

INFORMATION NEEDS OF ART MUSEUM VISITORS: REAL AND VIRTUAL

Victoria Kravchyna

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APPROVED:

S. K. Hastings, Major Professor and Interim  
Dean of the School of Library and  
Information Sciences

B. O'Connor, Minor Professor and  
Coordinator of Interdisciplinary PhD  
Program in Information Sciences

M. Mayer, Committee Member

C. Simpson, Committee Member

Sandra L. Terrell, Dean of the Robert B.  
Toulouse School of Graduate Studies

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Museums and libraries are considered large repositories of human knowledge and human culture. They have similar missions and goals in distributing accumulated knowledge to society. Current digitization projects allow both, museums and libraries to reach a broader audience, share their resources with a variety of users. While studies of information seeking behavior, retrieval systems and metadata in library science have a long history; such research studies in museum environments are at their early experimental stage. There are few studies concerning information seeking behavior and needs of virtual museum visitors, especially with the use of images in the museums' collections available on the Web.

The current study identifies preferences of a variety of user groups about the information specifics on current exhibits, museum collections metadata information, and the use of multimedia. The study of information seeking behavior of users groups of museum digital collections or cultural collections allows examination and analysis of users' information needs, and the organization of cultural information, including descriptive metadata and the quantity of information that may be required. In addition, the study delineates information needs that different categories of users may have in common: teachers in high schools, students in colleges and universities, museum professionals, art historians and researchers, and the general public.

This research also compares informational and educational needs of real visitors with the needs of virtual visitors. Educational needs of real visitors are based on various studies conducted and summarized by Falk and Dierking (2000), and an evaluation of the art museum websites previously conducted to support the current study.

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A civilization is a heritage of beliefs, customs, and knowledge slowly accumulated in the course of centuries, elements difficult at times to justify by logic, but justifying themselves as paths when they lead somewhere, since they open up for man his inner distance.

*Antoine de Saint-Exupéry, 1900–1944*



## CHAPTER 1

### INTRODUCTION

Cultural heritage professionals consider museums and libraries as large repositories of human knowledge and human culture. Both repositories serve the important role of preserving, collecting, and providing information using the highest possible scholarly standards (Sheppard, 2001). Museums and libraries have similar missions and goals in collecting, preserving and providing accumulated knowledge for the good of humankind (Wilson, 1977). Libraries represent recorded human knowledge on paper and in a variety of electronic formats. Museums reflect human culture through the display of works of art, architecture, and scientific expositions of the development of human civilizations. Libraries and museums disseminate recorded knowledge to society.

Today, museums and libraries create rich places for learning, both real and virtual. Museums are dedicated to fostering an understanding of works of art, to conducting research and deliver results to the general public (Berry & Mayer, 1989; Falk, 1999; Falk & Dierking, 2000; Gill, 1999). Technology allows a larger audience to participate in new learner communities beyond the walls of museums and libraries. The use of digital libraries as teaching and learning resources initiates new methods of educational exploration and discovery. Digital libraries eliminate barriers of geographical location and time, invite exchange of information with institutional experts as well as the

general public, and add to content, innovation, and a more meaningful exchange of ideas. Preservation of cultural heritage enhances the quality of life; preservation guards the history of our civilization for future generations. Preservation provides a wider range of knowledge, experiences, and beliefs acquired over the centuries. Preservation allows an opportunity for study and observation of human cultural evolution.

Digitization of museum collections reflects library developments of shifting traditional library card catalogs to online catalogs, digital libraries, and finally transferring to digital collections. Museum collection information originally stored in paper format is now stored in electronic museum catalogs, digital collections, and the World Wide Web (WWW) (Besser, 2002).

### Libraries and Museums

Public, academic, and special libraries serve a variety of user groups using a single collection of materials. People of different ages and professions, with different levels of subject knowledge, seek information expecting to find relevant materials to satisfy their needs. In the digital environment, users must apply acquired skills and knowledge of online searching and WWW browsing while in the traditional library, librarians can help users to meet their information needs.

Museum digital collections can be compared to special library collections in particular, art libraries that have the same subject matter as art history or cultural heritage collections. Special libraries serve a variety of clientele, from preschoolers to art historians and researchers. Art librarians help to select, to evaluate, and to provide needed information for a library's diverse population. As museums build their digital

collections they are challenged to meet the needs of multiple unique users groups. It is not always possible for librarians to know what types of information virtual visitors may require from Websites. Librarians have to conduct an interview to be able to serve better a patron. It is essential to know the educational background of a library user, and a purpose of a user's request.

Many libraries and museums offer a full schedule of public programs to promote appreciation of special collections and special exhibitions. Events include symposia featuring guest speakers, regular lectures and speeches by the professional staff and regional artists, and storytelling for children. Additionally, museums and libraries support students, faculty, and community users in educational exploration of recorded knowledge, and life long learning. Libraries and museums focus their service efforts on visitors' expectations and needs. In addition, many libraries and museums provide virtual services to the remote distance users.

Understanding similarities of functions of cultural institutions both, libraries and museums can create joint projects, sharing and adapting research results to suit both settings. Digital technology allows the libraries and museums to make broad strategic objectives accessible to a broader audience, to share resources, to implement joint exhibition, publishing, and educational initiatives, Internet activities, and to facilitate each institution's long-term cooperation and goals.

## Research Framework

Between 1995 and 1999, the international committee for architectural photogrammetry (CIPA) held a series of workshops that identified critical gaps in the field of heritage recording, documentation and information management between those who provide information and those who use it. The international council on monuments and sites (ICOMOS), the Getty Conservation Institute (GCI) and CIPA together created the Initiative partnership called RecorDIM. The purpose of the initiative is to bring information users and providers together to identify the nature of the gaps existing between the two groups, to develop strategies to close the gaps, and to recommend a framework for further cooperation (GCI, 2002).

Among the identified gaps there are gaps that are related to all cultural heritage institutions and facilities. They are:

1. Standards and guidelines
2. What is the range of users (users groups)
3. Users information needs
4. Terminology.

Standards and guidelines for the conservation of cultural heritage are needed to provide assistance for the information providers in developing accurate documentation of cultural heritage (GCI, 2002; Miller & Criddle, 2001; Miller, Dawson & Perkins, 2001). In addition, standards and guidelines are needed to display information about the documented, digitized cultural heritage to the users on Websites.

IMLS also underlined the importance to educate museum and library staff about the need to adopt standards, policies, and practices to enhance the usefulness and persistence of digital resources.

The round table participants stressed also that an analysis of the range of users and specification of the user community is needed to vary levels of documentation and information dissemination of cultural heritage. This group of participants expressed a strong concern that users' needs are not well defined and further studies of users' information needs are required.

Various categories of user groups have to understand the information provided by a provider. To be able to satisfy different user categories concurrently, a basic terminology should be identified and thesauri have to be created and provided to the users. Information needs are difficult to define. Information needs are defined as what an individual has to have for his work, his research and his education. Information needs can be defined by the variety of social groups (Havelock, 1979).

The GCI conducted research on the subject of the values and benefits of cultural heritage preservation. Research stated that historically, cultural heritage has been taken for granted (GCI, 2002). There was a practice to save old things that were determined and were respected as valuable (GCI, 2002). Owners of such collections paid less attention to the interpretation of the meaning and symbolic understanding of cultural values of collections. In the current situation of globalization, technological advancement, and population mobility, it becomes clear that technology is changing cultures and communities (Avrami, Mason & de la Torre, 2000).

In 1999, the School of Library and Information Science (SLIS) at the University of North Texas (UNT) began a new program in Digital Image Management. The SLIS and the African American Museum (AAM) in Dallas are collaborative partners in a program designed to produce expert managers of digital images and information (Hastings, 2000a; 2000b; 2000c; Hastings, O'Connor & Russell, 1999). Designing a database of the AAM's *Sepia* photographic collection and creating a Website for the museum were the major goals of the project during the first year of collaboration. While designing the *Sepia* photographic collection database, UNT fellows sponsored by the Institute of Museum and Library Services (IMLS) had difficulties with determination, selection, and creation of metadata to be used by potential virtual visitors to the museum Website. Arguments centered on the quality and quantity of information that the AAM Website should provide for virtual visitors. IMLS fellows decided that additional research about virtual visitors' information needs should be pursued. Three years later CIPA and ICOMOS officially recognized gaps that existed between users and information providers (GCI, 2002).

IMLS fellows conducted a pilot study to create a research agenda for further investigation of user groups information needs (Kravchyna & Hastings, 2002). Pilot study questions concerned types of information that virtual visitors are looking for, available technology and software, and the use of multimedia. The results of the pilot study indicated that virtual visitors have an opportunity to utilize textual and multimedia information to satisfy their informational needs while browsing art museums Websites. Highlights of the pilot study provided indicators of the types of information needs that virtual visitors have when using museum Websites (Kravchyna & Hastings, 2002). A

majority of virtual users (68%) look for information about current exhibits. Virtual visitors (63%) particularly value a capability to browse collection databases, and to locate supplementary descriptive information (Kravchyna & Hastings, 2002). There is a need for contextual information, vivid descriptive narratives, and theory drawn from the narratives (Crane, 2001; Hastings, 1999; O'Connor, 1996; O'Connor, O'Connor & Abbas, 1999).

The current study attempts to identify detailed information from a variety of user groups about the information specifics on current exhibits, museum collections metadata information, and preferences in the use of multimedia.

The proposed study is based on the theoretical constructs of limited studies. The theoretical constructs are discussed in Chapter II. Further investigation of users needs and potential information delivery are discussed in Chapter III, IV and V.

## Methodology

Chapter III includes a discussion on the importance, convenience and reliability of using a web-based Internet survey while at the same time trying to collect data concerning the potential information users. Chapter III describes the methodology that was used to collect data. The survey consists of five sections designed to collect data from teachers, students, museum staff and donors, general visitors, and scholars. Comparison of one set of data to another set provided an overview of similarities and differences of user information needs (Wolfram & Xie, 2002; Jansen, Spink & Saracevic, 2000).

Another purpose of this research is to compare informational and educational needs of real visitors with the needs of virtual visitors. Educational needs of real visitors are based on various studies conducted and summarized by Falk and Dierking (2000), and an evaluation of the art museum Websites previously conducted to support the current study. A more detailed discussion of the evaluation is provided in Chapter II.

### Statement of the Problem

The study investigates World Wide Web (WWW) users' information needs for art museum Websites. The study of information needs of user groups of museum digital collections or cultural collections allows examination and analysis of users' information needs, and the organization of cultural information, including descriptive metadata and the quantity of information that maybe required. In addition, the study delineates information needs that different categories of users may have in common. Analysis of information needs helped to establish a conceptual base for cultural knowledge organization, digitization of accumulated cultural heritage and the provision of information-rich contexts on the web.

The central focus of this user-oriented research is to distinguish common information needs that are relevant for all user groups and to identify differences between user groups. The research targets five categories of users including teachers, art historians and scholars, students in colleges and universities, museum staff and donors, and the general audience.



## Research Questions

The following questions frame this research.

1. What are the information needs of the virtual visitors for the museum Websites and virtual exhibits?
  - a. What are the unique and common information needs of selected social groups of virtual visitors?
  - b. What multimedia information resources provided by museums do virtual visitors prefer?
2. What are unique and common information needs of virtual and real visitors?

The objectives of this study are:

1. To identify and specify the user groups to be surveyed
2. To identify the museum Websites where links to the WWW survey were created
3. To inform selected users communities of ongoing research through different media communication
4. To provide an analysis of the collected data to cultural heritage professionals for further development of informational and educational content in the design of museum Websites.

## Significance of the Research

At this early stage of museum digital collections' development it is important to understand the information needs and motivations of users who visit museum Websites (Besser, 2002). The goal of the pilot study was to investigate virtual visitors' interests in the museum Websites, to determine users' information preferences for museum Websites and to build a stage for further investigation of virtual museum visitors. The publication of a pilot study report sparked great interest from cultural professionals in the United States and worldwide.

The results of this research:

1. Will assist designers and producers of museum Websites
2. Will help to provide users with the information they are looking for
3. Will provide an introductory look at the multimedia environment of the museum Websites
4. Will be one of the first descriptions of museum virtual visitors
5. Will provide assistance in creating an evaluation plan for digital collections.
6. Will contribute to filling gaps between information providers (museums) and users (virtual users).

Current research mandates an investigation of cultural heritage institutions in order to discover what has been done already in the area of digitization and cultural information provision to the general public and specific user groups. Chapter 2 provides an overview on the importance of cultural heritage preservation; information seeking

behavior and information needs of a variety of users groups, and offers a short description of major digitization projects existing in the United States of America (USA).

To support the study a second pilot study was conducted. Evaluation of museum Websites provided information that is presently available on art museum Websites, and explored multimedia formats that are currently in use (Appendix A). Thirty-five art museums were chosen for preliminary research. Additionally, Chapter II provides a summary of existing guidelines and standards for the development of museum Websites.

### Definitions

*Digitization* is defined as the process of converting, creating, and maintaining books, art works, historical documents, photos, journals, etc. in electronic representations so they can be viewed via computer and other devices (IMLS, 2002).

*Multimedia* is defined as a combination of various electronic formats that dispense information to users. In the proposed study, multimedia content includes such formats as text, 2-D and 3-D images, audio and video files. Some of the museum Websites include one to five minute audio and video files. Three-dimensional imaging software allows users to see an object in 3-dimensions. 3-D representations provide opportunities to study an object in more profound and detailed methods.

*Real visitor* is defined as a person who perceives the content of the museums in person.

*Virtual visits* are defined as a computer-based human experience via a museum Website. The organization of the virtual content mimics the actual organization of the

real content within the museum, therefore accepting and reproducing the museum's physical limitation.

*Virtual visitors* are defined as people who visit museum Websites.

Z39.50 is a national and international (ISO 23950) standard defining a protocol for computer-to-computer information retrieval. Z39.50 makes it possible for a user in one system to search and retrieve information from other computer systems (that have also implemented Z39.50) without knowing the search syntax that is used by those other systems.

## CHAPTER 2

### LITERATURE REVIEW

A description of cultural heritage and the importance of cultural heritage preservation begin this chapter. Two major institutions, libraries and museums, have priorities in preserving centuries of accumulated cultural heritage and providing access to cultural information sources. It is very important to see the similarities of these two institutions and how their cooperation can help to provide better services to the humanities. Studies on information seeking behavior and the information needs of a variety of users groups enlighten users groups' information needs concerning the art museums Websites. The literature also provides a short description of major digitization projects implemented in the United States of America (USA).

#### Cultural Heritage and Its Value

The *American Heritage Dictionary of English* (2000) defines *heritage* as something that is passed down from preceding generations; a tradition. The term *cultural heritage* is an extension of the basic concept of heritage. Cultural heritage carries a broader notion, meaning and concept. "Cultural heritage is cognitively constructed as an external expression of identity, operating in a range of ways and levels." (Pearce, 2000, p. 59).

Cultural heritage is an important value. The dimension of cultural heritage is not only about what should be preserved from the past: it is also about the specific qualities and traditions of a place, inherited from the past and carried into the future. A wider definition of cultural heritage includes cultural landscapes and heritage cities, cultural sites and monuments, museums and geographical sites, groups of buildings and historical sites, and elements of archaeological heritage (Davoudi, 2001).

Contemporary, interdisciplinary research on heritage states cultural heritage as a social construction that results from social processes specific to time and place. Scholarship on culture reinforces the notion that culture is a set of processes, not only a collection of things. Artifacts, objects, collections, buildings, and places become recognized as heritage through conscious decisions and unspoken values of particular people and institutions and are strongly shaped by social contexts and process (Avrami, Mason & de la Torre, 2000). The meanings assigned to objects and places emerge from the values that people attach to them. Individual perception of cultural heritage, influenced by cultural norms, traditions and environment, is an important characteristic in the appraisal of cultural values. The origins of cultural values lies in the principle that, “value represents positive characteristics rather than negative ones, an orientation to what is better than to what is worth” (Throsby, 2000, p.28). Increasingly, the wider public audience is discussing these meanings and places (Arizpe, 2000).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the convention concerning the protection of the world cultural and natural heritage (1972). The convention created the world heritage list that is intended to protect the masterpieces of human creative genius. The world heritage list names

historic sites, religious buildings, famous architectural creations and cultural sites. Previously preserved works of arts and objects of cultural heritage housed in museums have tight connections with UNESCO world heritage places and sites.

### Preservation

The preservation of cultural heritage enhances quality of life by saving the past and the present of our civilization for the future generations, by providing a wider range of knowledge, experiences, beliefs acquired during centuries, and by giving an opportunity for further exploration of human evolution.

Conservation or preservation is a process that recreates cultural heritage, accumulating the marks of the passing generations. The GCI report underlines the importance that cultural heritage preservation

must be situated in its larger social contexts- as part of the larger cultural sphere; as a basic phenomenon of public discourse; as a social activity constantly reshaped by forces such as globalization, technological developments, the widening influence of market ideology, cultural fusion, and myriad others. This process - centered model of conservation is at the heart of the future relevance of the preservation field. It could serve as a basis for orienting practice, formulating and analyzing policy, understanding economic forces, and generally ensuring that conservation is significant for society at large (Avrami, Mason & de la Torre, 2000, p.7).

Despite little research on *why* cultural heritage is important to human and social development and on *why* preservation is very important, some cultural heritage

professionals believe that preservation of cultural heritage is significant to future generations.

Values and valuing processes are paramount to understand the importance and fate of cultural heritage as it relates to (1) to societies and social groups that construct it and find meaning in it, and (2) the nature of heritage conservation as an activity that must draw on many disciplines and bodies of knowledge (Avrami, Mason & de la Torre, 2000, p.14).

Preservation of cultural heritage has encouraged academic debate. David Lowenthal (2000) identified the backlash against the conservation of cultural heritage and concentrated his arguments on the present more than a study of the past. His evaluation of cultural heritage status and its contextual meaning led to an interesting conclusion relevant to this study. Lowenthal noted that cultural heritage is a virtue of the elite and academic, and a distinct dilemma ensues that "... stewardship becomes an enterprise of technical expertise; the general public, devoid of professional competence, stands aside. Looked after by experts, the heritage seems to demand public acquiescence, not an active involvement" (Lowenthal, 2000, p.19). Lowenthal's controversial idea sees cultural heritage in an inevitable flux; no human creation endures forever, all artifacts eventually erode, and sites and cities will decay.

