, the research implies that the most effective virtual exhibits are ones that patrons can relate to. As Bowen, Bennett, and Johnson (1998) explain, based on a survey conducted by Reynolds (1997), “(c)urrently the most common reason for visiting a museum Web site is to explore a personal interest” (15). In order to allow visitors to get the most out of their virtual visits, many researchers believe that museums must learn how to exploit technology better. Teather and Wilhelm (1999) conclude that this can only

be achieved if museums redefine their role in society. They state, “(d)iscussions of the use of technology in museums must therefore begin with identification of who we are and who we want to be as museums within our multiple and varied identities” (7).

As previously described, there are many different opinions about how to create an effective virtual exhibit. Regardless of the various opinions, the fact remains that an online exhibit can allow museums of any size to display their work to a larger audience (Koenig, 1997). In addition, a virtual exhibit can contain information and works that a physical museum may not otherwise have room to display. These materials can be archived and offered indefinitely on the Web to a variety of audiences. The research reported in this paper will explore what museums consider the definition of a virtual exhibit to be, how they choose to display their works, who their target audience is, and what experiences they want visitors to have.

Methodology

Online surveys were sent via e-mail to 100 art museums in the United States having exhibits available online. The museums were selected by doing web searches in four different search engines. The search engines used for this study were: AltaVista, Excite, Google, and HotBot. At each search engine the words “exhibit and art museum” were entered in the text box. The top twenty-five hits were selected from each search engine and duplicates were eliminated.

For the purpose of this study the definition of “virtual exhibits” was left intentionally vague, due to the fact that the literature outlines several different approaches to presenting one’s art exhibits online. Part of the intention of this study was to try and determine what curators believe qualifies as a virtual exhibit. Too specific a definition would be restrictive. Although the definition is left rather broad, the top twenty-five web sites from each search engine were examined before inclusion on the survey list. Any site that had an exhibit page that included no images but merely a few sentences about the exhibit and its place and time was eliminated. When this happened, the next museum in the search results was selected. In most cases, more than twenty-five sites were examined on a particular hit list in order to obtain twenty-five that qualified.

Once the list of 100 museums was finalized, an e-mail contact was obtained for each. The address was found from information on the web site. If a webmaster e-mail address was available, the survey was sent to this address. If no such address was listed,

then e-mail was sent to the information address on the site that was intended for fielding questions about the museum. The consent form asked that the survey be forwarded to the person who could best answer questions about exhibits on the web site. The form was embedded in all e-mails so that participants would understand the purpose of the research and their rights as research subjects (See Consent Form in Appendix #6).

The survey URL was provided in the consent form that was e-mailed to all participants (See Survey in Appendix #7). CGI scripts were used to collect the form data. A follow-up e-mail was sent to those museums that did not reply within two weeks following the original solicitation. The second e-mail was the same, except for an additional note that the study was still taking place and their participation would still be welcome.

Statistical analysis consisted of tallying the results of multiple choice answers and calculating percentages. In some cases, the minimum, maximum, mean, and medians of survey results were calculated. Tables were provided for each question and brief statements pointed out the most significant findings.

Content analysis of the virtual exhibits was performed by sampling one web exhibit from the most current URL provided by each museum participant. The analysis consisted of counting the number of images provided by each exhibit along with classifying exhibits into different types based on their navigational components, presentation of artwork, organization of materials, and multimedia capabilities. The goal with this analysis was to assess the content and interactive qualities of various virtual exhibits.

Results

Thirty-seven participants from thirty-seven separate museums replied to the survey. Three of those who replied chose not fill out the survey as they did not consider their exhibits to be virtual. The following results were gathered from the thirty-four respondents (34% of the original sample of 100 museums) who provided information to all applicable survey questions (see the list of museums in Appendix #8). Results of the survey are described below and are grouped by question type. The complete survey is included in Appendix #7.

Putting Exhibits Online

The first few survey questions asked about the museum's experiences with putting virtual exhibits on the Internet. First, they were asked when they mounted their first virtual exhibit (see Table 1). While one museum had an exhibit on the Internet as early as 1993, most began mounting virtual exhibits since 1996.

Table 1. Year of First Virtual Exhibit

Year	Number of Museums
1993	1
1994	2
1995	3
1996	5
1997	4
1998	6
1999	5
2000	6
No Response	2
Total	34

Participants were also asked when their most recent virtual exhibit was put on the Internet (see Table 2). Approximately 2/3 of all participants had mounted a virtual exhibit in the past year.

Table 2. Year of Most Recent Virtual Exhibit

Year	Number of Museums
1995	1
1996	1
1997	1
1998	1
1999	6
2000	21
No Response	3
Total	34

The content analysis of the respondents' web sites indicated that there is quite a variation in the number of images that are provided online, ranging from 1-200, with a median of 10 images per exhibit. This information was gathered from

a sampling of one virtual exhibit per museum web site that responded to the survey.

The content analysis also showed that there are different ways in which virtual exhibits can be represented (see Table 3). Some exhibits were strictly for advertisement purposes and provided short text and on average less than ten images. Other exhibits contained little text, but provided video of the actual physical museum. One exhibit had a brief slide show available via Real Player. Other exhibits were more similar to "typical" web sites where a main page was displayed along with several sub-pages beneath it.

Table 3. Type of Exhibits

Exhibit Type	Number
Advertisement Exhibits	11
Virtual Reality Movies	7
Real Player Presentation	1
"Typical" Web Page	15
Total	34

Relationship Between Physical and Virtual Exhibits

Some of the questions posed in the survey were concerned with how the physical and virtual exhibits were related. The first question asked whether or not museums put all of their physical exhibits online (see Table 4). The results indicated that 1/3 of all

museums do translate all physical exhibits into virtual exhibits while 2/3 of the respondents said they only put a selection of their physical exhibits online.

Table 4. Number of Respondents That Do/Do Not Put All Physical Exhibits Online

Response	Number
Yes	11
No	22
Other*	1
Total	34

* One museum is only available online.

The next question asked those 22 respondents who said that they did not put all exhibits online to estimate the percentage of the physical exhibits that they do make available virtually. Of the 22 potential respondents to this question, 73% provided a specific percentage. The minimum percentage of physical exhibits available virtually was 1% while the maximum percentage of physical exhibits available virtually was 80%. The median percentage of physical exhibits available virtually was 25%. A few answers were given that were not percentages. These included statements such as: "only 2 on Web so far with 'full' treatment," "almost all," "exhibit artist web sites are linked to main museum web site," and "1 of 10 annually." Also, two respondents failed to answer this particular question.

Respondents were also asked whether or not they ever created exhibits exclusively for the Web (see Table 5). 26% of those who responded indicated that they did create exhibits for the Web which were never on display physically.

Table 5. Number of Museums That Do/Do Not Have Exhibits Created Solely for the Web

Response	Number
Yes	9
No	25
Total	34

The relationship between museums that put/do not put all physical exhibits online versus museums that do/do not have Web-only exhibits was also explored (see Table 6). Only three of the museums actually had all their physical exhibits available virtually along with some Web-only exhibits. Of those respondents who indicated that they did not put all of their physical exhibits online, more than three times as many also indicated that they did not have Web-only exhibits.