Cultural experts continue academic debates on the development of the advanced techniques for conservation and preservation of cultural sites and objects. Conservation and preservation may prolong the longevity of cultural heritage; digital representation of the cultural heritage may save it forever.



## Libraries and Museums as Cultural Institutions

Society has long considered libraries the main provider of the informational and educational needs for the community. Libraries and library personal began to explore information needs of the libraries users to provide better information sources and services to their communities. At the same time museums were available only for a restricted audience and cared more about collections than clientele. Presently, academia views academic fields as interdisciplinary; museums and libraries present a logical union.

In 1996, the United States 104th Congress passed legislation to create the Institute of Museum and Library Science (IMLS). This legislation reauthorized federal library and museum programs, and moved federal library programs from the Department of Education to the Institute (IMLS, 1996). The National Commission for Library and Information Sciences, an existing government entity, advises the director of the Institute on library and joint museum/library projects. The IMLS was the first effort to combine the branches of library and museum sciences together, share their scientific research, and develop a new foundation for further cooperation.

The design of the electronic databases for libraries, some being complete databases available for no cost stimulated research. Librarians and researches explored the utilization of databases by libraries' users, and observed information seeking behavior. Research, eventually, helped to provide better services to the user community (GCI, 2002).

Public, academic, and special libraries serve multiple clienteles using the same collection. People of different ages and professions, and varying levels of subject

knowledge seek information expecting to find relevant materials to satisfy their needs. The personal nature of research confounds a user information seeking behavior in the digital environment; a traditional library setting offers information specialists to help guide a search, while online searches are often independent of mediators.

Museums (Berry & Mayer, 1989; Falk, 1999; Falk & Dierking, 2000) and libraries already create rich places for learning, both real and virtual. The use of new technologies helps both institutions to reach a new learner community, breaking through barriers of geography and time. Museums and libraries are building digital libraries of educational materials, using technology to invite discovery, activity and the creation of new learning communities. Programs promote exchange between the institutional experts and general public knowledge, adding to content, innovation and meaningful exchange of ideas.

Museums have recently started to develop their own digital libraries and digital collections, e.g., the National Gallery of Art, Washington, DC, The Hermitage, Russia, etc. Gill and Miller (2002) suggested a gradual transition to find harmonization of the standard frameworks used in the creation, management and preservation of cultural heritage content between cultural institutions. Libraries and museums can reduce duplication of efforts in digitization process, reducing higher costs and diminished interoperability of the end results, and promotion of library and museum sciences interdisciplinary nature.

Museum digital collections can be compared to collections of special libraries, in particular, art libraries that have the same subject matter as art history collections or

cultural heritage collections. These special libraries serve a variety of clientele starting from preschool audiences and finishing with art historians and researchers.

Art librarians help to select, to evaluate, and to provide needed information for a library's diverse users. As museums build their digital collections they are challenged to meet the needs of unique user groups. It is not always possible for museums to know what types of information their virtual visitors may seek.

Besser (2002), Lynch (2002a), Sheppard (2001), and Rinehart (2003) provided valuable research information on similarities and differences between libraries and museums. Bates and her colleagues from the Getty Art History Information Program conducted *The Getty Online Searching Project*, a series of studies on how art scholars and art historians use electronic databases (Bates, 1994, 1996a, 1996b; Bates, Wilde & Siegfried, 1993; Siegfried, Bates & Wilde, 1993). The study was one of the first cooperative partnerships between an information science and art institution.

In a comparison of digital collections and interoperable libraries, Besser (2002) described the lack of service components in digital libraries environment. He analyzed public libraries, their services, and their digital collections. Besser underlined that digital collections lack a sustainable set of services: information delivery to multiple clienteles, formal education support centers, community activities centers, privacy protection, equal access to information, custodialship. "The digital collection we build will not truly be digital libraries until they incorporate a significant number of these services and ethical traditions" (Besser, 2002, p.3). Besser underlined key components of what he called "a sustainable set of services," of library services that are missing during transformation from a traditional library to a digital library. Libraries' ethical traditions are

not automatically transferred to digital libraries service components. Equal access to information and privacy protection is often omitted in digital libraries.

Sheppard (2001) gave an extended comparison of libraries and museums goals, missions, partnership and new cooperative efforts. A new learning network composed of libraries and museums is in great demand. Both types of institutions are facing new challenges and opportunities, and are richly endowed with learning resources. The collections of libraries and museums provide learning in every discipline from art to science, from history to the natural world. Sheppard describes characteristics of learning experiences provided by libraries and museums. They include:

1. Libraries and museums are trusted, engaging, and stimulating resources for families and communities
2. Libraries and museums exemplify the highest standards of stewardship for the collections
3. Libraries and museums offer authentic, first-hand encounters with the objects and information they collect
4. Libraries and museums customize learning experiences of high quality to meet the needs of many different audiences, from amateurs to experts
5. Libraries and museums offer superb scholarship, finely honed teaching expertise and tested strategies for working in their communities.

Libraries and museums facilitate comfort with cultural diversity. Exhibits and programming tell the stories of once forgotten Americans, bringing to light the histories of minorities and various ethnic groups. Museum collections can celebrate the richness of a community, capturing the drama of an individual story

and connecting it to the universality of the human experience (Sheppard, 2001, p.7).

Museums and libraries cannot succeed alone. A new kind of network, an infrastructure or system of complementary resources must be created (Besser, 2002; Lynch, 2002a; Sheppard, 2001; Rinehart, 2003). In partnership, museums, libraries and other centers (Besser, 2002) can create a flexible learning environment to provide the skills, resources, and tools for the learners.

### Current Digital Projects

To build a successful digital collection cultural institutions have to create evaluation plans. Evaluation plan involves research on user range and user needs, funding, human resources, etc. All these components have to be taken into consideration prior to building digital collections (Saracevich, 2000; Marchionini, 2000).

Numerous digitization projects are designed to educate people about cultural heritage resources, and to deliver rich educational resources in digital formats to the public. The majority of IMLS sponsored digitization projects have students and teachers communities in mind (Bennett & Sandore, 2001; Bennett, Sandore, & Pianfetti, 2002; Hastings, 2000a). Unfortunately, documentation on prior research and evaluation plans are not available for outsiders. It is impossible to predict complete success of recently started projects.

In 2002 the IMLS published a report entitled *Status of Technology and Digitization in the Nation's Museums and Libraries*. The purpose of this survey was to collect information on technology use, plans, and policies of libraries, museums and

state library agencies, especially in the area of digitization (IMLS, 2002), but no information was provided on users information needs.

The survey results quantify the current status of technology use and digitization activities by museums and libraries. Research findings show that digitization activities are an emerging focus in museums and libraries. More than 78% of all state library administrative agencies (SLAAs) reported digitization activities in the past year. Compare this with 32% of museums, 34% of academic libraries, and 25% of public libraries. A significant percentage of museums are involved in digitization activities. More than 30 % of museums had digitization activities in the past 12 months, including 21 % of small museums. A smaller number of museums (18%) indicated that they plan digitization activities in the next 12 months. Larger museums, academic libraries, and public libraries are more active than the smaller ones. Libraries lead in all areas of digitization, including funding, collaboration among institutions, and digitization policies (IMLS, 2002).

Collaboration in digitization activities and the adoption of policies and standard practices for digitization in museums, academic libraries, and public libraries is an important area for development. Museums that are not involved in digitization activities define the lack of funds and technological expertise as hindrances. Some of the museums do not see the usefulness of digitization in their institutions (IMLS, 2002).

Based on the results of the survey the IMLS underlines its support in the identification of best practices, model projects, and information about standards, guidelines, and resources. The best examples for the cooperative digitizing projects funded by the IMLS are *Museums and Libraries find Common Ground Project*, *Digital*

*Picture of Native American History Project, The Minneapolis Institute of Arts Project, Teachers Redraw Lesson Plans with Art Databases Project, and Teaching with Digital Content Project.*

### *Digital Collections*

*Museums and Libraries Find Common Ground project* gather together 30 libraries and archives, and museum policymakers to prove that museums and libraries share acres of common ground in the new digital world.

*The Digital Picture of Native American History project* delivers historical information from the Native American collections of Montana that are rich with images of the Cheyenne, the Gros Ventres, and twelve other Plains Indians cultures. A joint project between Montana State University Libraries at Bozeman and the Museum of the Rockies creates a searchable database of 1,500 images from five collections across the state and make it available for educational purposes for schools and colleges.

*The Minneapolis Institute of Arts project* conducts an intensive audience research and product evaluation study. The results are supposed to improve the museum digital products, including exhibitions, lesson plans, and image databases, to increase their accessibility to and use by the public.

*The Teachers Redraw Lesson Plans with Art Databases project* delivers art treasures from around the world into classrooms in central Indiana. It is developed through a joint project of the libraries of Indiana University-Purdue University Indianapolis and the Indianapolis Museum of Art. The project is aimed to prove that the study of art enhances a variety of subjects, including geography, math, and science.

*The Teaching with Digital Content* project uses primary source documents to digitize and make a range of exciting possibilities of exploring an original document that is available to teachers, librarians, and museum curators and educators. The University of Illinois Library at Urbana-Champaign helps these educators incorporate digitized primary source materials into their classes, to integrate digital primary source materials into K-12 curriculum and assignments, as well as into the educational programs of museums and libraries. Librarians, museum staff and students obtain technology training, learn how to create digital collections that provide historical context, explore the use of modes of communication, such as e-mail discussion lists, and study strategies to enhance visual literacy (Bennett & Sandore, 2001; Bennett, Sandore, & Pianfetti, 2002).

The above projects are sponsored by the IMLS *Colorado project*, *the Cornell project* and *the Getty Institute of Art* projects are significant examples of finding external funds from the other sources, of designing projects, of mutual cooperation and creating a basis for further exploration of efficient usability of digital collections and studies of users needs.

Through the collaborative effort of Colorado's archives, historical societies, libraries, and museums, the people of Colorado have access to the visual and oral record of Colorado's history, culture, government and industry in full text and graphic content. Participating institutions contribute content that is "born digital" as well as materials that exist in another format and have been digitized. The digital collection includes a wide range of resources including letters, diaries, government documents, manuscripts, photographs, maps, and digital versions of exhibits, artifacts, and oral histories. This project also is aimed to contribute to the development of standards and



guides in the digitizing area. The project brings together efforts of 25 institutions and creates a virtual collection of Colorado's unique resources and special collections.

Some museums prefer to create an educational program for various user groups' ages using the third party, e.g., Art Museums Image Consortium (AMICO). AMICO (<http://www.amico.org>) balances the needs of small and large museums, the well prepared and the novice, by providing for different levels of membership participation from observer through full contributor.

The IMLS (2002) technology report asserts the most-cited hindrances are the lack of funding and expertise in the digitization process. In this case, AMICO, for relatively low cost, can provide information on technology information services, including "best practice" guidelines, "frequently asked questions," standards for data capture, advice on hardware and software, application guidelines, training, research and liaison with developing standards. AMICO provides an example of how museums have collaborated, in a manner that respects the requirements of education and research, to enhance access to the digital multimedia documenting their collections. AMICO has responded to librarians' concerns about administration, economics, access and use in this new information environment, leveraging resources and providing cost-effective, unprecedented access to cultural multimedia.

### Information Seeking Behavior

Information seeking behavior study has its roots in the 1960s and 1970s (Bates, Wilde, & Siegfried, 1993). During the 1980s and 1990s, and into the beginning of 21<sup>st</sup> century, research has been done to evaluate online information-seeking behavior of

end-users (Bates, 1994, 1996a, 1996b; Bates, Wilde & Siegfried, 1995; Siegfried, Bates & Wilde, 1993). Although the history of user studies and information seeking behavior is long and varied, only recently studies have concentrated on the humanities. A few studies in the field of information use and needs show that the humanities are different in their information demands than physical and social sciences.

Scholars in the humanities field tend to browse databases and Websites; they consider browsing as a very important component in their information seeking behavior (Bates, 1996a, 1996b; Bates, Wilde, & Siegfried, 1995; Stone, 1982). Browsing databases and Websites by humanities scholars provides the idea that humanities scholars are intimidated with new waves of digital libraries digital collections and complicated WWW design and search strategies (Stone, 1982). The humanities scholars typically use different sources for information, but the primary source for their research remains an original work (Weintraub, 1980).

Humanists are probably the most book-bound scholars. Their fundamental work depends on the availability of original texts. A study conducted by Texas Tech University shows faculty in the fine art departments have a preference for books (75%), journals (35%), slides (25%) and finally, electronic databases (10%) (Reed & Tanner, 2001). Faculty members indicated that a variety of information source formats is necessary and relevant in research and teaching.

Many humanists have a special reverence for manuscripts, and they prefer the original to a copy (Crane, 2002; Reed & Tanner, 2001). The interaction of text and illustrations, maps and graphs is very important. The text provides unique understanding of museum digital collections and should be included in collection

databases. One of the successful digital projects that incorporated all types of multimedia is the Perseus Digital Library (<http://www.perseus.tufts.edu>) (Crane, 2002)

The complex interaction of personal insights form reasonable patterns of meaning. Penetrating the mind of others, especially those artists from the past, is infinitely subtle and complex mind (Weintraub, 1980). High quality images from the museum collections can reveal different feelings, thoughts and interpretations in the individual mind. In this case, basic information about an artwork, the artist's biography, and historical time should be provided for inexperienced and uneducated users in art history virtual user to reduce misunderstanding of an artwork and to increase an individual knowledge.

It makes little sense to feed more and more data into the computer, creating a digital collection of materials, objects, useless classifications and senseless information without appropriate documentation and interpretation (Bennett, Sandore, & Pianfetti, 2002; Crane, 2002; Hastings, 1999; O'Connor, 1996; O'Connor, O'Connor & Abbas, 1999; Thomas, 2000). In the case of museum collections, virtual exhibits are documents. This means that registrars, curators and the visitors are responsible for the value of information. Research on documentation interpretation of museum collections and virtual exhibits is not possible without involving museum visitors and museums virtual visitors. Some problems and challenges in interpretation of museum objects maybe met if museum visitors can contribute to the description of the object; functional descriptions maybe added to image indexing (O'Connor, 1999). All collecting, researching, educating and conserving has no sense, "if the actual egoistic thinking of our consumer society precipitates the collapse of humanity, culture and civilization. The

museum makes an important contribution to humanity. We all have the duty to lead our visitors and users to a critical seeing and understanding of art and reality. Critical seeing is distinctive seeing” (Moritsch & Krämer, 1999, p.2).

The need for complex documents that include and provide distinct visualization of components from many sources, e.g., details from high-resolution images, clips of time-based media, tabular or graphic visualizations of datasets, quotations from larger works, and links from each other inclusion to the source is in demand. A displayed image without supplemental materials is useless unless those with the knowledge and skills use them (Crane, 2002; Howze, 1989).

Most studies focus on information access in libraries, the role of a library in information retrieval by selected users’ groups, and users’ information seeking behavior studies (Bates, 1996a, 1996b; Bates, Wilde & Siegfried, 1993; Siegfried, Bates, & Wilde, 1993). Bates, Wilde and Siegfried studied information seeking behavior of visiting scholars at the Getty Center for the History of Art and the Humanities in Santa Monica, California. A series of multi-year studies concentrated on the visiting scholars search strategies. These studies show that online searches constituted searches for subjects, as opposed to searches for works or authors. Searches on individuals as subjects proved to be popular. Geographical names, terms referring to dates and historical periods, and discipline terms were popular as well. A brief evaluation of the museums Websites also supports Bates, Wilde, and Siegfried; no terms can be found on individuals as subjects, or geographical, chronological, or discipline terms. Scholars’ comments include:

1. More international literature, including German (the most popular suggestion), European, French, Spanish, and Latin American
2. Earlier literature of one kind or another: More information on early art and architecture, very current art topics, both art and architecture in the same database
3. Other comments suggested a film literature index, and bibliographies of classical archeology and philology.

Evaluation of museum Websites shows that many museums do not provide information that scholars may need.

Access to the major databases on art history is limited. Most scholars and art historians have access to educational databases like AMICO, a Library of Congress video collection database created to support college curriculum and research. Students and secondary school teacher membership is restricted from the user lists due to membership fees; not being a member of larger organizations; or not being an art historian or a student of a visual art school. Non-member research is based on general literature reviews, third party opinion rather than being able make their own observation and form an independent opinion. "Access to the cultural heritage of the humanity is a right, not a privilege. Digital objects and their components must be freely reusable" (Crane, 2002, p.629). Reusability of digital collections can be achieved by providing information not only to virtual museum visitors but all to incorporated these collections into school curriculum or other communities' activities (Besser 2002, Crane, 2002).

## Educational Value of Cultural Heritage

Falk's and Dierking's book *Learning from Museums: Visitors Experiences and the Making of Meaning* (2000) brought a broad theoretical and practical context in understanding museum visitors motivations to visit museums and visitors learning experiences. The summary of this book underlines visitors' characteristics that can be relevant for the further investigation of virtual museum visitors.

People go to the museum when they can satisfy their emotions, when they are free from anxiety, fear, and other negative mental states. Visitors come to museums, to have fun and /or to see new and interesting things in a relaxing and aesthetically pleasing settings, to look at exhibitions, or participate in programs (Falk, 1999; Falk & Dierking, 2000). If the exhibitions or programs are good, the visitors learn what the project team intended. A high quality exhibition or program attracts visitors and stimulates the learning experience. It is important to underline that the majority of people come to the museum with an agenda. Entering the building they already know what they would like to see or observe. Mass media, newspapers, and friends are the major sources of information for people when creating their vacation or weekend agenda.

Based on numerous studies, it is known that visitors have control over their learning, not a curator, not a teacher, and not a lector (Falk, 1999; Falk & Dierking, 2000). They learn from information provided:

1. From permanent and temporary exhibits
2. From video, movies available in the museum
3. From the variety of activities (meeting with an artist, curator, gallery talks)

4. From the library within the museum
5. From labels of artworks
6. From workshops organized by the museum staff
7. From the architecture of the museum building
8. Finally, people learn from each other through variety means of communication: phone calls, emails, private conversations.

People learn from a museum experience that is mentally organized and when it is recounted to the user in a story or narrative form. Moreover, Falk and Dierking underlined that learning experience is also constructed from a base of prior knowledge. They included such important factors as personal motivations, values, and interests; personal history relative to museum-going; and general awareness of museums and receptivity to the museum-going experience. Falk and Dierking make no mention of a role of museum Websites. Museum Websites can be the lead form of media that helps to create users agenda.