Table 6. Museums that Put/Do Not Put All Physical Exhibits Online Versus Museums That Do/Do Not Have Web-Only Exhibits

Put Exhibits Online	Have Web-Only Exhibits		Total
	Yes	No	
Yes	3	8	11
No	5	17	22
Total	8	25	33

*Note: The one respondent to the survey that had an art museum that was exclusively a Web-only museum, was not included in this question.

Participants who did respond that they had created Web-only exhibits were asked how many they had displayed in the past year. Of the nine who had Web-only exhibits, the minimum number of exhibits displayed in the past year was zero while the maximum was 20. The median was one exhibit in the past year.

These nine participants were also asked about the number of Web-only exhibits they had currently available on their museum's web site. The minimum number of Web-only exhibits currently available was zero while the maximum was 20. The median was two exhibits currently available. One respondent replied that their Web-only exhibit was "still in progress" while another gave no response for this particular question.

It was also determined that exhibit type can influence whether or not museums are able to put all physical exhibits online (see Table 7). In terms of advertisement type pages, the number of those who put all exhibits online versus those who did not showed little difference. In the case of exhibits with virtual reality movies, two and a half times as many respondents reported that they did not put all exhibits online than those that did put them all online. Of those with "typical" web pages twice as many respondents reported that they did not put all of their physical exhibits online than those that did put them all online.

Table 7. Number of Exhibits Online versus Exhibit Type

Exhibit Type	Put All Exhibits Online		Total
	Yes	No	
Advertisement Type Pages	5	6	11
Virtual Reality Movies	2	5	7
Real Player	0	1	1
"Typical" Web Page	5	10	15
Total	12	22	34

Another of the survey questions asked participants to indicate how long their virtual exhibits remain online (see Table 8). The greatest percentage of respondents (approximately 74%) indicated that their virtual exhibits remain online indefinitely.

Table 8. Amount of Time Virtual Exhibits Remain Online

Response	Number
Indefinitely	25
Varied depending on the exhibit	5
Until the physical exhibit is taken down	4
Other	0
Total	34

Motivations for Mounting Virtual Exhibits

There were some questions in the survey that were posed in order to get a feel for why museums have decided to mount virtual exhibits. The first of these questions asked respondents to pick from a list of reasons for putting virtual exhibits online. They were asked to select the one response that they considered most important. It was found that the most popular reason given for mounting virtual exhibits was to encourage individuals to visit the physical exhibit (see Table 9). This reason was given by approximately 44% of all respondents. The second most popular answer (26% of all respondents) indicated that museums mount virtual exhibits so that their web site visitors can visit their museum remotely. There were five additional responses written in by respondents (also included in Table 9).

Table 9. Reason Why Respondents Decided to Put Virtual Exhibits Online

Response	Number
To encourage individuals to visit the physical exhibit	15
In order to include additional resources	0
So all individuals who are not able to visit the museum can view materials remotely	9
So visitors to the web site can view materials at their own pace	1
*All of the above are equally important	3
*For educational purposes	2
*To preserve exhibits for ongoing research and study	2
*At this time our museum is virtual only	1
*To create the most important online resource in the world	1
Total	34

*These are responses that were written in under the "other" category by survey respondents.

Attention was also given to the reasons for placing exhibits online and if these reasons influenced whether or not these respondents put all of their exhibits online (see Table 10). More than three times the number of respondents who answered "so those who can't visit the museum can view material remotely" reported putting all of their exhibits online compared to those who didn't. One third more of the respondents who replied that they put exhibits online to "encourage individuals to visit their museum" did not put all their exhibits online while the rest of them did put their exhibits online.

Table 10. Reason For Placing Exhibits Online Versus Number of Exhibits Online

Reason for Placing Exhibits Online	Put All Exhibits Online		Total
	Yes	No	
Encourage individual to visit physical exhibit	6	9	15
In order to include additional resources	0	0	0
So those who can't visit museum can view materials remotely	2	7	9
So visitors to web site can view materials at own pace	0	1	1
Other	4	5	9
Total	12	22	34

Participants were also asked to indicate the audience they were primarily trying to reach with their virtual exhibits. They were asked to choose the response they deemed most important from a selection of five (see Table 11). The most often selected audience was "Anyone browsing the Internet" which got about 47% of all responses. The following also each got one write-in vote under "other": "All of the above," "Multiple audiences," "Potential members and people from out of state interested in the type of art we display," "A diverse audience and people who are not necessarily museum goers," "People interested in art," and "The audience is intended to be broad-based, but

realistically we appeal to those who have a specific interest in the material our artists use."

Table 11. Audience Art Museums are Trying to Reach with Virtual Exhibits

Response	Number
Current museum members	0
Potential museum members	6
Researchers	1
Teachers	4
Anyone browsing the Internet	16
Other	6
No response	1
Total	34

The next table examines whether or not the audience type being appealed to was related to the reason given by respondents for creating virtual exhibits (see Table 12). The results indicate that respondents who answered that they appeal to anyone browsing the Internet are most likely creating exhibits in order to encourage individuals to come visit the physical exhibit. The second most given answer for this audience was "so those who can't visit the museum can view materials remotely." For museums that create virtual exhibits to appeal to potential members, almost all exhibits were created in order to encourage individuals to visit the physical exhibit.

Table 12. Reason for Creating Virtual Exhibits versus Primary Audience

Primary Audience	Reason for Creating Virtual Exhibits					Total
	Encourage individuals to visit physical exhibit	In order to include additional resources	So those who can't visit museum can view materials remotely	So visitors to web site can view materials at own pace	Other	
Current museum members	0	0	0	0	0	0
Potential museum members	5	0	0	1	0	6
Researchers	0	0	0	0	1	1
Teachers	0	0	2	0	2	4
Anyone browsing the Internet	9	0	5	0	4	18
Other	1	0	2	0	2	5
Total	15	0	9	1	9	34

Respondents were also asked to pick one response from a list that best described their goal for users when creating virtual exhibits (see Table 13). The most popular answer for this question was "a desire to visit the physical exhibit at the museum" (approximately 41% of all responses). However, the response of "new knowledge about the topic being portrayed" was a close second with approximately 35% of all respondents selecting the response. There were six responses that each got one write-in answer under the "other" category. These responses included: "all of the above," "an enriching, engaging, educational experience," "a desire to attend an event at the museum," "accessibility," and "to attract visitors to the museum so they can connect with collectors and artists, and to share knowledge."

Table 13. Respondents' Goals for Visitors When Creating Virtual Exhibits

Response	Number
A desire to visit your museum	14
A feel for the physical exhibit	2
New knowledge about the topic being portrayed	12
Other	5
No response	1
Total	34

The relationship between the type of exhibit and the museums' desired experience of the visitor was also examined (see Table 14). The results showed that almost all of the respondents who answered "new knowledge about the topic being portrayed" as the goal for their audience had typical web pages. In comparison, those whose main mission was to use web exhibits to get visitors to come to the physical museum used a variety of approaches when designing their pages.

Table 14. What the Respondents' Want Users to Get Out of Their Virtual Visits Versus Exhibit Type

	What Respondents' Want Users to Get Out of Virtual Visit				Total
	A desire to visit your museum	A feel for the physical exhibit	New knowledge about the topic being portrayed	Other	
Exhibit Type					
Advertisement Type Pages	7	2	0	2	11
Virtual Reality Movies	3	0	2	2	7
Real Player	1	0	0	0	1
"Typical" Web Page	3	0	10	2	15
Total	14	2	12	6	34

Interactive Virtual Exhibits

Several questions posed in the survey asked respondents about interactive exhibits. For those who replied that they did have interactive components, questions were asked about the availability of them. The first question asked respondents if they had ever mounted a virtual exhibit that they would consider to be interactive (Table 15). Almost 25% of respondents reported having interactive exhibits.

Table 15. **Respondents Who Have Interactive Exhibits**

Response	Number
Yes	8
No	25
No Response	1
Total	34

For those who reported having interactive exhibits, a question was posed which asked when they made the first one available on the Internet (see Table 16). The results showed that the first interactive exhibits generally trailed the first virtual exhibits mounted (Table 1) by about three years. In addition the dates were not as widespread. Respondents with interactive exhibits were also asked when their most recent was made available on the Internet. There was not enough data received for this question to make any substantial conclusions.

Table 16. Year first “interactive” virtual exhibit was made available on Internet

Year	Number
1996	1
1997	1
1998	1
1999	2
2000	2
No year provided	1
Total	8

Summary

The results obtained from the survey reveal that 61% of all respondents have mounted a virtual exhibit in the year 2000. Of the 34 respondents who answered the survey, only 24% reported to have virtual exhibits which they considered to be interactive. The most oft cited reason for putting virtual exhibits online was to encourage individuals to visit the physical exhibit. 46% of respondents intended their virtual exhibit audience to include anyone browsing the Internet. 74% of respondents intended for their virtual exhibits to remain online indefinitely.

Discussion

The survey results revealed that the most common reason given for putting virtual exhibits online is to encourage people to come visit the physical exhibit at the museum. The second most cited answer for creating virtual exhibits was so that Internet users could view museum materials remotely. The virtual exhibits designed were most often kept indefinitely and were usually created to appeal to anyone browsing the Internet. The majority of respondents did not have exhibits that they considered interactive although there was a lot of interest expressed in designing future exhibits with more interactive components. More than half of the respondents had created a virtual exhibit in the year 2000 and most relayed a desire to keep improving them for the future.

Definition of a Virtual Exhibit

After reviewing the survey results and examining the contents of several virtual exhibits of museums that participated in the study, one thing that became apparent was different museums have different ideas about what constitutes a “virtual exhibit.” As explained earlier, the definition for “virtual exhibit” was left rather open ended in order to learn more about how different museums interpret the term when filling out the survey.

The survey results showed that the biggest reason museums put virtual exhibits online is to entice individuals to come and visit the physical museum. It is unlikely that museums will put extensive exhibits online when the main goal is to attract a physical

audience. The idea is to show enough material to pique someone's interest without showing them so many items that they would not bother to visit the museum. In these cases, where a few images were displayed along with some short text, there was some disagreement as to whether or not they qualified as "virtual exhibits." Approximately four of the thirty-four participants that replied to the survey did not consider their exhibits to be virtual. One museum did not see their exhibits as qualifying as virtual as they stated that "...while we have done some rather elaborate notice and ads of exhibitions, we have not done anything that I think of as a 'virtual exhibit.'" Another wrote, "We put a selection of images from every show online, along with at least basic text. It may be one image with a couple of paragraphs, or it may be dozens of images with many interlinking features. Either way, it's not the same thing as 'putting an exhibit online.'" Seven other museums, which had the same format for their exhibits (brief text and images), did claim to have virtual exhibits. They based their decision on the fact that they were displaying images online. None of these seven exhibit pages had more than nine images on their pages and all images were restricted to one page. Images were accompanied by text, but it was nearly always brief and a lot of it was dedicated to information about the physical exhibit.

Although one might deduce that few images were provided on many pages because the goal was simply to advertise the physical museum, there may be other reasons for the limited scope of materials available online. For instance, the size and resources available to the museum may have greatly influenced its ability to provide materials online. As one participant expressed, "...our museum's small staff size and budget does not allow for someone to dedicate significant amounts of time to designing

and maintaining the site. We strive to discuss each exhibit in some detail, though a lack of resources sometimes prevents us from including images of every work in an exhibition.” Another participant expressed similar frustrations as he/she wrote, “I wish to make the virtual exhibits more extensive and also evaluate their effectiveness...but we have no trained webmaster.” The size and resources of the specific museums was not an issue when soliciting participants for this study, but such information is bound to influence an exhibit site’s depth and appearance.

Seven of the respondents had what is called a virtual reality movie or video gallery. In these cases, Apple Quicktime was required in order to view any materials. First, the user selects a specific gallery, then Quicktime loads the video file across the network. In order to move about the gallery the user can zoom in and pan towards specific art pieces as well as rotate 360 degrees. One of the respondents that had this type of “virtual tour” criticized their current video for having poor graphical resolution. They further explained that they were planning to update the tour very soon in order to provide better quality. Another respondent noted that the museum he/she is affiliated with tried out a technology that provided “virtual tours” about two years ago, “...but we were not satisfied with the quality of the technology.” None of the exhibits viewed that had this “virtual tour” technology seemed to have the capability to provide a very focused view of art materials when using the zoom feature. It was difficult to see the art work in great detail and the quality was poor enough to make reading the descriptions of artwork that were mounted next to the pieces impossible. Although considered to be lacking in quality in some cases, these “tours” do have the ability to let the user see the art work differently from what still images (i.e., gifs or jpgs) provide. As one survey participant

noted, "...the nature of art objects, conceptual work notwithstanding, demands a physical presence, paintings get flattened, sculptures more so, and performance work likewise."

This "physical presence" is something which can be maintained with the help of video as works of art don't have to be modified as much for the screen.

One of the participant's museums had a virtual exhibit that was available via Real Player. In this instance, there was a narrator who talked about the artist being featured and described a sample of his work. A few images flashed on the screen as the narrator spoke in order to give the viewer a taste for the type of work that would be displayed at the physical exhibit. The segment ended with an invitation to come visit the physical exhibit. In this case, viewing the virtual exhibit would be a very passive experience for the user. There is the ability to rewind, fast forward, and pause with the Real Player, but the user has no influence on the order the images are displayed and no discretion to pick and choose what he/she wants to view.

Fifteen participants had virtual exhibits which resembled what one would consider a "typical" web page. In these instances, a main page was displayed with several sub-pages beneath it. The way these museums chose to organize their sites varied depending on how comprehensive the pages were and how much textual information was available. For example, one of the exhibits was divided into four pages: Introduction, Gallery, Information on the Culture at the Time of the Art Works Conception, and a Teacher Source page. Instead of being an advertisement, this particular exhibit is described as a "complement" to the physical exhibit. In the gallery users can click on any thumbnail they choose in order to see enlarged images and read about the type of artwork being displayed. The text provided gives the name of the piece, its country of origin, and

the time period from which it originated. Very detailed structural information is also available via a hyperlink. The page on culture provides additional information on the functions of the pieces displayed, methods used to make the materials, and a description of the people who designed such pieces. The page for teachers is designed to, "...be used in the classroom with supplementary materials if a visit to the Museum is not possible." Lesson plans and resources are provided for teachers to use for class activities. Other similar exhibits with sub-pages had categories that included titles such as: Introduction, Biography of Artist, Kids Zone, Credits, Galleries by Year, Critical Commentary, Exhibit Facts, Lesson Plans, Pictures, Director's Message, Drawing Techniques, Curator Notes, Learning Opportunities, etc.