Almost all studies in the Falk and Dierking work analyzed visitors' interests in temporary exhibitions, although visitors' interests vary (Sternberg, 1989). Because of their collections and their inherent immobility, museums have been limited geographically. Distance learning technologies, video conferencing and the Internet via the WWW became devices of special delivery of cultural information to the society. Falk and Dierking noted that technology shifts are a threat to the museum existence, "the rapid spread of virtual experiences, virtual collections, and virtual museums could undermine the need for real experience, real collection, and real museums" (Falk and Dierking, 2000, p.235). This statement has to be supported and verified by variety of

studies comparing people's museums experience and the role of museums Websites in their lives.

While building digital collections and museum Websites, it is important to create a comfortable learning environment for the virtual visitors. The lack of research in the area of virtual users behavior studies prohibits comparing people's museum - going and learning experience between real museums visitation and virtual visitation. Future studies may indicate that museums and museum Websites are partners, not competitors. Together museum and museum Websites may play distinct roles and address individual goals without interfering with each other. A high quality museum representation on the WWW requires more thoughtful and profound analysis of information needs by a diversity of user groups or communities.

### Museums and Multimedia

New technologies have created a global environmental reality for museums worldwide. Museums have always been concerned with presenting multimedia experiences to visitors through collections and exhibitions. Museums were among the first organizations to realize the potential of interactive multimedia and computer technology as a tool of greater public participation and involvement in the learning experience. The introduction of the WWW broke many previous limitations. The WWW provides virtual and limitless space to display artifacts, items traditionally omitted from public view. Interactive Webpages can link each object to others of the same subject, to background information, to commentaries, and to those historic events, which may have influenced its creation.



While virtual representation may substitute for the aesthetic experience of seeing an original work of art, the WWW and other multimedia tools such as CD-ROMs can make the object and its information widely accessible. WWW museums can make available images, which would otherwise be inaccessible. Multimedia allows the visitor to make his/her own choice, perhaps a more compelling experience than ushering passive viewers through the static exhibit. The WWW and its multimedia facilities is one of the most effective information dissemination and retrieval systems developed and maybe possible solutions to information distribution. Multimedia Websites can provide information on a museum's operations, describe collections, and include virtual exhibitions and topical pages that present materials from the institution's collections, as well as research information such as bibliographies and links to other museums and other on-line resources. It is just as important to make museum information available electronically as it is to keep a museum physically open.

The museum's traditional emphasis on objects rather than information about objects means that collections have been separated from related contexts and data. Breaking down the barriers between objects and information, multimedia systems allow the visitor to escape the limitations of physical space and to satisfy informational, educational and recreational needs.

There are two distinguished areas in which multimedia information systems are currently being applied in museums collections:

- Museum collection multimedia databases
- Multimedia guides to specific or current exhibitions

Museum multimedia databases allow the visitor to access information about the museum's collections or art galleries from a computer terminal. The advantage of these systems is that visitors have access to every work in the collection, rather than those that are currently on display. The level of information and the amount of detail systems provided can vary widely. The most successful systems are those that take full advantage of the potential of the medium to go well beyond simply providing an electronic version of an artwork.

Multimedia guides to specific or current exhibitions are those that provide contextual, interpretive information about works in an exhibition or a particular part of a museum's permanent collection. Multimedia systems are particularly useful in providing better access to information about collections, which, by way of their physical nature, might be difficult to display.

As computers become more powerful, sophisticated, and easier to use, and digital storage becomes cheaper and more expansive, museums will likely increase application of new technology in the future. The combining of multimedia computing with broadband digital communications will open up an entirely new range of possibilities. Physical distance and the walls of the museum are no longer barriers to information about museums and their collections.

The expanding use of the Internet by museum professionals throughout the world helps to facilitate widespread inter-institutional cooperation and information sharing on the international level, as well as providing online public access to museum collections.

Virtual reality has already begun to make an impact on museums. Virtual reality systems currently are hard to implement and use. With the rapidly increasing power of

computers and decreasing corresponding costs, it is probably only a matter of time before virtual exhibitions - three-dimensional digital environments that museum visitors can enter – are commonly available.

Paintings, craft works and fabric artworks are well represented in 2-dimensions (2-D) surrogates on the web. In most cases sculpture, ceramics and the rest of 3-D objects are also represented in 2-dimensions. A group of researchers from the Politecnico di Milano, Italy (Barbieri, & est., 1999) presented results stating that 3D graphic is very good at conveying the physical appearance of buildings, objects, and people. 3D technology, however, does not have the capability of communicating high quality content. 2D technology, on the contrary, could easily deliver high quality images, text and graphics. 2-D technology does not recreate the feeling of being somewhere, and, even less, of being with someone else.

Globally, while many thousands of museums have recently joined the World Wide Web, many others would like to have the opportunity to do so. Museums recognize the enormous potential to reach out and educate new audiences. With museums in the role of preserving disappearing resources of all kinds, multimedia creates new opportunities not only for education, but also for job training and distance learning and will become a key educational resource in the future.

## Evaluation of Museum Websites

The evaluation of information currently provided on museum Websites is an essential component for this study. Criteria for the evaluation of the art museums Websites covered such topics as information about exhibits, how permanent collections are presented and what metadata is used to present a work of art, what formats of multimedia are used on these sites and what educational materials are presented on the art museums Websites (Appendix A). Glenn Garelik (2000a; 2000b) has chosen the world's greatest museums and published his evaluation of the prestigious art collections. Garelick's (2000a; 2000b) criteria for evaluation of these sites are based on his personal perception of images, how images fit with background colors of the entire website, how many images are available, what textual information is presented, and information hyperlinked to each image.

The Hermitage museum in Russia and National Gallery in Washington, D.C. created the most comprehensive representation of their collections. These museum Websites are free centers of information, research, and education and scholarship in the field of art history, and cultural heritage in general.

Most of the images that represent the Hermitage and the National Gallery have extensive and literate annotations; audio files supplement some of images; cross-references greatly aid browsing; and links with bibliographies about artists, similar artworks and donors are listed. The National Gallery provides information not only about the artwork, but also about names and places that are associated with a particular artwork. The National Gallery is the only museum that advertises a free online educational course. These two giant museums have tremendous advantages among

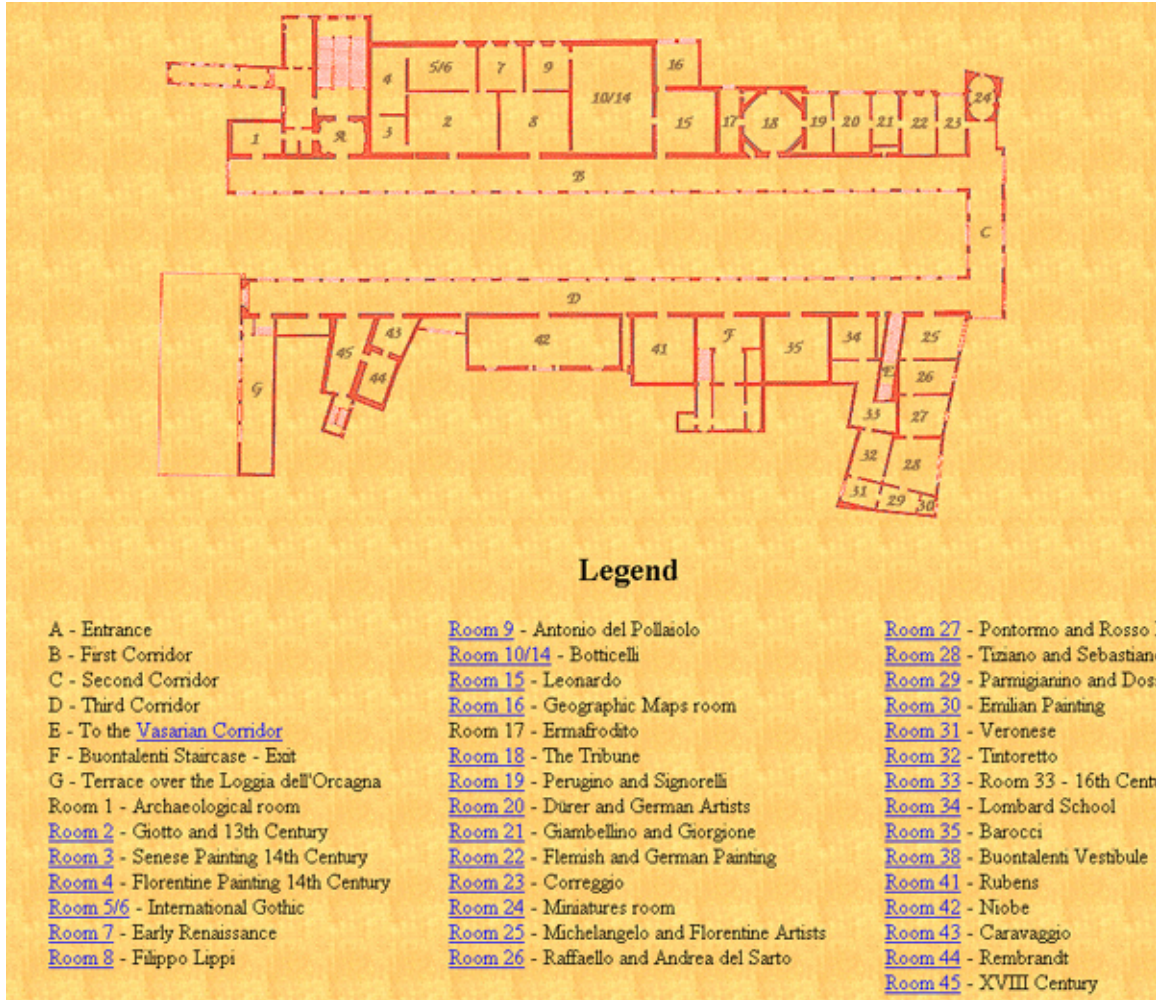
the rest of the museums: their budgets are enormous, respective federal governments sponsor them, and IBM Corporation provides contemporary technology.

Other museums that have a national status and/or are of great pride to a country like the Prado museum in Spain, or the Louvre in France, also broaden their horizons of reaching the public outside of their walls. Most European museums provide general information about museums and their collections in English, excluding the Louvre. The issue of cultural ignorance (Wilson, 1977) puts a barrier for people who do not speak, read or understand French while browsing its collection.

The National Gallery in London has a link to one of the promising features in the future – the EuroGallery. The EuroGallery is a facility that allows the user to search through the European museums and galleries Websites that have their collections online. It is a prototype of Z39.50 that is in great demand among libraries services worldwide.

An evaluation of 35 museum Web sites (16 selected from Garelik [2000a, 2000b]; 3 selected for personal reasons; and 16 randomly selected from a Web-based search engine) gives an opportunity to grasp an idea of what kind of information is provided for the public (Appendix A). Museums Websites provide general information to the visitors about museum facilities, hours of operation, activities, services, ticket prices, and short overviews of the exhibits. Gallery maps and building maps are available on limited sites (Uffizi Gallery of Florence, Van Gogh museum in Amsterdam, and 6 others). Some museums show maps of the building and include room content. The Uffizi image map links rooms to a list of paintings that are located within. QuickTime software helps a virtual user to step into a room and observe the collection.

Figure 1. The Uffizi Gallery rooms index.



Note: This screenshot was taken from the Uffizi Gallery in Florence, Italy at <http://www.arca.net/uffizi/roomsidx.htm>. This screenshot used for the research purpose only. Due to the possibility of the improvement and redesign of the Website, provided URL may change.

## *Exhibits*

Studies indicate that visitors of museum Websites come with a variety of information needs. Although some studies indicate that current exhibits arouse the highest interests in visitors, museum staff, students, and teachers (Hanauer, 2003; Kravchyna & Hastings, 2002; Lynch, 2002b). Recently the Van Gogh traveling exhibit in Germany had the highest visitation in the Bremen Art Center. It is interesting to note that 80 percent of the visitors were from outside the city, and only 16 percent from Bremen. The Van Gogh museum in Amsterdam, Holland that provided many Van Gogh works to the Bremen Art Center, had digitized almost all works of the great artists, but visitors still come to the museum, wait in lines to see original art works.

Almost all museums publish a calendar of events and information about exhibits on their Websites. The more prestigious the museum (The National Gallery in Washington, D.C., The Hermitage), the more detailed comprehensive information is provided (e.g., see Figure 4 and Figure 7). 31 of 35 museums have information concerning current exhibits. Some sites introduce a visitor only to the name, dates and a short paragraph of exhibit description, e.g., Dallas Museum of Art (DMA), Texas. Although the DMA mentions highlights of the exposition, no thumbnails are included to invite visual stimulation.

Figure 2. Exhibit description at the DMA

“The Gilded Age”  
November 3, 2002-January 12, 2003  
The J.E.R. Chilton Galleries  
Composed of 60 paintings, sculpture, and decorative objects from the late 1800's and early 1900s, this exhibition presents works from the collection of the Smithsonian American Art Museum, including a full-length portrait of Elizabeth Winthrop Chandler by John Singer Sargent. Other spectacular highlights include Apollo with Cupids, a decorative panel by Augustus Saint-Gaudens and John La Farge that once adorned the dining room of Cornelius Vanderbilt's palatial home on Fifth Avenue in New York City, as well as St.Gaudens's bronze Adams Memorial and paintings by Childe Hassam, Albert Pinkham Ryder, Henry Ossawa Tanner, Winslow Homer, and George Inness.

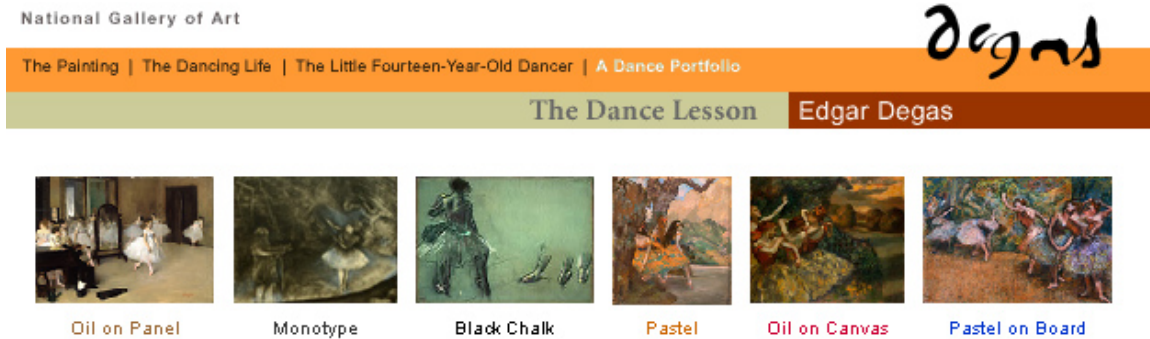
*Note:* This information was retrieved from the Dallas Museum of Art, at <http://dmaws.dallasmuseumofart.org/> on November 2002. Due to the possibility of the improvement and redesign of the Website provided URL may change.

More comprehensive information about a current exhibit can be found on the Musee De La Civilization Website, Quebec City, Canada. The exhibit *A Wild And Woolly Ride Through the Idealized West*, highlighted the major works of art showing pictures as well as providing an extensive list of artifacts with a short description. An interactive exposition, *Cowboy in Heart*, supplemented the exhibit.

An informative virtual exhibit design is presented at the National Gallery in Washington, D.C. Online exhibits are by themselves educational tools for a virtual visitor. *The Dance Lesson*, by Edgar Degas, allows a virtual visitor not only to see works of art by a famous Impressionist artist, but how these works were created, how they are related to each other, and how they reflect Degas' life.



Figure 3. *The Dance Lesson*. Edgar Degas.



### A Dance Portfolio

*There are examples of pictures begun in water color, continued in gouache, and afterwards completed in oils, and if the picture be examined carefully it will be found the finishing hand has been given with pen and ink.*

So wrote an art critic in 1890 about Degas' wide-ranging technique. Throughout his career, the artist experimented with art materials, combining media in new and surprising ways. This "Dance Portfolio" features ballet works by Degas in many different media.

Click on the works of art to examine how Degas used these diverse materials.

*Note:* This screenshot was taken from the National Gallery of Art, Washington, DC, at [http://www.nga.gov/feature/artnation/degas/danceportfolio\\_1.shtm](http://www.nga.gov/feature/artnation/degas/danceportfolio_1.shtm) on November 2002.

Screenshot used for the research purpose only. Due to the possibility of the improvement and redesign of the Website provided URL may change.

The Van Gogh museum virtual tour requires free registration to enter the 3D exhibit of a permanent collection with complete representation of artworks by Van Gogh. The 3D Van Gogh Exhibit features a 3-dimensional representation of Van Gogh's works on the first floor of the Van Gogh museum. In addition to being able to zoom in on the detail of any painting, a visitor to the 3D exhibit can browse anywhere within the gallery, either alone or in the company of other online visitors or engage in a real-time text or

audio chat. In an effort to foster a deeper understanding of his art and life, a visitor can experience a simulation of two of Van Gogh's works, *The Bedroom* and *The Yellow House*. The so-called *Insights* provide information about several aspects of the artist's life and work. The Van Gogh museum has a wonderful link to the site, <http://www.vangoghgauguin.com/>, with an interactive educational program about two great artists, Gauguin and Van Gogh. The Website is a research project that studied and compared the influences these two masters had upon each other and presents results in a very sophisticated, technologically advanced manner.

Figure 4. 3-D Van Gogh exhibit



Note: This screenshot used for the research purpose only.

A complete list of artworks displayed during an exhibition is published only by 6 museums. Information on a creator of the exhibit (6 museums of 35), a sponsor (6 museums of 35), lectures related to an exhibit (8 museums of 35) and free tours (3 museums of 35) is a rare piece of information on the museum Websites.

A majority of museums provided information about past and upcoming exhibits (Appendix A). Some museums archive past exhibits with the complete information that was provided while an exhibit was on display, saving images and textual information. Some museums leave only titles and calendar dates when the exhibit was on display.

### *Museum Collections*

Museum digital collections represent the entire treasure of the institution, reflecting partial cultural heritage of human civilization. An access to digital collection databases that allows viewing remote artworks, which cannot be physically accessible, is one of the greatest benefits for virtual users. Most museums that were evaluated for the second pilot study, provide free access to their digital collections with a display of thumbnails and larger images (72 dpi), but rarely do they provide descriptive information about the object. Museums try to claim the copyright of their collections using low quality images or embedding digital watermarks (e.g., Uffizi Gallery).