All of the exhibits with this more common web-page look provided textual information to supplement the works of art. The type of information that the museum provided varied depending on the particular exhibit. All of these exhibits provided factual information with each piece of art displayed. The factual information usually included things such as: name of artist, year work was made, medium type, country where work was made, and size of work. Additionally, most exhibits gave information about the donor of the work, its sponsors, and curators. Seven of the fifteen exhibits included biographical information about the artist. This was most often done if the exhibit only displayed the work of one particular artist.

The Goals of Virtual Exhibits

The majority of exhibits in this study simply provide factual information. However, there are a few exhibits out of the sample that include text that is phrased in a way which encourages site visitors to think about the art work being viewed. For example, one exhibit page questions, “Does X (the exhibit name) render a particular community, Livermore, California or does it depict a social class?” Another example is an exhibit which has a kid’s section that allows children to study certain paintings and then reflect on what they see and relate it to their own lives. They are asked questions that persuade them to think about why certain colors were used or encouraged to write stories which describe what they think is going on in a certain painting. This is an example of one of the few exhibits that asks the user to think about the work instead of having it pre-interpreted for them. Another exhibit uses its collection to promote independent thinking. It does this by enabling the visitor to put two drawings that depict similar images right next to each other so the artwork can be compared. There is text explaining some of the differences and similarities, but there is an opportunity for the user to understand and/or interpret the text by having the two images side by side.

The previously described exhibits (those which dedicate pages to text about images and their context) are likely to allow visitors to learn about the exhibits regardless of whether or not they visit the museum itself. So, it seems fitting that of the fifteen museums which had this type of exhibit, ten of them answered “new knowledge about the topic being portrayed” when asked what they wanted their visitors to gain out of a virtual visit. Some of the comments given by respondents also articulate their desire to use their virtual exhibits as an education tool. One respondent states, “...seems like a great

resource for educational materials and an inexpensive way to maintain resources/images/etc.” Another respondent criticizes museum sites for being too, “...self serving, hoping to entice either visitation or membership.” They go on to explain that they would like to provide more substantial content that might promote learning.

One of the survey questions asked whether or not the museums put all of their physical exhibits online. Of the thirty-four participants who answered the question, twenty-two of thirty four answered that they did not put all exhibits online while eleven said they did put all physical exhibits online. One possible explanation is that those whose main mission in mounting virtual exhibits is to attract visitors to the physical museum might also be those who would try and put all exhibits online. However, there did not seem too much validity to this proposition because, of the fourteen who did answer that their main mission was to attract visitors to their physical exhibit, only five said that they put all exhibits online. Another possible explanation is that the exhibits which display just a few images on one page might be more likely to put all of their exhibits online as their exhibits were so small. However, there was no clear relationship between these variables as these type of advertisement exhibits were split almost evenly in terms of whether or not the museum put all exhibits online.

Whether or not museums put all of their physical exhibits online is largely dependent on the museum's financial resources and whether or not they have the skills to create and maintain web pages. One of the museums commented that being affiliated with a university meant that they had a lot of help maintaining their web site. They stated, “We depend on other University of X departments to create our virtual exhibitions due to their expertise and our limited staff time.” A different museum whose web site

was done entirely “in-house” explained that creating exhibits is not cost-efficient and that they only have the resources to commit to 2-5 virtual exhibits annually.

Another factor determining whether or not a museum puts all exhibits online is the size of the museum and its mission. One of the museums that participated in the study, and put all exhibits online, explained that their, “Web audience is considerably larger than our through-the-door audience.” Due to this fact, the museum chose to dedicate extra time to mounting exhibits online. In contrast to many of the museums that display collections of deceased artists, one participant in the study explained that most of the exhibits held at their museum were those of current artists whose work they had selected to display for a period of time. This respondent explained that the museum put information about all exhibits online so, “...the artists who have exhibited with us in the past can direct others to see their work.”

Another question asked in the survey was about the duration of time museums kept their exhibits up on their web sites. Seventy-three percent of the respondents (twenty-five out of thirty-four) indicated that exhibits were kept indefinitely. Most indicated that since archiving information on the Web is rather simple, it was to their advantage to keep all past information. Archiving past exhibit materials was of particular interest to those museums which consider themselves to be providers of research materials. As one museum stated, “This research component, is as important, even more important in some ways, than our desire to present our collections...” Archiving materials indefinitely was thought to be a way to preserve materials at a low cost. Some indicated that they added a subject search to their site so these materials could be accessed easily by the web site visitor.

Although most answered “indefinitely,” there were a few museums which indicated that they did not preserve all exhibit information. One respondent explained that their museum only archived what they considered to be the “bigger” exhibitions. One might deduce that these “bigger” exhibitions are ones that have more substantial content and would still provide useful information no matter what the time period. In contrast, the smaller exhibits were likely ones that were solely used for advertising and thus would not have much value as time passes and the physical exhibit is long gone. Another respondent explained that, “information on the permanent collection stays up all the time” while exhibits that are not permanent are not archived. One can only hypothesize about why this is the case. Perhaps the exhibit materials are not in-house long enough to create a detailed web site or maybe this particular museum does not want to feature extensive information on materials that they do not own.

Another question that was posed to respondents was about whom they considered to be the target audience for their virtual exhibits. Forty-six percent (16 out of 34) responded “anyone browsing the Internet.” This seems to indicate that most designers of virtual exhibits don’t have a very specific audience in mind when creating their web sites. This may be an indication of why the virtual exhibits viewed varied in style so much. If there is no particular audience in mind, then web site designers feel no obligation to adhere to any specific format when creating exhibits.

Six of the respondents said that they created their virtual exhibits specifically for potential museum members. Because of this, it was not surprising that of these six, five indicated that they make exhibits available online in order to encourage individuals to visit the physical exhibit. It also made sense that these five museums displayed very few

images from the collection on their web pages. If the idea in creating the exhibits is to attract visitors to the museum so they will get involved and become members, then it would be fitting to just give visitors access to enough information and images to entice them to visit. For this group of five museums that create their virtual exhibits for the sake of attracting museum members, the average number of images displayed was only 5.8.

Of the thirty-four respondents, one indicated that their target audience was researchers while four implied they targeted their exhibits to teachers. Of these particular respondents, only one indicated that their goal was to attract visitors to the physical museum, but this respondent was the individual who answered “all of the above” to the question. Two respondents said that the goal of their virtual exhibits was to provide educational tools, and two said the purpose of their site was to reach individuals who are not able to visit the museum so they can view materials remotely. For this particular group of virtual exhibits the average number of images displayed was equal to 40. The fact that the mean is so much higher than that of the group that promotes their exhibits to potential members seems realistic. Museums that are targeting teachers and researchers will want there to be more information available online so learning can be had outside of the museum.

Interactive Virtual Exhibits

A question concerning interactive virtual exhibits was included in the survey to get an idea of how many museums have them. The word “interactive” was not defined in the survey in order to get a sense of what is deemed interactive by museums. Only twenty-four percent of participants (8 out of 34 respondents) reported having exhibits

that they would consider interactive. The *High-Tech Dictionary Definition* of interactive is, “A term for computer programs that accept input from the user while they are running;...The interaction between computer and user may take place through typed commands, voice commands, mouse clicks, or other means of interfacing.” This was the definition used when assessing the URL’s of museums that consider certain exhibits to be interactive.