Figure 5. Leonardo da Vinci. *Annunciation* with a digital watermark.



Note: This image was taken from the Uffizi Gallery, Florence, Italy on November 2002 at <http://www.arca.net/uffizi/img/1618.jpg>. This image used for the research purpose only.

Thumbnails and images can carry enough information for one person yet are insufficient for another user (Howze, 1989). One of the survey respondents to the pilot study commented "... part of my job is to classify images in our digital database by their iconography. I use museum Websites to look up information on the images that I classify—to find out who they portray, if a landscape or architecture is real or imagined, if the scene is historical, etc... The museum Websites most useful for this purpose are those that tell me the story of why an artwork was made, and what the symbols in it mean, if there are any."

Historical periods, places, and people are poorly represented in the art museum's collection (Passe & Whitney, 1998). The most representative information is about title, artist, dimensions, texture, genre (the National Gallery in Washington, DC) and culture (Victoria and Alberta Museum)(Figure 6).

Humanities scholars prefer titles and artists' names for searching databases (Bates, 1994, 1996a, 1996b). Names can be written in foreign languages and the spelling can vary. It is also known that some of the artworks can have multiple titles, like *Olive Pickers* and *Olive Garden* by Van Gogh. There are museums that divide their collection based on geographical presentation, e.g., European, American, African paintings. These collections do not reflect genre specifics such as Impressionism or Renaissance. Classification can cause search problems if an artwork is not supported by a broader description, cross-references and moreover, if standards for the description and displaying artworks are not created. Thirteen museums provide descriptive information about an artwork that is more than 100 words (multiple paragraphs). The broader a description is, the easier it is to find a desired piece of art using free text searching.


It is interesting to note that large museums and very small museums provide links to other museum Websites. Middle-sized museums, like the DMA and the Detroit Museum of Art, do not provide information on other collections, artworks that are outside their walls. Three museums – the National Gallery in Washington, D.C., the Hermitage Museum, in St. Petersburg, Russia and the Swiss National Museum of Zurich, Switzerland - provide online information about additional resources and provenance.

Figure 6. Information on Escher's *Eight Heads* painting.

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the collection

NATIONAL GALLERY OF ART



M.C. Escher  
Dutch, 1898 - 1972  
*Eight Heads*, 1922  
woodcut, block printed four times, image: 32.5 x 34 cm (12 13/16 x 13 3/8 in.)  
sheet: 45.7 x 44.8 cm (18 x 17 5/8 in.)  
Cornelius Van S. Roosevelt Collection  
All M.C. Escher works © Cordon Art-Baarn-the Netherlands. Used by permission. All rights reserved.  
1973.65.2

**From the Tour: M.C. Escher -- Life and Work**  
Object 3 of 24

Created while Escher was still a student at the School for Architecture and Decorative Arts in Haarlem, this is the first print to demonstrate his theory of the regular division of a plane. Escher cut eight heads -- four male and four female -- in the original wood block. The final image was achieved by printing the block four times.

**full screen image**  
**bibliography**  
**exhibition history**  
**location**  
**provenance**

Note: This screenshot was taken from the National Gallery, Washington, DC, on November 2002, at <http://www.nga.gov/collection/gallery/ggescher/ggescher-53798.0.html>. It is used for the research purpose only.



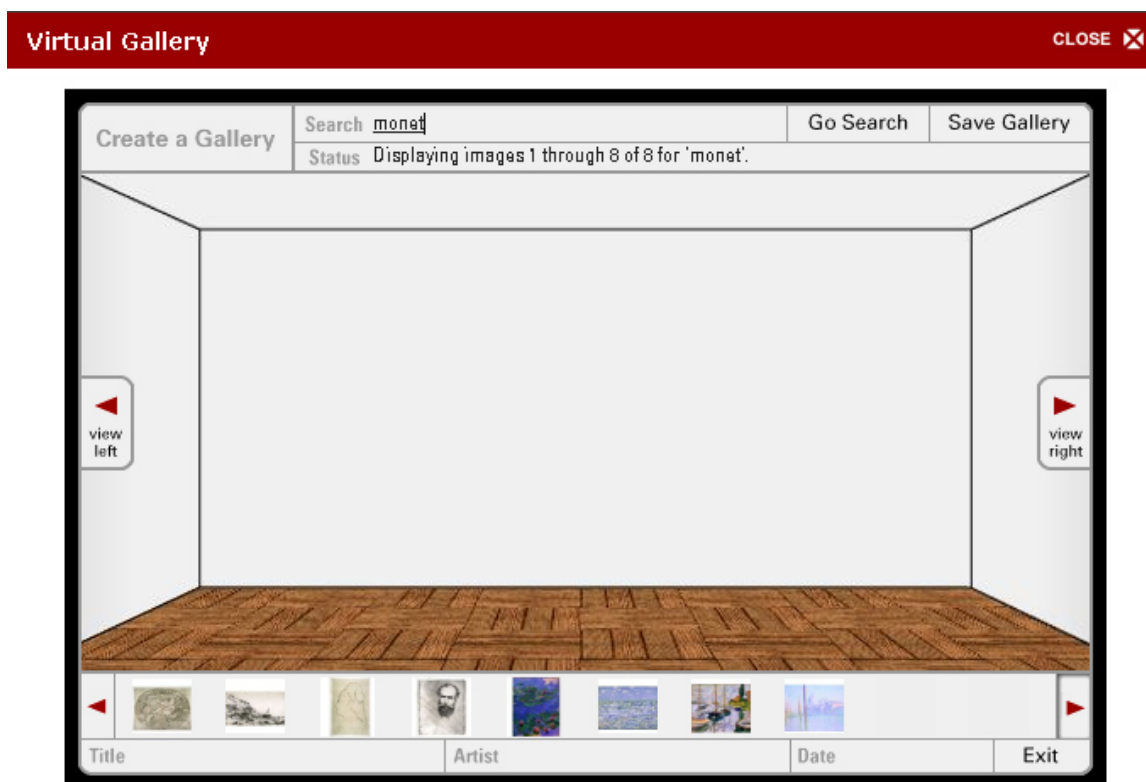
## *Multimedia*

Thumbnails, enlarged 2-D surrogates of museum collections, and textual information are the most popular formats used to deliver museum content to a virtual visitor. Multimedia formats are understood and presented in different ways. For some museums, multimedia includes text and images used to create virtual tours. For others, multimedia involves more than text and images – audio and video files, 3-D interactive games and tours. With the help of two formats - images and text - designers create online tours, or virtual tours. Educational games are created with the help of QuickTime (Apple Computer Australia Pty Ltd.) (The National Gallery in Washington, DC, Uffizi Gallery, Florence), Macromedia Shockwave 8® player (Macromedia, Inc. <http://www.macromedia.com/software/shockwaveplayer>), and Macromedia Flash 4® (Macromedia, Inc.) from (Museum of Modern Art (MoMA), New York) (Figure 7). MoMA's educational programs use videoconferencing, interactive broadcast. *Looking with MoMA* videoconference classes provide multiple-part programming to teachers and students outside the New York metropolitan area. The Whitney Museum has a select introduction to its collection with audio narratives (a description of an artwork is narrated and written), named American Voices audio tour. American Voices introduces many of the art works in the Whitney permanent collection. The tour features the voices of notable artists, authors, and scholars as well as their own curators, all of whom bring multiple perspectives to the works.

The Museum of Fine Art of Boston and the Metropolitan Museum of Art of New York have virtual galleries that visitors can create. A virtual visitor can be a curator and can select from the 82,000 works of art from the permanent collections to include in

their own virtual gallery, or browse through the galleries created by other visitors. Once visitors complete a virtual gallery, they can have an opening and invite their friends and colleagues to view their selections. The Museum of Fine Arts in Boston offers an example of an interactive image zoom using imaging application. Virtual visitors can see an artwork in details.

Figure 7. Virtual Gallery created by a visitor.



Virtual Gallery

Note: This gallery was created and a screenshot copied from the Metropolitan Museum of Art in New York in November 2002 at

[http://www.metmuseum.org/mymetmuseum/my\\_main.asp](http://www.metmuseum.org/mymetmuseum/my_main.asp).



The J. Paul Getty Museum of Los Angeles includes a video gallery. Virtual visitors can watch an overview of the museum's rooms and their content. Of course the connection speed plays an important role in the decision – to watch this video or not.

Figure 8. Video Gallery in J. Paul Getty Museum, Los Angeles, CA



Note: This screenshot was taken from the Getty Museum, CA on November 2002, at [http://www.getty.edu/art/collections/media\\_gallery.html](http://www.getty.edu/art/collections/media_gallery.html) . This screenshot is used for the research purpose only.

The most surprising discovery is that none of the evaluated museums use 3-D software to present 3-D objects. Most 3-D objects are presented as 2-D images. It is understandable that at the beginning of the digitizing era, museums rushed to shoot 3-D

images and present them in their collections. An interesting question arises: Will museums that have placed 3-D objects on the WWW in 2-D, go back to create a representation of 3-D objects using 3-D software?

### *Educational Information*

The last criteria used to evaluate museum Websites concerned the level of educational information provided to the visitors, to the virtual visitors, and to educators. Most museums have educational courses onsite that support school curriculum e.g., teachers packets (DMA) and kids programs. Less educational information is provided on art museums Websites. Again, the more known museums like the National Gallery in Washington D.C., and Metropolitan Museum in New York share educational resources with the virtual community. Based on the museum evaluation, it can be said that smaller museums protect their intellectual rights for created educational context by supporting onsite courses or protecting virtual course by password, as in the case kids page at the Biggs Museum of American Art of Middletown, Delaware. The Biggs Museum of American Art provides educational resources to school and they are better than information about the collection. The Biggs Museum of American Art houses a personal collection that has been in the making for over half a century. The idea, that smaller museums concentrate their efforts to attract visitors to the museum by providing and delivering educational programs onsite, requires further academic investigation.

### *Summary of the Museum Websites Evaluation*

The goal of each cultural heritage information provider must be to create a set of “heterogeneous, in some way incommensurable, collections that appealed to wide-spread, complex audiences with disparate, often competing interests” (Crane, 2002, p.626). Information delivery via Websites becomes a heavily used communication device. Museum Websites and digital collection databases have to be designed to meet the variety of user categories. Although Siegel and Grigoryeva (1999) think that the research Websites are easier to design than public sites, consideration of the nature of humanities scholars, their information needs, suggestions for including specific fields in databases, and search strategies have to be taken into account. The basic difference between research and general public sites (created by Siegel and her group) is that the public site has only two search conditions: country and object type. Siegel understands that geographical information is one aspect that is shared across most collections; this helps to provide contextuality across many collections. Unfortunately, an analysis of museum Websites for this proposal shows the lack of geographical information, and this is also supported by Bates’ studies (Bates, 1994, 1996a, 1996b) on humanities scholars.

The proposed study investigated information needs of virtual museum visitors. Analysis of virtual visitors’ information needs helped to establish a conceptual base for cultural knowledge organization, digitization of accumulated cultural heritage and information/context-production process.

Chapter III describes the methodology of the proposed case study. It introduces the surveyed user categories and how an analysis of collected data was evaluated.

## CHAPTER 3

### METHODOLOGY

The central focus of the proposed descriptive case study is to elicit information needs that are relevant for selected categories. Descriptive case study is used as the jumping-off point for new studies (Simon & Burstein, 1985) in information science, related to the information needs of virtual visitors for the museum Websites (research questions 1). This project identified the information needs, present and potential, similar and dissimilar, of various communities among art museum virtual visitors. The users categories that are targeted in this research include teachers of middle and high schools, art historians and scholars, college and university students, museum staff and donors, and the general public. This empirical research compared user categories and discovered differences and similarities if any (research questions 1, 1a and 1b) in information needs for museum Websites (Simon & Burstein, 1985; Williamson, 2000; Tanner, 2000).

#### Research Questions

The following questions framed this research.

1. What are the information needs of the virtual visitors for the museum Websites and virtual exhibits?

- a. What are the unique and common information needs of selected social groups of virtual visitors?
  - b. What multimedia information resources provided by museums do virtual visitors prefer?
2. What are unique and common information needs of virtual and real visitors?

The objectives of this study are:

1. To identify and specify users groups to be surveyed
2. To identify museum Websites where links to the WWW survey will be created
3. To inform selected users categories of ongoing research through different media communication
4. To make suggestions to cultural heritage professionals for further informational and educational content design of museum Websites based on data analysis.
5. To build a platform for future research
6. To contribute to filling a gap between information providers and virtual visitors.

A web-based survey was created and launched to conduct this research and to gather data for further analysis.

## Population

Five categories of users are targeted for this study.

### *Museum professionals and donors*

Museum professionals, cultural heritage professionals and donors include everyday life information seeking (ELIS) (Huotari & Chatman, 2001) behavior and information needs of cultural professionals. The Canadian Heritage Information Network (CHIN) conducted the survey with the aim of obtaining a profile of virtual users within the heritage community. The survey findings show that 94.4% of cultural heritage professionals use World Wide Web (WWW) to obtain information on other museum Websites (76.4%) and to find information on related research topics (87%). Respondents also ask for richer and reliable content on the museum Websites (75%). Contextual information is in great demand for cultural heritage professionals (Thomas, 2000).

The museum professionals were selected from the Dallas Museum of Art (DMA), the African-American Museum in Dallas (AAM), the Amon Carter Museum in Fort Worth, and Kimbell Museum in Fort Worth. I worked with a cultural professional from the CHIN.

### *Scholars and art historians*

Scholars and art historians from the School of Visual Arts (SOVA), School of Library and Information Science (SLIS) at the University of North Texas (UNT) were contacted to answer the survey. In addition, there was an opportunity for scholars, art historians, and museum professionals to participate in the survey through a variety of listservs and professional newsletters. Selected international listservs were to be used to distribute information about a survey (see Appendix B).

### *General public*

The third group of users, the general public, provided information regarding recreational information seeking behavior and information needs of museum virtual users. In this study, they are the people who are looking for information on places to go; museums, things to see and to observe, exhibits, participatory events, and museum activities. This user category was selected from the museum visitors that have used the Website through mailing lists. A letter to the Information Technology (IT) departments of select museums (the Dallas Museum of Art, the African-American Museum in Dallas, the Amon Carter Museum of Art in Fort Worth, and the Kimbell Museum of Art in Fort Worth) requested the museum to create a link to the survey on the index page of the museum's Webpage (see Appendix C).

### *Students in colleges and universities*

The fourth group of users category provided information regarding students' information seeking behavior and information needs. Representatives for this user category were students from the UNT SOVA and SLIS. Survey information was

distributed via the UNT GroupWise mailing list. SLIS and SOVA students received information during their classes.

### *Teachers of high schools*

The fifth group of user categories is teachers of high schools. Denton Independent School District (ISD) was very helpful when pilot study was conducted. For this case study, Denton ISD was consulted and asked to help to collect data from local teachers. In addition, several listservs were used to distribute information to other educational institutions (Appendix B).

The specifics of this case study indicate that for each category of users it was needed to collect data from 25-100 respondents (150-500 total) for a valid sample (Simon & Burstein, 1985, p.413).

### Survey

Online surveys are widely used as a research method in a variety of academic, social and scientific areas. Such surveys provide new opportunities to collect data, to reach a wider population, and to improve the quality of survey data through a dynamic/interactive process in comparison to other survey research methods (Klassen & Jacobs, 2001; Wang, Dziuban, & Moskal, 2000; Zhang, 2000). Email, mailing lists, and newsgroups are used as a tool to advertise ongoing research and to gather a greater number of responses. These means of informing population groups about the research are also useful because people who subscribe to selected lists share similar interests.

Web-based surveys have great potential value for research. The advantages of the web-based survey include low cost for sending questionnaires and coding data



(Berge & Collins, 1996; Zhang, 2000; Wang, Dziuban, & Moskal, 2000). Less time is required to gather necessary information. Web-based surveys can also reach potential respondents that are in geographically remote areas. Biased samples are a major concern with web-based surveys. Most people who use the Internet have access to computers and feel very comfortable using surveys. Zhang (2000) suggests that these types of surveys cannot be generalizable because some social groups can be underrepresented, like women, people with limited financial resources, minorities and the elderly.

The current research depends on self-selected respondents. A problem may occur with duplicated submissions (Silverman, 2000). I assumed that a large number of responses ameliorated false submissions. The effective online system should have a mechanism that identifies the respondents but it is necessary to guarantee anonymity.

A large number of surveys have been conducted online and proved successful. Knapp and Kirk (2002) conducted a study at the University of California using three survey methods: pencil and paper, Internet survey, and a touch-tone telephone response system. They found no significant differences in these types of surveys and submission of responses from participants.

The largest and the most known comprehensive survey was launched on the National Geographic Website in 1998. *Survey2000* was designed to gather data about geographic mobility, feelings of community, and literary and musical tastes. *Survey2000* had outstanding success in collecting data. *Survey2000* represents an experiment in survey methodology on the Internet that reached 178 countries and received 80 000 responses (Witte, Amoroso, & Howard, 2000). Governments and international

organizations begin to use web-based surveys as their primary research method to develop further knowledge about the WWW as a survey research tool, and to collect data of broader topical interests and to cover broader geographic areas. For example, the United Nations Economic Commission for Europe designed an international survey to investigate social and economic diversity all over the world (Available online <http://www.unece.org/press/survey2000-2.htm>).

### *Survey design and analysis*

For implementing a Web-based survey Active Server Pages (ASP) (Sun Microsystems™, Inc.,) scripts were created and hosted on one of the SLIS Microsoft Windows® NT servers. These scripts gathered information from the survey forms presented to the respondents via the Webpage and then store that data in a database. Administrative scripts for this survey allowed browsing collected information, performing some basic statistics analysis (including number of respondents of each category and number of answer to each questions) and downloading the data to a spreadsheet for further analysis and reporting. This method of collecting data was used for a pilot study (Kravchyna & Hastings, 2002). Data analysis is provided with graphs and tables. This study is targeted for the museum professionals and majority of museum reports are presented in graphs and tables.

People are reluctant to answer questions if a survey is too long (Hampton & Wellman, 1999). The designed online survey took about 10-15 minutes to answer all questions.