To begin with, one of the respondents who had replied that their museum did have interactive exhibits, did not provide its URL. Another respondent gave a URL which was not working at the time of this study. Three of the remaining six exhibits were judged to be interactive because of the opportunity to use mouse clicks in order to learn more about exhibits. The first exhibit has a page with, “Interactive art activities for kids and families.” This particular site gives the visitor five selections to choose from: Explore--Color/Portraits/Composition/Light&Shadow/Mood. These particular pages all have some content about the subject matter and then give the visitor the chance to either click on a piece of artwork for a more detailed perspective or provide a short quiz using the object. For example, one section shows a portrait and then allows the user to guess what type of pose is being portrayed in the portrait. The visitor is given three choices to select from. When the visitor clicks on the selection, they are either told they are wrong, and given an example of why what they chose was wrong or are told they are right and are given another example of the correct answer to exemplify the point.

The second interactive exhibit gives a page of thumbnails for the visitor to select from. Once a particular picture was selected, the visitor had the opportunity to click on any part of the picture in order to see a close-up view. The third exhibit gives the visitor

the opportunity to make a web page about photography. Examples are given of three types of different photos and then the visitor is asked to make a selection concerning what type of photos they want displayed in their page. Information is provided about each photo type so visitors know something about the medium and style they are selecting. Once all selections have been made, the visitor can start making their web site. This means selecting colors for the page along with guessing who they think is the artist and the style being depicted. The visitor hits enter and the created page is displayed. There is the opportunity to save the page and view other pages made by virtual visitors.

Another one of the exhibits is most likely listed as interactive because it has a gallery which is accessible with Quicktime. The visitor to this site has control over which works of art are viewed by the way he/she zooms in or rotates with the mouse. In other words, the visitor has input in the sense that he/she is able to determine the path of the tour.

The next interactive exhibit used typed commands and mouse clicks to promote interactivity within its site. One of the opportunities provided to the user is that of creating one's own personal tour. This consists of the ability to select artworks of particular interest and save them as a tour where the visitor can, "...comment on the artworks for other people to see." In order to save artworks, the user only has to click the mouse on a "tour list tab." Another component that is interactive is the timeline which is included within the virtual exhibit. The visitor has the ability to move the timeline as fast or as slow as he/she wants with the added ability to stop the timeline, click on an image of interest, and view it in greater detail. This site also has a learning section with several activities, including: a match game where uncovering pairs of artwork makes you a

winner; a program which allows the visitor to create their own artwork and send it as a postcard; instructions on how to draw/make certain art pieces at home; and the tools to be the curator of one's own web exhibition.

The last exhibit viewed was probably considered interactive due to its hyperlinks. This particular page is divided into sections which all have a lot of text. Visitors have the ability to choose which section to read in which order.

After examining the sites that were judged to be interactive by respondents it becomes clear that not all participants in the study agree on what the term means. Although a lot of the so-called non-interactive exhibits had the same components (i.e., Quicktime, resizable images, hyperlinks, etc.) as the "interactive" ones, those who responded did not consider them interactive. Some participants did indicate that they had some "interactive features" in particular exhibit sites, but did not include the URL's of these exhibits because they did not consider them substantial enough.

It is hard to draw any major conclusions about the interactive exhibits because so few museums reported having them. The question asking about when the most recent interactive exhibit was put online didn't provide much insight as four of the eight respondents failed to provide a date. It appears that more museums put their first interactive exhibits online recently, as four of the eight were put up between 1999-2000. It would seem logical that, as Web technologies advance each year, more museums would strive to include interactive features. Some respondents did allude to a lack of time and money which prevented them from including interactive components. There didn't seem to be a lack of interest, but rather a lack of resources.

Conclusion

The response rate to this survey was lower than what would have been desired in order to arrive at conclusions which could be considered statistically reliable. Less than half of those who received surveys sent back replies. One reason for the low response may have been related to the distribution method. Contacts were determined by searching for the webmaster e-mail address at the museum web site. Some of the sites did not have webmasters, so the survey was sent to an address provided for general questions. A lot of the museums did not know who to forward the survey to and in some cases, a lot of different people had worked on and maintained the site over the years. It is possible that mailing a physical survey would have given the staff more incentive to find and route the paper to the appropriate party. On the other hand, the online survey was more efficient to administer and far less expensive. Due to the lack of financial resources for this survey, the ability to encourage a higher response rate was severely curtailed.

Another problem encountered was that the survey was sent to a broadly-defined category of art museums in the United States that were determined to have online exhibits. It included museums of various sizes and financial means. Such a heterogeneous group may have introduced lurking variables that could not be accounted for in the analysis. A future study might concentrate on a smaller, more specific group of museums. For example, museums could be categorized by mission, types of exhibits displayed, or amount of money dedicated to exhibits.

The last concern was with the rather ambiguous definition of the term “virtual

exhibit.” Some individuals implied that they would have liked to have a more specific definition in order to answer the questions more accurately. A few participants responded that they could not fill out the survey as they did not consider their exhibits to be virtual. Perhaps a better description of the term and a more detailed explanation of the survey’s intent in the cover letter could have persuaded more museums to respond. Some considered a virtual exhibit to be anything related to the physical museum that is placed online. Consideration was not given to the quantity of information available, only to the fact that something related to the museum has been put on the Web as an advertisement for the physical exhibit. Others were more sophisticated and particular when defining the term “virtual exhibit.” Many museums did not see their exhibits as virtual even though at times their web material was much more detailed than those who did claim to have virtual exhibits. It appears that some respondents believe a virtual exhibit has to be akin to virtual reality. They consider something virtual to be that which allows the web visitor to see their exhibits via video. Finally, others seemed to define a virtual exhibit as a web site whose main purpose is to display a lot of images and information about a particular exhibit. These were most often web sites with strong navigational capabilities and enough content to let the user learn without having to visit the physical exhibit. After examining the thirty-four sites, it became apparent that the vocabulary used to describe web-based art exhibits is far from standardized.

It appears that museums are quite interested in making exhibits available to web users. The last three years has seen an increase in museums providing online content about exhibits. Additionally, 61% percent of those surveyed say that they have put an

exhibit online in the year 2000. Many of those surveyed provided comments about wanting to improve their exhibits.

Lack of resources was the most oft-cited reason for not putting all exhibits online. Either museums lacked people with adequate technical abilities or they lacked the money to outsource the job. Along these same lines, another significant issue was lack of time dedicated to maintenance of the site (this is a likely reason why 32% of those surveyed had the time to put all physical exhibits online and only 26% had the time to create web-only exhibits).

The reasons that museums gave for mounting their virtual exhibits were also enlightening. The majority of the museums surveyed wanted to use their virtual exhibits to attract individuals to the physical museum as well as attract new museum members and financial donations. Some respondents felt that the Internet is not yet a suitable substitute for the experience of viewing art in person, which is why they refrained from adding a lot of online content. Sizes, shapes, and colors are the essence of art. The Internet does not always preserve these characteristics in their original state and some feel it ruins the viewing experience. Thus, in order to advance the state of the art in virtual exhibits, the challenge is not only in educating curators about the new Internet medium, but also in finding ways to use web technology to create exhibits suitable for even the most discerning art enthusiasts.