### *Survey Questions*

To collect data that would represent several cultural backgrounds and cover broader audiences, e.g., US, Canadian and European, survey questions were translated into 3 languages (Appendix D). The survey was represented by 6 question sets and each question provided the answer choices. Respondents had a choice to select all that apply to their needs and well as submit comments on those needs that were not available from answer choices.

Falk and Dierking (2000) mention that a technology shift is a threat to museum existence and can undermine the need for real experience, real collections, and real museums. Chapter II mentioned that the goals of museums and their representation on the Internet would likely never interfere with each other. Museum representation on the WWW may serve as a media source to create an agenda for future museum visitation. To investigate this assumption, survey question 1 (Table 1) was asked to determine if virtual visitors would go to the museum after they see a collection on the WWW and what are their primary purposes in visiting the museum Websites (survey question 2, Table 2).

Table 1

*Survey question 1: Will you visit the museum after you have visited the museum Website?*

---

<i>Answers to the question</i>	
1	Yes
2	No
3	May

---

*Note.* Respondents had a choice to select only one answer.

This was a first attempt to deny or support a common viewpoint that representations of a museum collection and exhibits on the WWW will jeopardize real museum visitation and real museum experience.

Table 2

*Survey question 2: What is the primary purpose of using a museum Website?*

---

<i>Answers to the question</i>	
2	To determine what to see in a museum
3	To search for a specific image(s)
4	To gain knowledge about a museum collection
5	To find textual information on a museum object(s)
6	To gather information for scholarly research
7	To look for educational materials
8	To purchase gifts from the museum store
9	To learn about community programs
10	To check calendar of events
11	Other

---

*Note.* Respondents had a choice to select all that apply.

Selection of the answers 2, 9, 10 and probably answer 4 of the survey question 2 (Table 2) as primary purposes, support the assumption that virtual users use museum

Websites to create their agenda for museum visitation. Selection of answers 3, 4 and 5 to the survey question 2 indicates more interest in scholarly or educational information. An educational need for museum Websites is an area to be studied in a more detailed manner in the future.

Table 3

*Survey question 3: When you visit a museum Website and look for exhibit information which of the following is most important?*

---

<i>Answers to the question</i>	
1	Upcoming exhibits
2	Current exhibits
3	Past exhibits

---

*Note.* Respondents had a choice to select all that apply.

Current exhibits arouse the highest interests in visitors, museum staff, students, and teachers. Most people who come to the museum are interested in current exhibits (Falk & Dierking, 2000). The expected results from the survey question 3 were that people are interested in current exhibits (Table 3). The response turned out as expected, real and virtual visitations of current exhibits raise common interests in both real and virtual visitors. To find out what type of information virtual visitors need about current exhibits, survey question 4 (Table 4) was asked. Most museums provide only general information about an exhibit such as the exhibit title; exhibit duration with a short explanation paragraph. Sometimes, museums provide brief information on number of presented art works and the titles of artwork highlights. Some museums go further, introducing their visitors to the highlights of an exhibit, and images of famous works of art are available for observation for virtual visitors.

Table 4

*Survey question 4: What exhibit information would you like to read on the museum Website?*

---

<i>Answers to the question</i>	
1	Exhibit duration (opening date/closing date)
2	Open hours of a museum/exhibit
3	Location
4	Ticket prices/entry fees
5	Highlights of an exhibit
6	A complete list of artworks displayed for the exhibit
7	A creator of an exhibit
8	If guided tours are available

---

Looking at current exhibits and getting to know museum digital collection may have similarities in information provided about an artwork. Asking respondents to answer survey question 5 (Table 5) about the information they need concerning an artwork may help to design a digital collection database with an ability to display this information to the virtual visitors. Answers to the survey questions 4 and 5 (Table 4 and 5) may show some strategies in their image retrieval process using database descriptive fields that require future investigations. It is already known that humanities scholars requested more profound information, e.g., geographical terms and bibliographies, (Bates, 1996) for their information retrieval. Unfortunately, not all museum digital collections provide in-depth information about an artwork. Although desired displayed on the computer screen and search strategies differ in meaning, future studies may investigate their relationship.

Table 5

*Survey question 5: What information about work of art would you like to access on the museum Website?*

---

*Answers to the question*

- 1 Title of an artwork
  - 2 Name of a creator/artist
  - 3 Physical dimensions of an artwork
  - 4 Date of creation
  - 5 Medium object is created with (oil, glass, etc.)
  - 6 Genre (Renaissance, Impressionism, etc.)
  - 7 Country an artwork was created
  - 8 Brief description of an artwork (50-70 words, a paragraph)
  - 9 In-depth description of an artwork (70-200 words, a couple of paragraphs)
  - 10 Additional reference resources about an artwork or artist
  - 11 Copyright of an artwork or an owner
  - 12 Provenance (Proof of authenticity)
  - 13 Links to other museums that have similar artwork(s), or works of the same artist
  - 14 Contextual or historical information about an artwork or artist
  - 15 Other
- 

*Note.* Respondents had a choice to select all that apply.

*Research question 1a: What are the unique and common information needs of selected social groups of virtual visitors?*

The collected data from the virtual visitors was compared between each selected users categories to identify similar and unique information needs for each selected users groups. Identified similarities and differences may provide some strategies in creating an evaluation plan for digitization process.

*Research question 1b: What multimedia information resources provided by museums do virtual visitors prefer?*

Museums have a wide range of devices to provide information to their visitors: exhibits with explanatory labels and audio guides, videos and computer stations with variety of educational information, library and curators, gallery talks and a diversity of activities. People choose one kind of activity and skip another (Falk and Dierking, 2000). It is a personal choice and, as it was mentioned before users have control over their learning selection. People are also unique in learning styles. Learning styles may influence the selection of users' activities in the museums.



Table 6

*Survey question 6: Which of the following types of multimedia would you like to access on the museum Website?*

---

*Answers to the question*

1	Small image (thumbnail)
2	Full size image
3	Zoomable image
4	3-D images
5	Online educational games
6	Virtual tours of an exhibit
7	Virtual tours of a museum building
8	Audio description (1-5 minutes)
9	Audio description (5-10 minutes)
10	Audio description (more than 10 minutes)
11	Video description (1-5 minutes)
12	Video description (5-10 minutes)
13	Video description (more than 10 minutes)
14	Other

---

Not many designers of museum Websites consider users preferences for multimedia while providing information about digital collections. To understand better virtual visitors preferences in using multimedia, the survey question 6 (Table 6) was asked. It is understandable that different people prefer different multimedia devices and have different technical tools to access multimedia tools, e.g., dial up connection, various plug-ins, etc. The purpose of this question is to establish the minimum of people's desire for multimedia representation.

*Research question 2: What are unique and common information needs of virtual and real visitors?*

The collected data from the virtual visitors supposed to be compared with an analysis of the real visitors' museum experience. Unfortunately, the lack of studies of information needs and information behavior of the virtual visitors does not provide a complete chart of unique and common information needs of virtual and real visitors. However, studies from Falk and Dierking (2000) provide some basic categories for comparison.

### Summary

We know that visitors of museum Websites come with a variety of information needs. We have to investigate these needs in detail and make suggestions for what elements should be included on museum Websites. Paterno and Mancini (2000) suggest that WWW design has to take into consideration various types of users who want to perform various tasks in various context, and people with various experiences. They point out that museum Websites design could only be improved taking into account the different needs of different types of users. The proposed research attempts to understand information needs for the selected user categories in the area in art history represented on museum Websites, like virtual exhibits and multimedia information resources identification. Similar information needs of virtual visitors may provide a platform for the digitizing process of museum collections. It maybe one of the approaches for creating an evaluation plan for digital collections:

1. To provide information on museum Websites needed by all user categories

2. To provide in-depth information (to add information later) requested by specific user categories

This research does not attempt to suggest a prioritizing strategy on what collections should be selected digitization.

## CHAPTER 4

### DATA ANALYSIS

This research identified the information needs, present and potential, common and unique, of 5 categories of virtual visitors to art museums. The user categories targeted in this research include teachers of middle and high schools, art historians and scholars, college and university students, museum staff and donors, and the general public. This research determined information needs of virtual users (research question 1) and users' multimedia preferences on the museum Websites (research question 4) and compared user categories and discovered differences and similarities (research questions 2 and 3) in information needs for museum Websites. An analysis of the data is organized by research questions and each research question is followed by analysis of survey questions.

#### Research Questions

The following questions framed this research.

1. What are the information needs of the virtual visitors for the museum Websites and virtual exhibits?
  - a. What are the unique and common information needs of selected social groups of virtual visitors?

- b. What multimedia information resources provided by museums do virtual visitors prefer?
2. What are unique and common information needs of virtual and real visitors?

### Research Design

The Institutional Review Board (IRB) approved the research project on February 23, 2003 (Appendix E). For implementing a Web-based survey, Active Server Pages (ASP) (Sun Microsystems™, Inc., technology was used and hosted on one of the School of Library and Information Sciences (SLIS) Digital Lab's Microsoft Windows®\* NT server. These scripts gathered information from the survey forms presented to the respondents via the Webpage and then stored the collected data in a database. Administrative scripts for this survey performed basic statistical analysis (number of respondents of each category and number of answers to each questions) and these survey results were downloaded to a spreadsheet for detailed analysis. Responses were considered valid if at least one answer was checked from each of six sets of questions.

A questionnaire was available in English, French and German languages in order to collect more data via international listservs and mailing lists (Appendix B, Appendix D). Approximately 600 cards with a project information and survey URL (Appendix F) were distributed among students at the University of North Texas (UNT), at the Canadian Art Museum Association and at the Visual Resources Association. The survey was available online from March 6, 2003 through July 6, 2003. During that period of time approximately 15 thousand listserv subscribers were informed about the ongoing research. Minor inconveniences occurred in reaching categories like teachers and

scholars. Many listserves are designed for discussion purposes only and they don't allow distributing information about the survey. Teachers required permission of their superintendents to answer the survey and without such permission particularly this user category was limited only to personal contacts. Future projects may seek other ways to reach teachers and scholars.

### Population

During the four-month period 564 responses from selected categories of users were submitted and stored in the database. Upon inspection 14 answers have been deleted from the database. Five responses contained double responses to the first question "If you have an opportunity, will you visit a museum after you have visited a museum Websites?" They had to answer only "yes," "no" or "maybe" for results to be valid. It was one of the survey's design problems. To avoid duplication of answers to this question, radio buttons had to be created instead of using check box design option. Also, 9 responses were considered invalid due to missing answers in each set of questions or those responses contained no data. 550 responses are valid for the research analysis, among them 171 members of museum staff, 188 general visitors, 98 students, 40 teachers and 53 scholars. 145 respondents have submitted their comments and these comments have been numbered consequently (Appendix G).

Table 7

*Population Participating in the Research.*

<u>User categories</u>	<u>N</u>
Museum staff	171
Scholars	53
Teachers	40
Students	98
General visitors	188
<i>Total</i>	<i>550</i>

The research does not intend to analyze the collected data based on cultural or native language differences at this time. This data can be used for future research to determine similarities and differences based on the cultural background of user categories. The total number of responses for each set of questions and a number of responses of each user category within a set of questions were analyzed.

### Data Analysis

Chi square test of homogeneity was used to provide statistical analysis of collected data and to identify significant difference ( $p$  value) between user categories. Graphical representation of collected data was provided to enhance visual perception. Petterson (1989) states that an ability to see salient features of statistical graphs is the ability to show patterns in the individual data values plotted. These patterns are easily detected by the human eye and used for explanatory analysis. Using graphs, it is easier to see differences between lines, to see relationship between user categories, and to see differences between volumes (percentage) (Petterson, 1989).

Chi square test of homogeneity and graphs with tables was intentionally used for this data analysis. This type of analysis displays complex data in a simple way. The main consideration for this research was general knowledge of statistical analysis methods of people who will use this data for practical purposes, e.g., digitization plans, WWW design, etc.

Figures 11, 12, 13 and 14 present data using charts to visualize similar and unique patterns of virtual visitors preferences. Tables 8, 10, 11 and 12 present data analysis with primary, secondary and tertiary information preferences and delineate virtual visitors' preferences within each user category.

*Survey question 1 (Table 1): If you have an opportunity, would you go to a museum after you have visited a museum Website?*

This question was put into the survey to determine the validity of Falk and Dierking's (2000) assertion that representation of museum collections and exhibits on the World Wide Web (WWW) can jeopardize real museum visitation and real museum experience. The pilot study (Kravchyna & Hastings, 2002) was the first attempt to resolve this problem. It showed that 57% of all respondents will visit museums before and after they visit a museum Website and 23% before they visit a museum.

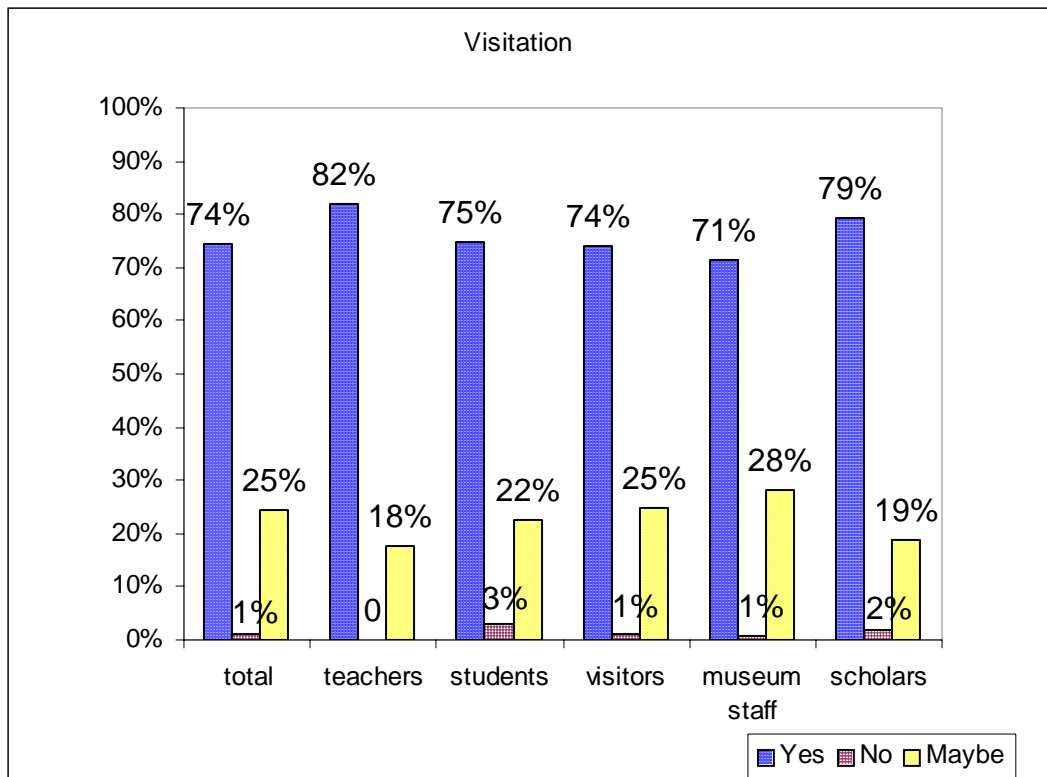
Current research uses data submitted by 550 respondents. Figure 10 shows that 74% ( $n=409$ ,  $n$  is a number of respondents) of all respondents ( $n=550$ ) will visit a museum after they have visited a museum Website if they have such an opportunity. Chi square analysis shows that there is a not statistical difference ( $p=0,573$ ,  $p$  value is statistical significance) between user categories (82% teachers, 75% students, 74%



general visitors, 71% museum staff members and 79% scholars) in their intention to visit a museum if they have such an opportunity.

A smaller but quite impressive percentage (25%,  $n=135$ ) of each of the user categories (18% teachers, 22% students, 25% visitors, 28% museum staff members and 19% scholars) answered this question with “maybe.” Current research does not intend to identify *why* virtual users *may or may not* go to a museum. Many reasons can influence virtual users’ decision not to visit a museum after browsing museum Websites: conflicts of time schedule, exhibits are not of users’ interests, etc. Future studies may investigate these reasons. Only 1% ( $n=6$ ) of respondents replied “no” to the first question. Results of survey question 1 indicated that representation of museum collections on the museum Websites do not jeopardize museum visitation.

Figure 9. Museum visitation after browsing museum Websites.



*Research question 1: What are information needs of virtual users for museum Websites?*

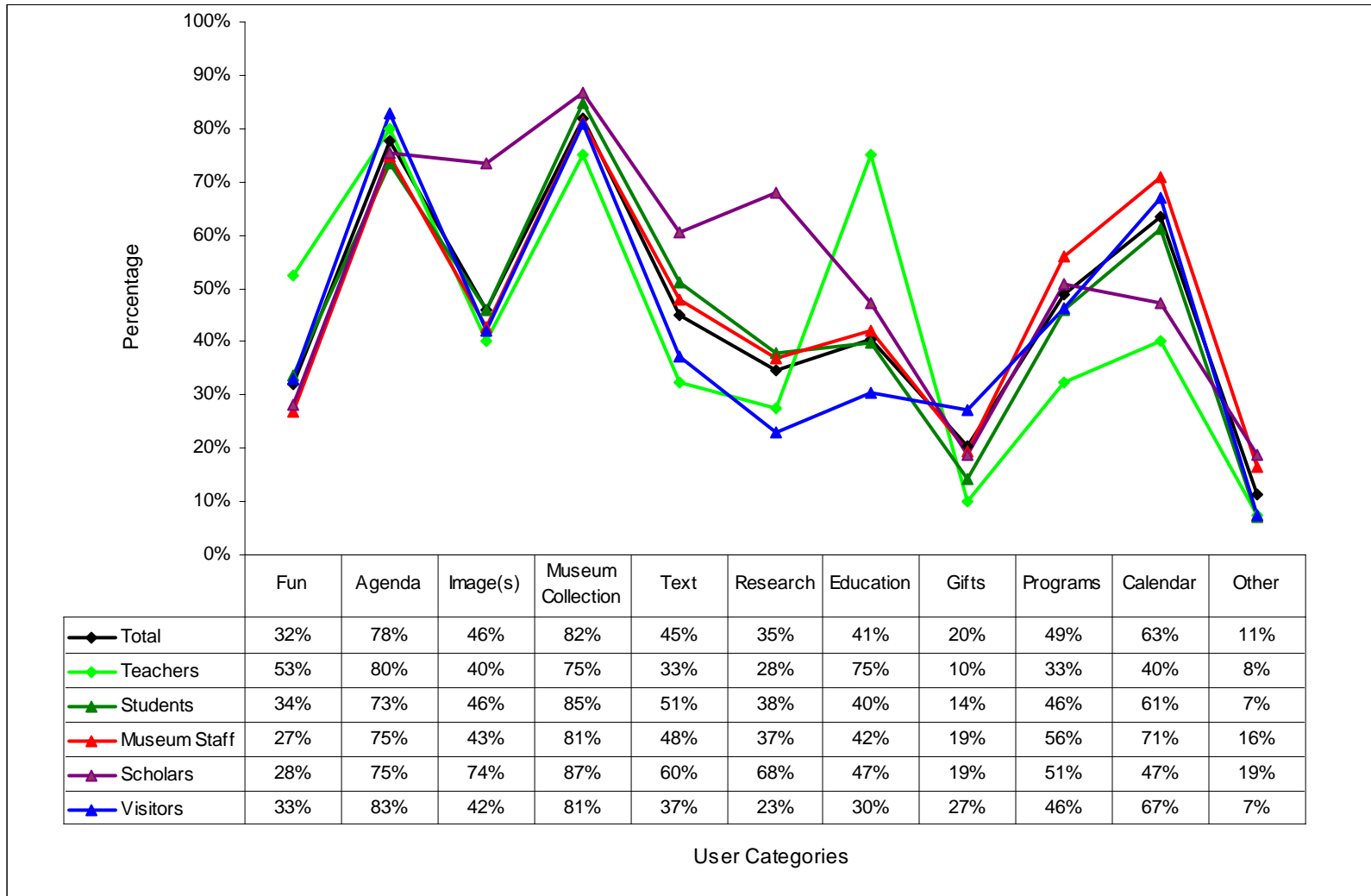
Representation of museum collections and exhibits on the WWW may serve as a media source to create an agenda for future museum visitation. To investigate this assumption, a set of questions was asked to determine primary purposes of using museum Websites (Appendix D). I determined answer options to each question by the researcher and later students of the Digital Image Management program at the UNT edited them.

*Survey question 2 (Table 2): What is the primary purpose of using museum Websites?*

For each category of users the primary purposes were the one (or more) that had 50 or more percentage of responses to the same answer option. Figure 11 shows that, indeed, the primary purposes for browsing museums Websites are to determine what to see in a museum (78%,  $n=428$ ), to gain knowledge about museum collections (82%,  $n=450$ ) and to check calendar of events (63%,  $n=348$ ). Secondary preferences distributed as follows: to learn about community programs (lectures, concerts, etc) (49%,  $n=268$ ), to search for a specific image(s) 46% ( $n=252$ ), to look textual information on a museum object 45% ( $n=247$ ), to look scholarly research materials 35% ( $n=190$ ) and 41% ( $n=223$ ) of virtual visitors look for educational materials (Figure 11, Table 8).

The lowest percentage of virtual visitors browse museum Websites to have fun (32%,  $n=177$ ), to purchase gifts from museum stores (20%,  $n=112$ ) and other reasons for browsing museum Websites (11%,  $n=62$ ).

Figure 10. Virtual visitors' purposes for browsing museum Websites.



An observer can notice that all user categories' purposes for browsing museum Websites follow similar patterns (except scholars who are gathering information for scholarly research (68%) and teachers who are looking for educational materials (75%). These patterns show that all virtual users share similar information needs. Analysis is organized by research questions and each research question is followed by an analysis of each survey question.

The comments of respondents suggest that there are other reasons for browsing museum Websites that were not included in the current survey. They can be organized in several major categories: information on museum facilities, historical information about a museum, information on human resources and educational materials, technical papers and museum scholarly contribution.

Information about museum facilities and their surroundings, and services might include, but are not limited to links to other cultural facilities and travel sites, dining facilities and their menu and prices, childcare and handicap facilities, online reminders about museum events. As respondent 61, a scholar commented that "links to other museums in the area, local and regional art links for the museums community" are wanted as well. More interactive services have be available on the museum Websites: ability to submit and read visitors' comments and feedback, ability to ask questions and get responses, membership information and how to contribute to a museum (See comments by respondents 32, 42, 53, Appendix G).

Historical information has to include a brief overview of a museum history and its architecture. Information on human resources has to contain complete contact list of museum staff members with information on their professional positions, as well as

employment and internship opportunities. One of the comments from respondent 19, a visitor says that "... museum Websites [should] include staff/contact information (including names with areas of responsibilities as opposed to the general auto email response), the site assumes more credibility. I'm often surprised by those sites that lack such information." Information on education materials and educational facilities, links to museum library catalogs would be important not only for educators but also for families and casual visitors.

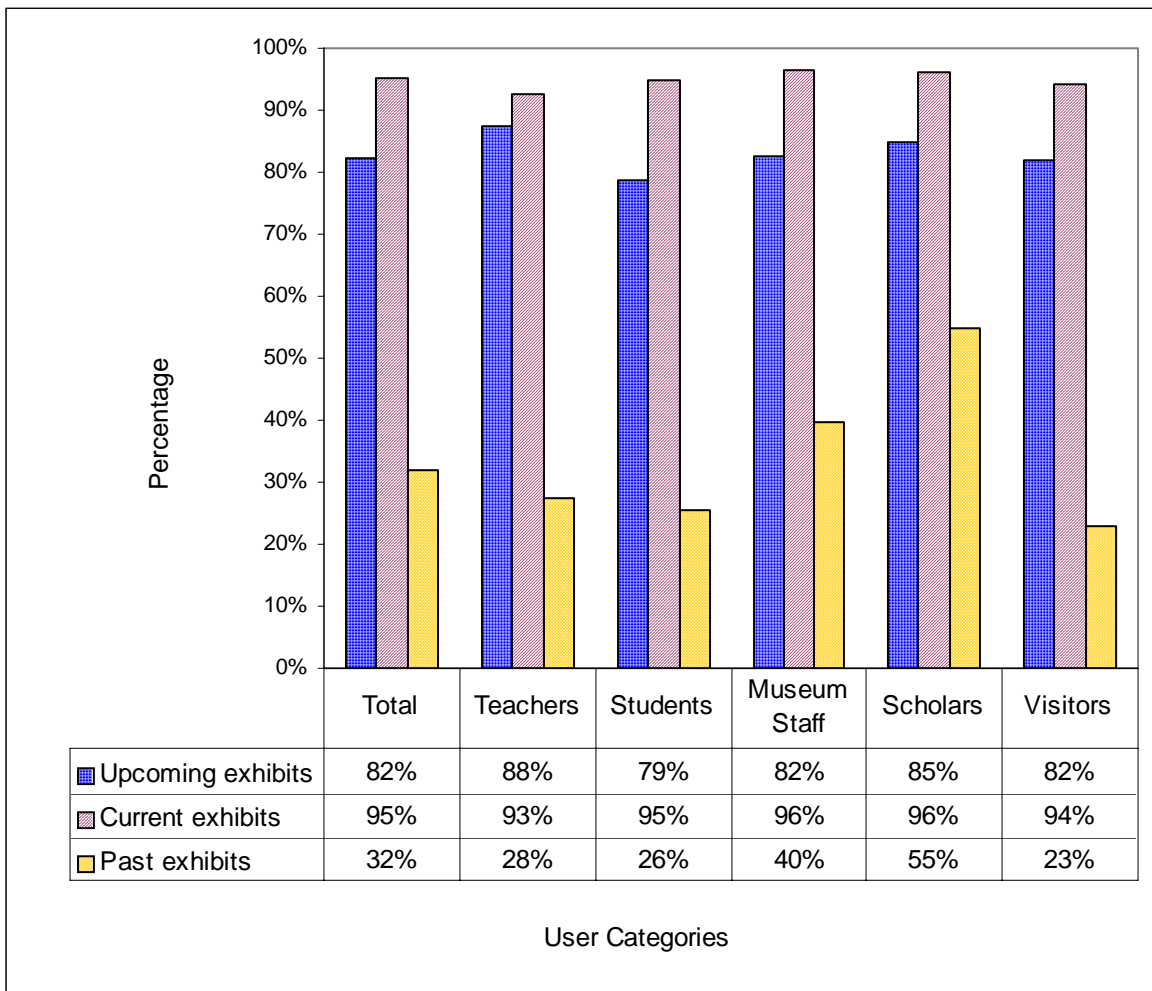
Access to technical museum information such as statistical information on museum visitation, in-house museum reports, policies, technical papers about the museum procedures should be presented on the website. The important information for museum staff members, scholar and art historians is information on archival holdings, preservation and conservation, museum publications and professional conferences. This is also a case occasionally for general visitors and students.

Respondent 3, a member of museum staff "would like to see a page of links to other sources of information related to the information presented on the website, exhibits, etc. The links could include other Websites, reference books, documentary films or other research materials." One more comment from respondent 10, a visitor suggests "...to add to the museum Website the following options: Current museum news, museum service and publications." Submitted comments are a vast source of users' information needs for museum Websites. Contextual analysis of these comments will be discussed separately from current research.

Survey question 3 (Table 3): When you visit a museum Website and look for information about exhibits which of the following is most important?

Figure 12 shows preferences in current exhibits followed by upcoming exhibits (82%) and past exhibits (32%). Current exhibits arouse the highest interests in visitors, museum staff, students, and teachers. Most people who come to the museum are interested in current exhibits (Falk & Dierking, 2000).

Figure 11. Information about exhibits.



*Survey question 4 (Table 4): What information about current exhibits would you like to read on the museum website?*

Figure 13 indicates preferences of virtual users for detailed information about the exhibit and they are exhibit duration (95%), open hours (94%), ticket prices (89%), location (81%) and highlights of exhibits (75%). An observer can see similar patterns that unite all virtual visitors in their primary information about exhibits. A step drop of interests shows that more detailed information about exhibits falls into secondary rank. The second pilot study that evaluated museum Websites (Appendix A) shows that museums provide only general information about an exhibit such as the exhibit title (31 of 35 museums); exhibit duration with a short description (30 of 35 museums). Some museums go further, introducing their visitors to the highlights of an exhibit (15 of 35 museums), and images of famous works of art (6 of 35 museums) are available for observation by virtual visitors. Sometimes, museums provide brief information on the number of presented art works and the titles of artworks (6 of 35 museums).

Respondent 57, a visitor would like to see

a place where museum members could indicate that they would like to get emails re: new exhibits, etc.... If I could get notice, with a link to the museum website with some of the features of the exhibit, I'd go to the museum more often. I find that I access the Websites rarely unless prompted. So, some sort of monthly or quarterly update via email with links to coming and current attractions would be good.

Figure 12. Detailed information about exhibits.





Respondent 32, a teacher would "...like to be able to read comments about the exhibit made by people who have visited the website AND actually seen it." Comment from respondent 71, a museum staff member stated that "interpretive information about the exhibit as a whole..." would be useful, e.g., "intro panel so that I [visitor] can determine the interpretive slant of a particular show...."

Respondent 70, a museum staff member would like to have a "place for comments from Website visitors" and to know "WHY certain exhibitions were chosen." Respondent 199, a scholar "use[s] museum Websites for all kinds of things," "...use[s] them to check information or find information." And this museum member "use[s] museum Websites for making decisions on what ... to see and when ...[to] see...." Also respondent 123, a scholar needs "contact information for an individual who can answer questions about an exhibition."

*Survey question 5 (Table 5): What kind of information about works of art would you like to access on the museum website?*

As Figure 14 indicates, the common information interests for all user categories are a title of the object (92%), a name of the creator (an artist)(91%), date of the creation (76%), brief description of an artwork (50-70 words, a paragraph) (76%), medium object is created with (oil, glass, ceramics, etc.) (74%), contextual/historical information about the artwork or artist (69%), genre (64%), references (55%) and links to other museums that have similar, related objects or works of the same artist can provide essential information for virtual users.

Most museums provide information about a title, a name of a creator, date of creation (29 of 35), medium (texture 27 of 35 museums) and country the work was

created (19 of 35 museums). These descriptive elements are the only elements that met both: information already provided in the museum Websites and information needed by virtual visitors.

Figure 13. Virtual users' information needs about an artwork.

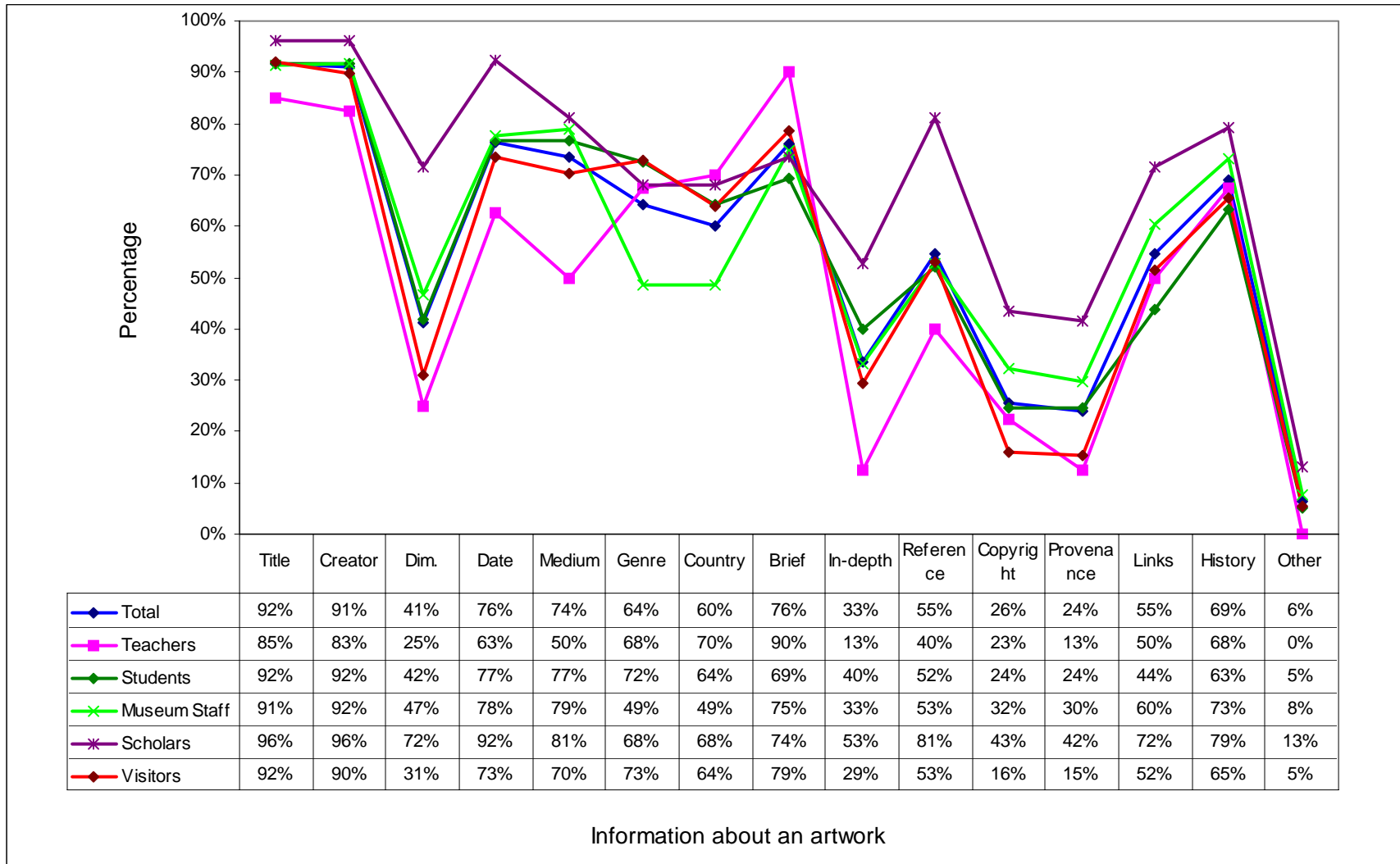


Figure 14 shows a steep drop of interests for physical dimensions for all virtual users except scholars (72%). Evaluation of museum Websites (Appendix A) demonstrates that in fact physical dimensions information is mostly presented on the museum Websites (29 of 35 museums).

Comment from respondent 77 suggest that a visitor would like to have

a linked index, so I could look up to see if a certain piece of art was located in the museum --- menu bar so I could jump around without having to backtrack --- text only option (I know, that seems to defeat the purpose of a museum, but sometimes you just want some info about something where you know what it looks like, and loading images can take a long time or freeze up a computer.

Respondent 65, a visitor asked for “links not only to other museums but if possible to good Websites dealing with the art and artist in a collection or exhibit.” And respondent 115, a visitor would like to see “...short biographies of the artist/creator with links to additional sites where his/her works can be viewed. I would also like to know if a work is part of a larger collection at another museum if it is part of a temporary showing, traveling show, etc.”

*Research question 1a: What are unique and common information needs of virtual museum visitors?*

This research question analyzed each survey question and provided common and unique information interests for museum Websites by virtual visitors.

*Survey question 2: What are primary purposes for browsing museum Websites?*

Common information needs

Analysis of the primary purposes of virtual visitors (Figure 11, Table 8) shows that the highest percentage of all virtual users is represented by the answer *to determine what to see in a museum* (83% general visitors, 80% teachers, 85% students, 75% scholars and 81% members of museum staff) and *to gain knowledge about a museum collection* (81% general visitors, 75% teachers, 73% students, 87% scholars and 81% members of museum staff).

Unique interests

Although these answer choices take the first two places in the ranking of primary purposes, there is a difference between general visitors and teachers as one group and scholars, museum staff and students as another group. The first group has the primary purpose to determine what to see in the museum. For general visitors and teachers museum visitation of Websites is to create an agenda for future museum visits. Together scholars, museum staff and students try to gain knowledge about the museum collections and have access to a complete list of museum holdings. For these user categories museum Websites serve the roles of information resources.

The third answer choice by general visitors (67%), students (61%) and museum staff (71%) is to check the calendar of events, while teachers (75%) are looking for educational materials and scholars (74%) are searching for specific images. It also can be interpreted that general visitors and students build an agenda for visitation. In addition to various exhibits, they want to attend other activities held in a museum or in a museum neighborhood. It maybe assumed that museum staff also check on calendar of

events in their own museum for attending these events or they try to find out what kind of activities other museums provide for their communities. Scholars search for a specific image in the museum collection and they may use museum collections as an information resource for their scholarly research. The fourth answer choice is to find textual information on a museum object (51% students), to gather information for scholarly research (68% scholars) and to have fun browsing museum Websites (53%).