After examining survey results and reading literature about virtual exhibits, it became apparent that often the audiences' needs are not considered. The survey for this paper indicated that 46% of all virtual exhibits are designed for "anyone browsing the Internet." Considering that most people go to a web site for numerous reasons, it seems

exhibits might be more effective if they had an audiences' specific needs in mind. This might mean designing sites which gives users several topics to choose from. For example, those who are going to the site to find out more information about visiting the physical exhibit could select a category which would give them information about times and locations. Those who have no intention of visiting the museum but want to find out about featured exhibits would be able to move immediately to related information. There are many different ways this could be implemented depending on the type of museum and exhibits displayed.

Additional advice might be directed towards virtual exhibit designers. The quality of the pages should be considered carefully when mounting exhibits online. Several of the exhibits had video presentations which, although impressive, did not prove to be very helpful due to bad resolution. Further, none of these exhibits had text to accompany the artwork. It was nearly impossible to get a feel for what was being looked at, who the artist was, when the pieces were made, etc. Further a large segment of Internet users are apt to be excluded from viewing the video due to slow connection times. These videos might have been improved if they had been supplemented by other material which provided more explanation. The main message would be that advanced technology does not always mean that something is "better." In these instances, more thought should have been given to what would work best for the audience.

In terms of future research, I think a usability study would be useful. It is important to hear from designers, but it is also necessary to learn more about what is important to the virtual exhibit visitor. This might entail users trying out different museum web sites and then answering questions about different types of features (i.e.,

image style, navigational capabilities, structure of pages, etc.). Knowing what is preferred by users would go a long way in helping designers organize future sites.

It also seems necessary to continue questioning museums about their definitions of virtual exhibits. It would be interesting to see how these views change over the years and to keep up to date on trends and why they are occurring. This particular study asked participants a lot of multiple choice questions, but future studies might expand on these questions in order to acquire more qualitative responses. More detailed responses might provide more explanation as to why certain museums design their exhibits the way they do and give more insight into their long-term goals.

Bibliography

- Argoski, J. (1995). Virtual museums: the web experience. *The Virtual Mirror*, 1-4. Retrieved June 24, 2000, from, the World Wide Web: <http://www.vmirror.com/rov-int/museums.html>
- Bearman, D. (1995). Museum strategies for success on the Internet. *Archives & Museum Informatics/Getty Art History Information Program*, 1-14. Paper based on talk given at Museum Collections and the Superhighway Conference, held at the Science Museum, 10 May 1995. Retrieved June 4, 2000, from, the World Wide Web: <http://www.nmsi.ac.uk/infosh/bearman.htm>
- Bowen, J.P., Bennett, J., & Johnson, J. (1998). Virtual visits to virtual museums. *Museums and the Web 1998*, 1-24. Retrieved June 24, 2000, from, the World Wide Web: http://www.archimuse.com/mw98/papers/bowen/bowen_paper.html
- Fernström, M., & Bannon, L. (1997). Enabling technology for museum visitors: issues and experiences, selected papers from *Museums and the Web 97*, Los Angeles. In D. Bearman & J. Trant (Eds.), *Archives & Museum Informatics*, 191-199.
- Hein, George E. (1998). *Learning in the museum*. London: Routledge.
- Koenig, M. (1997, December). More than museums. *Information Outlook*, 7(12), 15-16.
- Kydd, S., & MacKenzie, D. (1997). Going on-line: moving multi-media exhibits onto the web, selected papers from *Museums and the Web 97*, Los Angeles. In D. Bearman & J. Trant (Eds.), *Archives & Museum Informatics*, 299-313.
- Lord, L. (1999). Keeping our word: preserving information across the ages, *College & Research Libraries News*, 60(9), 629-644.
- Marable, B. (2000, June). A walk through an online exhibit, *Web Techniques*, 5(6), 42-46.
- McKenzie, J. (1997). Building a virtual museum community, selected papers from *Museum and the Web 97*, Los Angeles. In D. Bearman & J. Trant (Eds.), *Archives & Museum Informatics*, 77-86.
- Paternò, F., & Mancini, C. (2000, January). Effective levels of adaptation to different types of users in interactive museum systems. *Journal of the American Society for Information Science*, 51(1), 5-13.

Reynolds, R. (1997). *Museums and the Internet: what purpose should the information supplied by museums on the World Wide Web serve?* University of Leicester, UK: Department of Museum Studies.

Roberts, L.C. (1997). *From knowledge to narrative*. Washington: the Smithsonian Institution.

Teather, L., & Wilhelm, K. (1999). *Web musing: evaluating museums on the web from learning to methodology*. *Museums and the Web 1999*, 1-23. Retrieved May 28, 2000, from the World Wide Web:
<http://www.archimuse.com/mw99/papers/teather/teather.html>

Walsh, P. (1997). *The web and the unassailable voice, selected papers from Museums and the Web 97*, Los Angeles. In D. Bearman & J. Trant (Eds.), *Archives & Museum Informatics*, 69-76.

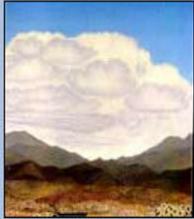
Appendix #1

(Example of a virtual art museum exhibit that is intended primarily to market the physical exhibit.)

The screenshot shows a web browser window with the following elements:

- Browser Title Bar:** "orer" with standard window controls.
- Address Bar:** "seum.org/content/action.lasso?response=fr_change.html" with "Go" and "Links" buttons.
- Navigation Bar:** Includes icons for Refresh, Home, Search, Favorites, History, Mail, Print, Edit, and Real.com.
- Left Sidebar (Dark Blue):**
 - Home icon and "Main" link.
 - Section: "Changing Exhibitions" with sub-links:
 - [Changing Exhibitions](#)
 - [Future Exhibitions](#)
 - [Past Exhibitions](#)
 - Section: "Trashformations" with a right-pointing arrow icon.
- Main Content Area (Light Blue):**

Changing Exhibitions

<p>Beyond the Mountains: The Contemporary American Landscape August 12 - October 15, 2000</p> <p>Beyond the Mountains examines the past ten years of contemporary art in an attempt to answer the question "What is American landscape?" With work from more than 25 artists, this exhibition will explore the modern, idiosyncratic, and unique character of contemporary landscape painting. Since the 1980s, landscape painting has dramatically changed as artists have increasingly defined themselves through their personal, as well as physical, landscape. This exhibition was curated by Michael Klein and is touring under the auspices of Pamela Auchincloss Arts Management.</p>	 <p>Helen Miranda Wilson, <i>Sangre de Cristo, Nambe Pueblo, N.M., 1986</i>, oil on masonite, 10 x 10", Collection of Pamela Auchincloss, New York</p> <p>FREE Public Lecture by Curator Michael Klein on Thursday, September 28 at 7:00 at BAM.</p>
<p>NW Perspectives: Ron Jude Sponsored by Key Foundation & Idaho Commission on the Arts July 22 - October 15, 2000</p> <p>Ron Jude's color photographs document the impact of rapid economic development that has occurred in the McCall, Idaho area during the past two decades. Focusing on themes of housing, timber, and tourism in his 45th Parallel project, Jude explores the contradictions and complexities that occur as society reshape its environment. NW Perspectives exhibitions present the work of contemporary Northwest artists.</p>	 <p>Ron Jude, <i>Fire Before the Skinning, 1996</i>, chromogenic print, 24" x 30", courtesy of the artist</p> <p>Ron Jude ART TALK on October 5</p>

Footer: Main > Museum Info > Permanent Collection > Changing Exhibitions > Teacher Info > KidSite >