These responses address the concern of Falk and Dierking (2000). Museum representation on the WWW serves as a media source to create an agenda for future museum visitation much the same as newspapers ads, TV advertising, posters around a city. Also for such categories as scholars, students and museum staff museum representation of the museum collection on the Internet serves as an electronic information resource in place of library catalogs, and other printed resources.

Chi square test of homogeneity, cross tabulation analysis between groups shows that five user categories purposes for browsing museum Websites are significantly different ( $p=0.000011$ ). This test helps to identify similarities and differences between user categories. Analyzing primary purposes of user categories, the test shows that

Table 8

*Answers to Survey Question 2: What is the primary purpose of using museum Website?*

Primary			
<i>Teachers</i>	<i>%</i>	<i>Students</i>	<i>%</i>
To determine what to see in a museum	80	To gain knowledge about a museum collection	85
To gain knowledge about a museum collection	75	To determine what to see in a museum	73
To look for educational materials	75	To check calendar of events	61
To have fun	53	To find textual information on a museum object(s)	51
Secondary			
To search for a specific image(s)	40	To search for a specific image(s)	46
To check calendar of events	40	To learn about community programs	46
To learn about community programs	33	To look for educational materials	40
To find textual information on a museum object(s)	33	To gather information for scholarly research	38
To gather information for scholarly research	28	To have fun	34
Tertiary			
To purchase gifts from the museum store	10	To purchase gifts from the museum store	14
Other	8	Other	7

table continues

table continued

Primary			
<i>Museum Staff</i>	%	<i>Scholars</i>	%
To gain knowledge about a museum collection	81	To gain knowledge about a museum collection	87
To determine what to see in a museum	75	To determine what to see in a museum	75
To check calendar of events	71	To search for a specific image(s)	74
To learn about community programs	56	To gather information for scholarly research	68
		To find textual information on a museum object(s)	60
		To learn about community programs	51
Secondary			
To find textual information on a museum object(s)	48	To check calendar of events	47
To search for a specific image(s)	43	To look for educational materials	47
To look for educational materials	42	To have fun	28
To gather information for scholarly research	37		
To have fun	27		
Tertiary			
To purchase gifts from the museum store	19	To purchase gifts from the museum store	19
Other	16	Other	19

table continues



table continued

Primary			
<i>General visitors</i>	<i>%</i>	<i>All user categories</i>	<i>%</i>
To determine what to see in a museum	83	To gain knowledge about a museum collection	82
To gain knowledge about a museum collection	81	To determine what to see in a museum	78
To check calendar of events	67	To check calendar of events	63
Secondary			
To learn about community programs	46	To learn about community programs	49
To find textual information on a museum object(s)	37	To search for a specific image(s)	46
To search for a specific image(s)	42	To find textual information on a museum object(s)	45
To look for educational materials	30	To look for educational materials	41
To have fun	33	To gather information for scholarly research	35
To purchase gifts from the museum store	27	To have fun	32
To gather information for scholarly research	23		
Tertiary			
Other	7	To purchase gifts from the museum store	20

There is no significant difference between museum staff and students ( $p=0.6385$ ) and between museum staff and scholars ( $p=0.5628$ ).

One of the ways to gain knowledge about a museum collection is to provide complete information about museum holdings. Respondent 23, a museum staff member, reinforces that “links to collections (behind the scenes) and staff” are essential. Museum staff members and students have one difference in their primary purposes for browsing museum Websites. While museum staff prefers information about community programs (56%), students have to find textual information on a museum object (51%). Searching for a specific image and finding textual information on a museum object differ museum staff from scholars. A student, respondent 12 wrote:

When my sister and I knew we were going to Florence we researched it first on the web. We made notes and researched getting a live tour guide for our time there. We were so fortunate to find an American art/architecture student to guide us through the maze. That was the best real/virtual tour we have ever had. It pays to research ahead of time.

Chi square test of homogeneity shows that there is not significant difference between students and visitors ( $p=0.1232$ ) and students and scholars ( $p=0.1836$ ), but a small  $p$  value indicates that some differences can be identified. In addition to students' primary purposes, scholars are searching for a specific image and gathering information for scholarly research. Together scholars and students use museum Websites for informational and educational purposes.

Scholars' primary purposes (50%-100%) (Figure 11, Table 8) for visiting museum Websites are presented by selection of answer choices such as gaining knowledge

about a museum collection, determining what to see in the museum and checking the calendar of events. Also scholars' primary intention is to find contextual information about museum objects, artists, etc.

Table 9

*Statistical Significance*

	<i>Visitation</i>	<i>Exhibit</i>	<i>Purpose</i>	<i>Exhibit</i>	<i>Image</i>	<i>Multimedia</i>
		<i>type</i>		<i>Information</i>	<i>metadata</i>	
1 Teachers vs.Students	0.408	0.890	0.068	0.513	0.236	0.115
2 Teachers vs. Museum staff	0.352	0.518	0.001	0.496	0.022	0.012
3 Teachers vs. Scholars	0.668	0.199	0.008	0.895	0.005	0.009
4 Teachers vs. Visitors	0.493	0.859	0.001	0.978	0.720	0.417
5 Students vs. Museum staff	0.193	0.243	0.639	0.703	0.273	0.463
6 Students vs. Scholars	0.783	0.052	0.184	0.756	0.388	0.873
7 Students vs. Visitors	0.202	0.869	0.123	0.479	0.685	0.698
8 Museum staff vs. Scholars	0.312	0.485	0.563	0.409	0.745	0.760
9 Museum staff vs. Visitors	0.884	0.034	0.024	0.121	0.000	0.003
10 Scholars vs. Visitors	0.400	0.006	0.000	0.004	0.000	0.162
All groups	0.573	0.078	0.000	0.274	0.006	0.040

High interest in gathering information on scholarly research and finding textual information on museum objects is consistent with Bates' (1993,1994,1995,1996b) and Siegfried's (1993) series of studies on humanities scholars. These series describe scholars as a user category that requires more profound, in-depth contextual information on museum artworks, artists, original source of information (textual or visual), etc. Scholars' primary purposes also include a search for a specific image (74%). Respondents' comments support this assertion.

Respondent 109, scholar:

My interests are more in history than in art. I like to see raw data, primary documents, historical photographs, archival materials, museological publications,

policies, evaluation reports, staff directories, etc. I'm a consultant, working for museums, galleries and related organizations. The more information about the institution and its practices from a Website, before contacting the institution the better.

Respondent 90, scholar:

My interest in using a museum Website is to get as much information as possible, as quickly as possible. Either logistics about coming to see an exhibit, lecture, film or information on specific collections items. I would not be interested in virtual tours, audio, or video because of the loading times of those programs-- textual information is just fine for my purpose. I would rather that museums spend their resources in developing more content than "bells and whistles."

Respondent 98, a scholar:

I would be interested in knowing if the museum had their own objects such as exhibited in specific displays....for example, a traveling exhibit of Chinese ceramics might pique my curiosity, but does the museum have similar pieces (perhaps not included in the display) that could be examined more closely.

A significant difference between teachers and students ( $p=0.067$ ), between teachers and museum staff ( $p=0.0013$ ), between teachers and scholars ( $p=0.0077$ ) and between teachers and visitors ( $p=0.0006$ ) can be observed. Primary purposes of teachers that make them different from the rest of user categories include looking for educational materials (75%) and having fun while browsing museum Websites (53%) (see Table 8).

Teachers use museum Websites to create an agenda for future visitations and possibly use these visits as an educational trip as a part of the school curriculum. It can be assumed that educational materials on the museum Websites help to provide pre-visit introduction to what students see later. It is interesting to note that teachers are the only category that has the highest percentage among user categories of *having fun while browsing museum Websites* (53%). There is no explanation at this point why this answer option for this specific category received such attention. Teachers share common primary purposes with other user categories such as to determine what to see in a museum (80%) and to gain knowledge about a museum collection (75%). Respondent 62, a teacher wants “to know what is there, the hours and a little about the items. I'll go to almost any museum so I just need the basics.”

General visitors have different purposes than scholars ( $p=0.000014$ ) and than museum staff ( $p=0.0242$ ) (see Table 11). Secondary, not primary information needs are that make general visitors different from scholars and museum staff. General visitors share similar primary purposes with all user categories and each user category (except teachers) in determining what to see in the museum (83%), gaining knowledge about museum collection (81%) and checking the calendar of events (67%). Respondent 9, a visitor, wishes to access a “full list of the permanent collection and the list of the works of the permanent collection that are currently on display.” Data analysis concludes that general visitors use museum Websites mainly as an information resource to create their agenda for future visitation.

*Survey question 3: When you visit a museum website and look for information about exhibits which of the following is most important?*

#### Common interests

Figure 11 shows that current exhibits (95% all respondents) raise the most interest by virtual visitors. Upcoming exhibits (82% all respondents) and past exhibits (32% all respondents) take the second and the third place in virtual users preferences of exhibit types. Based on Figure 11, all user categories share similar preferences for exhibit types.

Respondent 71, a museum staff member, also emphasizes, that “staff lists and contact information specific to individual staff is important. I also want to see interpretive information about the exhibit as a whole i.e. intro panel so that it can determine the interpretive slant of a particular show. Information about specific works in the show is not as important to me.”

Respondent 57, a visitor would:

like to see a place where museum members could indicate that they would like to get emails re: new exhibits, etc. I get these in the mail, but they are often discarded before I see by other family members. If I could get notice, with a link to the museum website with some of the features of the exhibit, I'd go to the museum more often. I find that I access the Websites rarely unless prompted. So, some sort of monthly or quarterly update via email with links to coming and current attractions would be good.

Table 10

*Answers to Survey Question 4: What information about current exhibits would you like to read on a museum Website?*

Primary											
<i>Teachers</i>	<i>%</i>	<i>Students</i>	<i>%</i>	<i>Museum Staff</i>	<i>%</i>	<i>Scholars</i>	<i>%</i>	<i>General visitors</i>	<i>%</i>	<i>All users</i>	<i>%</i>
Exhibit duration	100	Open hours	93	Exhibit duration	96	Exhibit duration	94	Exhibit duration	96	Exhibit duration	95
Open hours	90	Ticket prices	93	Open hours	94	Open hours	91	Open hours	95	Open hours	94
Ticket prices	80	Exhibit duration	90	Ticket prices	88	Ticket prices	79	Ticket prices	91	Ticket prices	89
Location	93	Location	82	Location	81	Location	75	Location	84	Location	81
Highlights	78	Highlights	71	Highlights	74	Highlights	75	Highlights	78	Highlights	75
Guided tours	58										
Secondary											
List of artworks	28	List of artworks	43	Guided tours	38	Curator	49	Guided tours	47	Guided tours	43
Curator	25	Curator	43	Curator	35	List of artworks	45	List of artworks	36	List of artworks	35
		Guided tours	42	List of artworks	27	Guided tours	38	Curator	26	Curator	33
						Other	21				
Tertiary											
Other	3	Other	10	Other	13			Other	5	Other	9

## Unique interests

However, chi square test of homogeneity shows that there is significant difference between all user categories ( $p=0.0776$ ). This difference occurs when past exhibits attract more interests in scholars and museum staff (difference between scholars and visitors ( $p=0.0055$ ), between museum staff and visitors ( $p=0.0337$ ), students and scholars ( $p=0.05207$ ). While past exhibits may provide valuable information for scholars, museum staff and students, this exhibit type is not significant for general visitors and teachers. These results demonstrate that general visitors and teacher intend to visit museum to see current exhibits and upcoming exhibits, e.g., build their agenda for future visitation.

Figure 12 demonstrates information preferences, common to all user categories (50% or more of responses). They are exhibit duration, open hours of the museum, ticket prices; exhibit location and highlights of the exhibit. Figure 12 displays how stable and congruent these preferences are. Although chi square test of homogeneity indicates that there are no significant differences between all user categories ( $p=0.2737$ ), the difference between teachers (58%) and other user categories is information on availability of guided tours. General visitors also are interested in guided tours (47%). Together with scholars (49%), students (43%) are more interested in complete list of artworks presented at the exhibit and name of a curator than the rests of user categories.

Figure 12 shows that virtual visitors prefer information about exhibit duration, open hours, location, ticket prices and highlight of an exhibit. Although information differences can be found within each user category, a similar pattern in declining and



arising information preferences show that the virtual visitors as a group, have common information needs and patterns for virtual exhibit.

*Survey question 5: What information about work of art you like to access on the museum Websites?*

#### Common information interests

As Figure 13 indicates, the common information interest for all user categories are a title of the object (92%), a name of the creator (an artist)(91%), date of the creation (76%), brief description of an artwork (50-70 words, a paragraph)(76%), medium object is created with (oil, glass, ceramics, etc.) (74%), contextual/historical information about the artwork or artist (69%), genre (64%), references (55%) and links to other museums that have similar, related objects or works of the same artist can provide essential information for virtual users.

#### Unique information interests

Chi square test of homogeneity shows that there is no significant difference between general visitors and teachers ( $p=0.7199$ ) and between general visitors and students ( $p=0.6853$ ). Although the highest information preference for teachers is brief description of an artwork (90%) rather than a title (85%) or a name of creator (83%), teachers have similar interests with students ( $p=0.2364$ ) in title, name of an artist, date, medium, brief description and history of an artwork.

Table 11

*Answers to Survey Question 5: What kind of information about work of art would you like to access on a museum Website?*

Primary			
<i>Teachers</i>	<i>%</i>	<i>Students</i>	<i>%</i>
Brief description of an artwork (a paragraph)	90	Title of an artwork	92
Title of an artwork	85	Name of a creator/artist	92
Name of a creator/artist	83	Date of creation	77
Country where an artwork was created	70	Medium an artwork in which an artwork is created	77
Genre	68	Genre	72
Contextual or historical information about an artwork or artist	68	Brief description of an artwork (a paragraph)	69
Date of creation	63	Country where an artwork was created	64
Medium an artwork in which an artwork is created	50	Contextual or historical information about an artwork or artist	63
Links to other museums that have similar artwork(s)	50	Additional reference resources about an artwork or artist	52
Secondary			
Additional reference resources about an artwork or artist	40	Links to other museums that have similar artwork(s)	44
Physical dimensions of an artwork	25	Physical dimensions of an artwork	42
Copyright information about an artwork or an owner	23	In-depth description of an artwork	40
		Copyright information about an artwork or an owner	24
		Provenance	24
Tertiary			
In-depth description of an artwork	13	Other	5
Provenance	13		
Other	0		

table continues

table continued

Primary			
<i>Museum Staff</i>	%	<i>Scholars</i>	%
Title of an artwork	91	Title of an artwork	96
Name of a creator/artist	92	Name of a creator/artist	96
Date of creation	78	Date of creation	92
Medium an artwork in which an artwork is created	79	Medium an artwork in which an artwork is created	81
Brief description of an artwork (a paragraph)	75	Additional reference resources about an artwork or artist	81
Contextual or historical information about an artwork or artist	73	Contextual or historical information about an artwork or artist	79
Links to other museums that have similar artwork(s)	60	Brief description of an artwork (a paragraph)	74
Additional reference resources about an artwork or artist	53	Physical dimensions of an artwork	72
		Links to other museums that have similar artwork(s)	72
		Country where an artwork was created	68
		Genre	68
		In-depth description of an artwork	53
Secondary			
Country where an artwork was created	49	Copyright information about an artwork or an owner	43
Genre	49	Provenance	42
Physical dimensions of an artwork	47		
In-depth description of an artwork	33		
Copyright information about an artwork or an owner	32		
Provenance	30		
Tertiary			
Other	8	Other	13

table continues

table continued

Primary			
<i>General visitors</i>	%	<i>All user categories</i>	%
Title of an artwork	92	Title of an artwork	92
Name of a creator/artist	90	Name of a creator/artist	91
Brief description of an artwork (a paragraph)	79	Brief description of an artwork (a paragraph)	76
Date of creation	73	Date of creation	76
Genre	73	Medium an artwork in which an artwork is created	74
Medium an artwork in which an artwork is created	70	Contextual or historical information about an artwork or artist	69
Contextual or historical information about an artwork or artist	65	Genre	64
Country where an artwork was created	64	Country where an artwork was created	60
Additional reference resources about an artwork or artist	53	Additional reference resources about an artwork or artist	55
Links to other museums that have similar artwork(s)	52	Links to other museums that have similar artwork(s)	55
Secondary			
Physical dimensions of an artwork	31	Physical dimensions of an artwork	41
In-depth description of an artwork	29	In-depth description of an artwork	33
		Copyright information about an artwork or an owner	26
		Provenance	24
Tertiary			
Copyright information about an artwork or an owner	16	Other	6
Provenance	15		
Other	5		

Chi square test of homogeneity shows that students have similar information needs with museum staff ( $p=0.2728$ ) and scholars ( $p=0.3883$ ). These similarities center around title, name of an artist, date of creation and medium.

Secondary preferences (20-49% of all responses) for information about an artwork are  
Scholars' preferences (50%-100) are:

Information interests for scholars are similar to information interests of museum staff ( $p=0.7451$ ). They share interest in title, name of creator, date, medium brief description and history of the artwork. Information differences that occur between scholars and the rest of five user categories appear in physical dimensions, in-depth descriptions, additional references, copyright, provenance, links to other museums or related art objects and others. Once again, Figure 13 supports Bates' statement on scholars' information needs.

Comment from respondent 77, a scholar prefers to have " bibliographic information on objects" and to have an "ability to ask questions about an object to a curator." Comment from respondent 61, a scholar: "Links to other museums in the area, local and regional art links for the museums community."

Chi square test of homogeneity shows that differences in information about an image occur between museum staff and general visitors ( $p=0.00031$ ) and museum staff and teachers ( $p=0.0220$ ).

Respondent 3, a museum staff member "... would like to see a page of links to other sources of information related to the information presented on the website, exhibits, etc.. The links could include other Websites, reference books, documentary films or other research materials."

It is visible from the Figure 13 that all five user categories have similarities and differences. Also observable patterns display users rising and steep drops in information needs (steep drop in physical dimensions, in-depth descriptions, copyright and provenance and steep ups in date, links and history of an art work). Further research will investigate this phenomenon in a more detailed matter.