Appendix #2

(Example of a virtual art museum exhibit that replicates the actual physical exhibit)

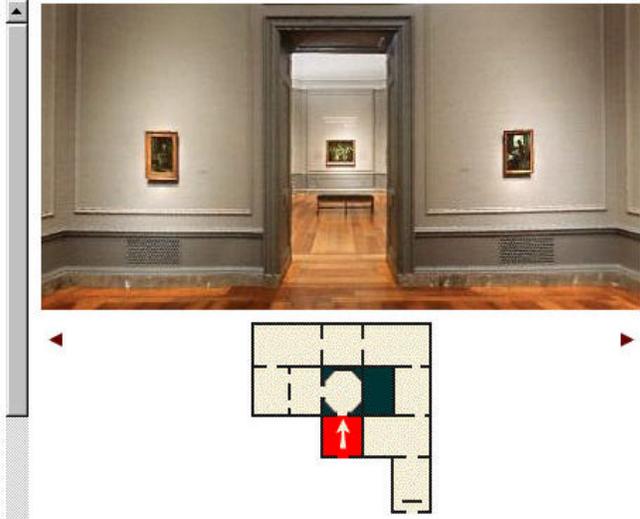
[Introduction](#) | [Early Works](#)
[The Potato Eaters](#)
[Holland to Paris](#)
[Self-Portraits](#)
[Paris](#)
[Japanese Influence](#)
[Arles](#)
[The Yellow House](#)
[Saint-Rémy](#)
[Auvers-sur-Oise](#)

[Early Works](#)

Introduction
wav file ● 🎧 RealAudio 🎧

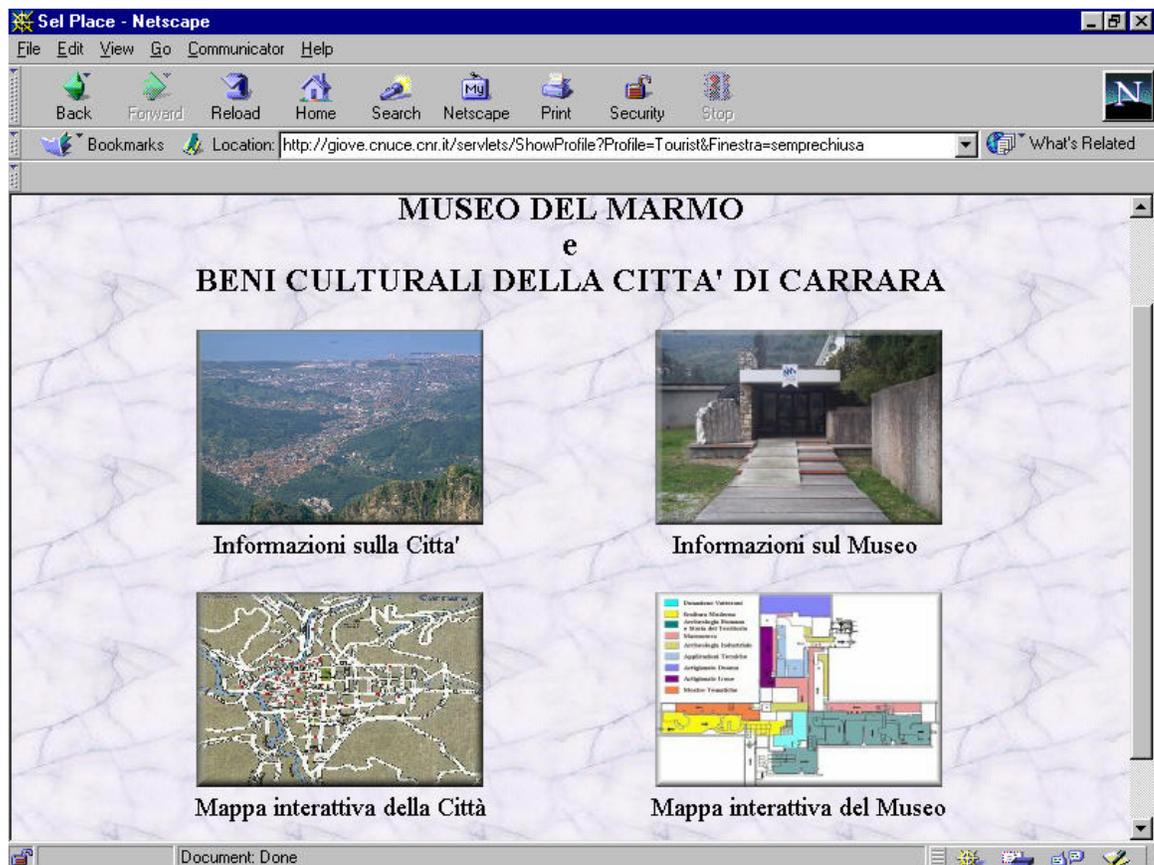
I want to get to the point where people say of my work that man feels deeply.
-- Letter to his brother Theo, 21 July 1882

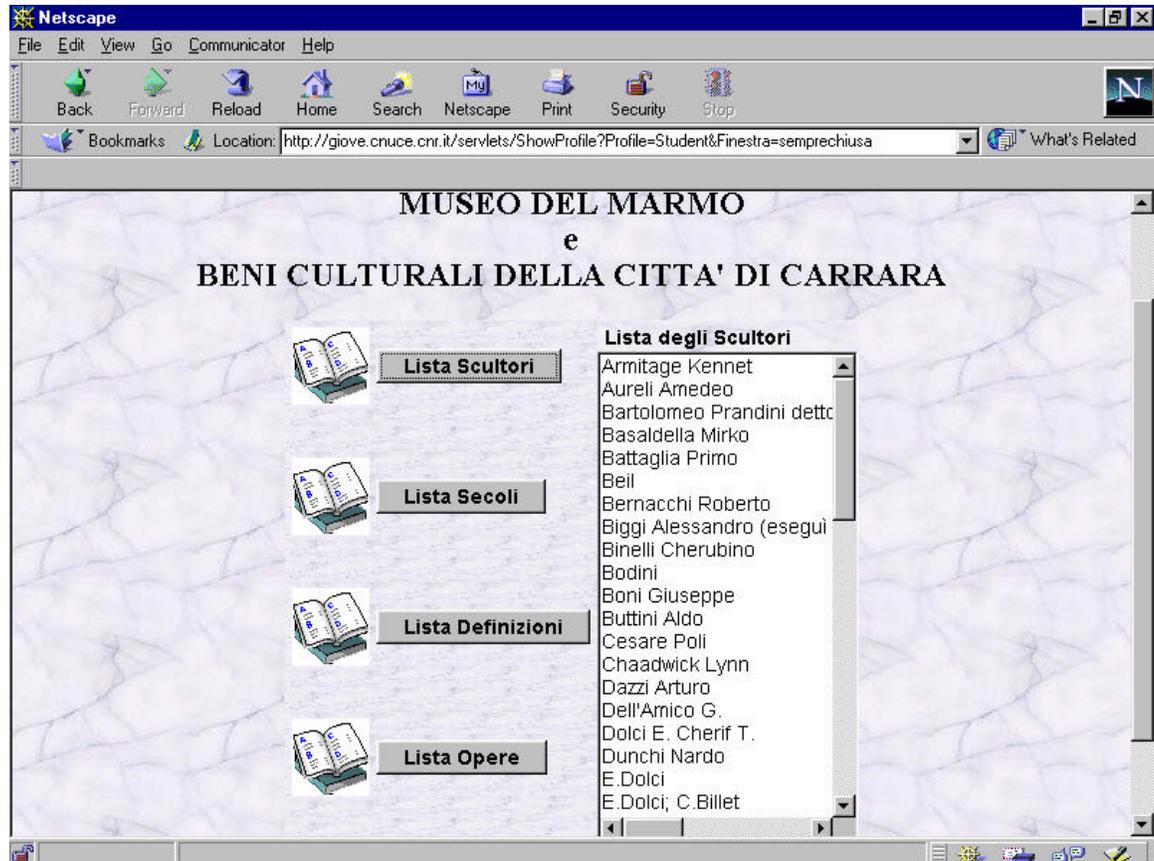
More than a century after his death, Vincent van Gogh



Appendix #3

(Marble Museum, Tourist Task Model)



Appendix #4**(Marble Museum, Art Student Task Model)**

Appendix #5

(Marble Museum, Expert Task Model)



Appendix #6

(Consent Form sent to survey participants)

Consent Form

The survey linked to this e-mail is part of a graduate student research project being conducted by Meg Nystrom, a student in the School of Information and Library Science at the University of North Carolina at Chapel Hill, advised by Dr. Barbara M. Wildemuth.

Purpose of this Study:

This study is intended to provide an in-depth examination of virtual exhibits found at art museum web sites. One goal of the study will be to look at how physical exhibits are being translated into virtual exhibits. A second goal will be to conduct an empirical investigation using content analysis and surveys with an aim towards discovering what museums are hoping to accomplish by putting their exhibits on the Web.

What Will Happen to Your Survey Information:

There will be approximately one hundred surveys sent out to art museums around the country that have virtual exhibits available on their web sites. Each museum will be sent the same survey. Your answers to the survey questions will be recorded. Any information I receive will be recorded with a participant number, not your personal name. Your museum's name will be listed as a participant in the study, but will not be associated specifically with any of the data.

If you have any questions regarding this study, please feel free to contact Meg Nystrom at nystm@ils.unc.edu or Barbara M. Wildemuth at wildem@ils.unc.edu.

You may contact David A. Eckerman, Chair of the UNC-CH Academic Affairs Institutional Review Board, at aa-irb@unc.edu if you have questions or concerns about your rights as a research subject.

By completing and returning the following survey you are agreeing to the conditions above.

The survey can be found at:
<http://www.ils.unc.edu/~nystm/survey/survey1.html>

Thank you for your participation.

Appendix #7**(Survey sent to participants)****Art Museum Virtual Exhibit Survey**

Research conducted by:
Meg Nystrom
School of Information and Library Science
University of North Carolina at Chapel Hill
nystm@ils.unc.edu

Thank you for filling out this survey. When you are finished filling out the questions that relate to you, please click on the submit button in order to log the results.

1. What is the name of your museum?**2. Please begin by telling us some things about your exhibits:****a.** When was the first time you put a virtual exhibit on the Internet?**b.** What was the title of the first virtual exhibit you displayed on the Internet?**c.** On approximately what date was it made available on the Internet?**d.** If it is still available, at what url?**e.** What was the title of the most recent virtual exhibit you displayed on the Internet?**f.** On approximately what date was it made available on the Internet?**g.** If it is still available online, at what url?**3. Do you put all of your physical exhibits online?**

Yes or No

4. If you answered no to number two, can you estimate the percentage of your physical exhibits that are available virtually?

5. Do you ever have exhibits that were created solely for the web (i.e. were never on display physically)?

Yes or No

6. If you answered yes to number 5:

a. How many Web-only exhibits have you displayed in the past year?

b. How many of these are still available online?

c. What are their url's?

7. How long do exhibits remain online?

- Until the physical exhibit is taken down
- Varies depending on the exhibit
- Indefinitely
- Other _____

**8. Why did you decide to make your exhibits available virtually?
(check the one response you consider most important)**

- To encourage individuals to visit the physical exhibit
- In order to include additional resources
(there was not enough space in the physical exhibit to feature all materials)
- So individuals who are not able to visit the museum can view materials remotely
- So visitors to the web site can view materials at their own pace
- Other _____

**9. Who is the audience you are primarily trying to reach with your virtual exhibits?
(check the one response you consider most important)**

- Current museum members
- Potential museum members
- Researchers
- Teachers
- Anyone browsing the Internet
- Other _____

**10. What do you want users to get out of their visits to your virtual exhibits?
(check the one response you consider most important)**

- A desire to visit your museum
- A feel for the physical exhibit
- New knowledge about the topic being portrayed
- Other_____

11. Have you mounted any virtual exhibits that you would consider to be interactive?

Yes or No

12. If you answered yes to question #10:

- a. When was the first one made available on the Internet?

- b. If it is still available, what is its url?

- c. When was the most recent interactive virtual exhibit made available on the Internet?

- d. If it is still available, what is its url?

13. Please use the space below to provide any additional comments you might have:

Appendix #8**(Names of Museums that Responded to Survey)**

1. Amarillo Museum of Art
Amarillo, Texas
2. Arizona State University Art Museum
Tempe, Arizona
3. Artcar Museum
Houston, Texas
4. Art Museum of Missoula
Missoula, Montana
5. (AMUM) Art Museum of The University of Memphis
Memphis, Tennessee
6. Bayly Art Museum at the University of Virginia
Charlottesville, Virginia
7. Boulder Museum of Contemporary Art
Boulder, Colorado
8. Brigham Young University Museum of Art
Provo, Utah
9. Chrysler Museum of Art
Norfolk, Virginia
10. The Cleveland Museum of Art
Cleveland, Ohio
11. El Paso Museum of Art
El Paso, Texas
12. Fairfield Art Museum: William S. Fairfield Public Gallery
Sturgeon Bay, Wisconsin
13. (LACMA) Los Angeles County Museum of Art
Los Angeles, California
14. Margaret Harwell Art Museum
Poplar Bluff, Missouri

15. Mint Museum of Art/Mint Museum of Craft + Design
Charlotte, North Carolina
16. The Museum of the City of New York
New York, New York
17. Nevada Museum of Art
Reno, Nevada
18. Northwest Museum of Arts & Culture
Spokane, Washington
19. North Carolina Museum of Art
Raleigh, North Carolina
20. North Dakota Museum of Art
Grand Forks, North Dakota
21. Norton Museum of Art
West Palm Beach, Florida
22. Oriental Institute Museum, University of Chicago
Chicago, Illinois
23. Phoenix Art Museum
Phoenix, Arizona
24. Spencer Museum of Art at the University of Kansas
Lawrence, Kansas
25. Susquehanna Art Museum
Harrisburg, Pennsylvania
26. Tacoma Art Museum
Tacoma, Washington
27. The Textile Museum
Washington, D.C.
28. Timken Museum of Art
San Diego, California
29. (UCR) University of California at Riverside/California Museum of
Photography
Riverside, California

30. Utah Museum of Fine Arts
Salt Lake City, Utah
31. Virginia Museum of Fine Arts
Richmond, Virginia
32. The Weaving Art Museum and Research Institute
Currently, Web only
33. West Valley Art Museum
Surprise, Arizona
34. Whitney Museum of American Art
New York, New York