*Research question 1b: Which of the following types of images and multimedia would you like to use on museum Websites?*

It is understandable that different people prefer different multimedia devices. The purpose of this question is to establish the minimum of people's desire for multimedia representation. Not many designers of museum Websites consider users preferences for multimedia while providing information about digital collection

Figure 14 shows virtual visitors preferences for multimedia (50%-100% of responses). Respondent 46, a teacher " Smart virtual exhibitions, showrooms so to speak, which give more than just a diashow, but some sort of background 'behind' the objects." This comment depicts the reality of virtual exhibits. Just representation of images and exhibits rooms is not enough for virtual visitors. Virtual visitors need contextual information that can be used as a learning tool for classroom students and visitors in general.

Figure 14. Multimedia preferences of virtual users.

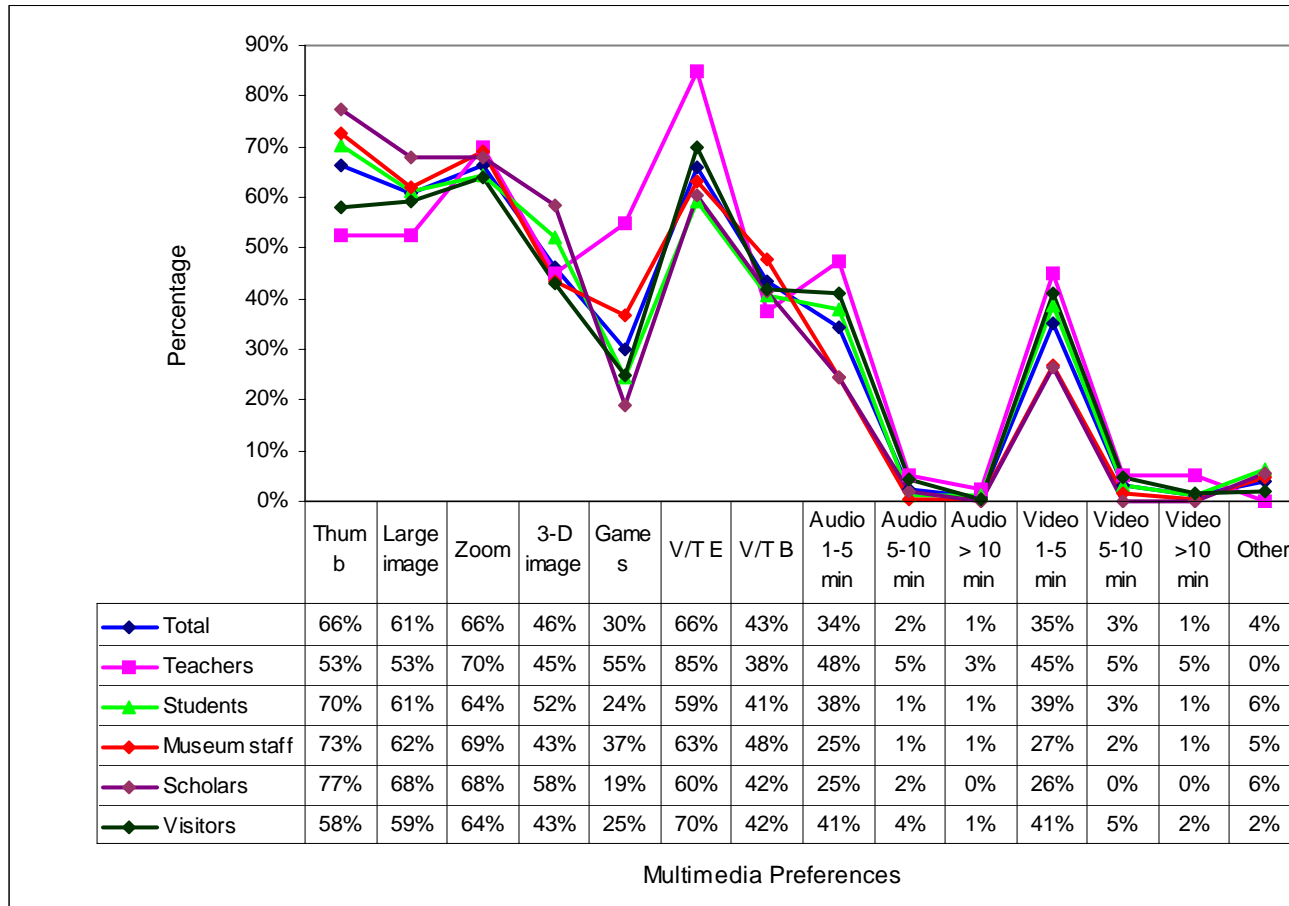


Table 12

Answers to Survey Question 6: What of the following types of multimedia would you like to access on a museum Website?

Primary					
Teachers	%	Students	%	Scholars	%
Zoomable image	85	Small image (thumbnail)	70	Small image (thumbnail)	77
Full size image	70	Zoomable image	64	Zoomable image	68
Audio description (5-10 minutes)	55	Full size image	61	Full size image	68
Small image (thumbnail)	53	Virtual tours to exhibit	59	Virtual tours to exhibit	60
3-D images	53	3-D images	52	3-D images	58
Secondary					
Virtual tours of a museum building	48	Virtual tours of a museum building	41	Virtual tours of a museum building	42
Audio description (1-5 minutes)	45	Video description (1-5 minutes)	39	Online educational games	19
Online educational games	45	Audio description (1-5 minutes)	38	Video description (1-5 minutes)	26
Virtual tours of an exhibit	38	Online educational games	24	Audio description (1-5 minutes)	25
Tertiary					
Audio description (>10 minutes)	5	Other	6	Other	6
Video description (1-5 minutes)	3	Video description (5-10 minutes)	3	Video description (5-10 minutes)	0
Video description (5-10 minutes)	5	Audio description (>10 minutes)	1	Video description (>10 minutes)	0
Video description (>10 minutes)	5	Audio description (5-10 minutes)	1	Audio description (>10 minutes)	0
Other	0	Video description (>10 minutes)	1	Audio description (5-10 minutes)	2

table continues



table continued

Primary					
<i>Museum Staff</i>	<i>%</i>	<i>General visitors</i>	<i>%</i>	<i>All user categories</i>	<i>%</i>
Small image (thumbnail)	73	Virtual tours to exhibit	70	Small image (thumbnail)	66
Zoomable image	69	Zoomable image	64	Zoomable image	66
Virtual tours of a museum building	63	Full size image	59	Virtual tours to exhibit	66
Virtual tours to exhibit	63	Small image (thumbnail)	58	Full size image	61
Full size image	62				
Secondary					
3-D images	43	3-D images	43	3-D images	46
Online educational games	37	Virtual tours of a museum building	42	Virtual tours of a museum building	43
Video description (1-5 minutes)	27	Video description (1-5 minutes)	41	Video description (1-5 minutes)	35
Audio description (1-5 minutes)	25	Audio description (1-5 minutes)	41	Audio description (1-5 minutes)	34
		Online educational games	25	Online educational games	30
Tertiary					
Other	5	Video description (5-10 minutes)	5	Other	4
Video description (5-10 minutes)	2	Audio description (5-10 minutes)	4	Video description (5-10 minutes)	3
Video description (>10 minutes)	1	Other	2	Audio description (5-10 minutes)	2
Audio description (>10 minutes)	1	Video description (>10 minutes)	2	Video description (>10 minutes)	1

## Common multimedia preferences

Although chi square test of homogeneity shows that all user categories are different ( $p=0.03979$ ), definite similarities for all of them are a lack of interest in video and audio files that are more than 5 minutes and in zoomable images.

General visitors have similarities with teachers ( $p=0.41702$ ) and students ( $p=0.87307$ ). These similarities center around representation of the collection through thumbnails, full screen images, zoomable images and virtual tour of an exhibit. While sharing these similarities teachers also are looking for educational materials and students are looking for 3-D images.

Students and scholars share similar interest in their primary and secondary information preferences ( $p=0.87307$ ) and a difference occurs in educational materials. Students would prefer educational games as secondary source of information when scholars see it as tertiary. Also students and museum staff ( $p=0.4628$ ) multimedia preferences differ in 3-D images, educational games. While for students 3-D images are primary and educational games secondary preferences for multimedia, museum staff sees these multimedia types as secondary.

## Unique multimedia preferences

Chi square test of homogeneity shows that museums' staff has differences in multimedia preference with general visitors ( $p=0.0031$ ) and teachers ( $p=0.0118$ ). Teachers (55%) have a higher interest in educational games than general visitors (25%) and museum staff (37%). Although thumbnails are the primary multimedia preferences for all user categories the difference between museum staff (70%) as one group and

teachers (53%) and general visitors (58%) as another group is noticeable. The percentage of teachers (47% for 1-5 minute audio and 45% for 1-5 minute video) and general visitors (41% and 41%) that have secondary multimedia preferences also distinguish this category from museum staff (25% and 27%) and scholars (25% and 26%).

Zoomable images is one of the choices that virtual public would like to see on the museum Websites. It is possible that students and scholars select a particular piece of art object for discussions during a class. A selected slice of a picture can provide information for scholars on previously undepicted things or for scholarly investigation (Pettersen, 1989). Image zooming that doesn't change the content of a picture can have a major impact on image perception. Based on the collected data about multimedia preferences and respondents comments it is worth mentioning that stand alone images, virtual tours, video and audio files do not play a major role in information discovery. These types have to be presented in an appropriate way that each type will improve the other. An appropriate combination of animation, images and text will improve the learning process for virtual visitors with different learning styles.

*Research question 2: What are unique and common information needs of virtual and real visitors?*

This research question aimed to identify common information needs of real and virtual visitors. Information about real visitors supposed to be collected from Falk and Dierking's publications.

## Common information interests

Information on exhibits, community programs and calendar of events is provided via newspapers, radio and television programs for real visitors (Falk & Dierking, 2000). Museum Websites also serve a role of information provider of activities that are available for real and virtual visitors. Real and virtual visitors are interested in current exhibits (Falk & Dierking, 2000, Figure 11, Table 8). This common interest indicates that both, virtual and real visitors are planning their agenda for future visitation. Both real and virtual museum visitors have the same information preferences for exhibit information, e.g., exhibit duration, open hours, ticket prices, location and exhibit highlights.

Similarities can be found in information about an artwork. Both real and virtual visitors prefer basic information that includes title of an artwork, name of creator, data of creation, medium and brief description. Museum labels provide all this information for real visitors and museum digital collection – for virtual visitors.

## Unique information needs

A real visit to the museum provides aesthetic experiences for museum goers. They have an opportunity to see the whole exhibit while virtual exhibits present only highlights. Various multimedia devices are available only in the museum, e.g., workstations and playrooms for kids, audio tours and possibility to socialize with other museum visitors.

Audio tours and educational games are rarely available on the museum Websites. Virtual visitors requested a commentary section on the museum Websites where they can ask questions about the current exhibit. Unfortunately, this service is not available yet. Also various lectures and programs organized by museum curators are available only for real visitors.

Comments of respondents to the survey identify time as a commodity. Museum staff, scholars, teachers, students and general visitors would like to get information as soon as possible. Geographical locations prevent museum staff and scholars from getting needed information if it is unavailable on the museum Websites.

While visiting a museum, real visitors don't have access to multimedia. They can't zoom and see an artwork in details. According to some museum rules close up observation is not allowed in the museums.

It is known that real museum visitors spend more time during the first 10-15 minutes reading labels and information available. Also there are complains that museum labels are written in small font and visitors eyes, considering lighting in the hall get tired very quickly. Unfortunately, they cannot go back to the exhibit for the second time because of time, ticket prices and location. It would be in interest of museums to provide a brief narrative about an artwork on the museum Websites. Real visitors can access information that they skipped in the museum on the website.

It is in the interest of museum staff to provide more information about museum research on the Websites because scholars and museum staff from other museum may contribute to the research and may exchange information much faster. Museum labels do not provide information about similar works in other museums. Digital representation

on the Websites can fill a gap that consists of requested information by the surveyed population. Contextual and historical information about an artwork or an artists and additional references resources are not available for real visitors. This information is on demand for virtual visitors who also maybe a real visitor.

Representation of museum collections on the WWW is considered a thread to museum staff and administration. Museum collections and exhibits and digital collections and virtual exhibits may contribute to each other by providing information that is lacking in both environments. Because of the research questions that are mostly aimed towards virtual visitors, more comparison and studies have to be done to provide in depth information about real and virtual visitors.

#### *Association clustering analysis*

It is known that different types of analysis may provide different research results. Alternative analysis using Association Clustering has been conducted to identify if different results can be found.

Using association clustering, the chi square statistic was calculated, and the related  $p$ -value was used as a selection criterion. The association-clustering algorithm formed two clusters of occupations: occupations (teachers, students, visitors) and occupations (museum staff, scholars). Cluster 1 mainly consists of individuals that belong to a “may’s” social group, where specific knowledge depends on the individual (Berlo 1960, p. 140). Cluster 2 consists of individuals that belong to a “must’s” social group, where specific knowledge is required by professional expectations, therefore is independent of the individual (Berlo 1960, p. 140). It is not clear from the existing

literature whether students should belong to the “must’s” or the “may’s” group, but our association clustering analysis classified them with the “may’s” social group, since their image attribute preferences resembled the preferences of that group the most.

Association clustering was used also to analyze image metadata. The first cluster caters to more *professional information* needs, such as the need for legal information (copyright, provenance) and scholarly information (in-depth description). The second cluster relates to more *general information* (title, name, date, medium, genre, etc.). This particular clustering result seems to make a lot of sense, and in fact is related to two existing image metadata standards that are well-known in information science as the DC and the VRA standards. The fact that students alone were represented by the second component was less of a surprise to us, since students are commonly perceived as a transitional social group (Evangelopoulos & Kravchyna, 2004).

## CHAPTER 5

### DISCUSSION

As long as the information listed above is provided straight forward, I would be happy.

*Respondent 8, a student*

This research focused on the identification of virtual user textual and visual information needs for museum Websites, needs for descriptive metadata for artworks and users' preferences for multimedia. Additionally, issues about museum visitations and descriptive information on exhibits were analyzed. This chapter includes a summary of findings, research limitations, implications, recommendations, future research agenda and conclusions.

#### Findings

##### *Primary purposes for browsing museum Websites*

All five selected user categories browse museum Websites to gain knowledge about museum collections and to determine what to see in the museum. Checking the calendar of events follows these two reasons. Based on professional occupation scholars include in their primary purposes a search for a specific image(s) and gathering information for scholarly research.

Respondent 109, a scholars support this conclusion: "My interests are more in history than in art. I like to see raw data, primary documents, historical photographs,



archival materials, museological publications, policies, evaluation reports, staff directories, etc. I'm a consultant, working for museums, galleries and related organizations. The more information about the institution and its practices from a Website, before contacting the institution the better." Respondent 90, a scholar also confirms the main reason of browsing the museum website is

to get as much information as possible, as quickly as possible. Either logistics about coming to see an exhibit, lecture, film or information on specific collections items. I would not be interested in virtual tours, audio, or video because of the loading times of those programs--textual information is just fine for my purpose

This comment suggests another reason for browsing museum Websites – time. Time is a valuable commodity for many researchers and the World Wide Web (WWW) serves as a tool to get needed information fast.

Together with museum staff, scholars also are interested in learning about community programs. Looking for specific images on the museum website is not a primary purpose for virtual visitors, except scholars. Museum staff has a denial attitude towards putting images on the museum website. "I'm a bit prejudiced because, in my position, I am expected to safeguard the Museum's images from misuse. Therefore, although I'm sure that many museum web-site visitors would like to see full-size or zoomable images, the thought of allowing such visitors to download such images makes me cringe." (Respondent 137, a member of museum staff).

Teachers is another category that has a major difference in primary purposes for browsing museum Websites. Teachers expect to find educational materials for their classes on the museum Websites. Their primary purpose is based on teachers'

professional occupation. Teachers identified *having fun while browsing museum Websites* as one of the primary purposes. It is possible that this answer choice was a result of Web-based survey design. This issue has to be research further.

#### *Users' preferences for the exhibits types*

There is no significant difference between user categories for types of exhibits. Their high interests in current and future exhibits suggest that virtual users create their agenda for future visitations. All user categories have their preferences for information about current exhibits that are followed by information on future exhibits and concluded by past exhibits. Scholars are the only category that has the highest percentage among user categories interested in information about past exhibits.

#### *Users' preferences for information about exhibits*

All five user categories requested information about exhibit duration, open hours, location, ticket prices and highlights of the exhibits. As secondary information about exhibits scholars prefer to know a name of a curator and list of all works displayed during an exhibit. Teachers are one of the user categories that are most interested in guided tours. The current research did not intend to identify user preference on exhibit design, although some respondents expressed their wishes for better virtual exhibit design. "Smart virtual exhibitions, showrooms so to speak, which give more than just a diashow, but some sort of background 'behind' the objects." (Respondent 47, a teacher)

Information gaps between museums and their users

Current research used metadata set of Dublin Core and VRA to create answer choices for this question. Unique Identifier (UI) as a metadata element was substituted

with contextual or historical information about an artwork. This replacement was a result of the pilot research on evaluation of museum Websites. Evaluation of museum Websites shows that each museum has its own UI element and it doesn't serve the same purpose as ISBN in book publishing. There is no international recognized standard for museum original (not digital surrogate) object registration number. UI element does not help to search information about an art object by its number. Keywords metadata element was substitute with brief description and subject metadata element with in-depth description. Reasons for these replacements were studies, which proved that images that don't have a brief description are useless. Keywords and subjects maybe included in brief and in-depth descriptions. For retrieval information both fields can be searchable.

All five user categories expressed their primary needs in information about an art object which includes a title, a name of a creator, a date of creation, a brief description, medium, contextual or historical information about an artwork or an artist. Genre, a country an artwork comes from, additional reference resources on this particular artwork or artist and links to other museums that have similar, related objects, or works of the same artist are also determined by respondents as their primary information needs. Although these choices vary in quantity of information (percentage in each user category), they remain as primary information needs (more than 50% selected by each user category).

Museum staff expressed slightly lower interests in genre and country an artwork was created. Possible reasons of lower interests in genre and a country an artwork comes from may suggest that museum staff is already familiar with these metadata

elements. This phenomenon requires more studies. Why museum staff is not interested in physical dimensions of an artwork remains unclear in this study. Evaluation of museum Websites shows that a physical dimension is one of the usable metadata elements for descriptive metadata.

Teachers selected additional reference resources on this particular artwork or artist as secondary information preferences. Scholars are the only user category that is interested in physical dimensions of an artwork.

Figure 15. Comparison: Standards, providers and users.

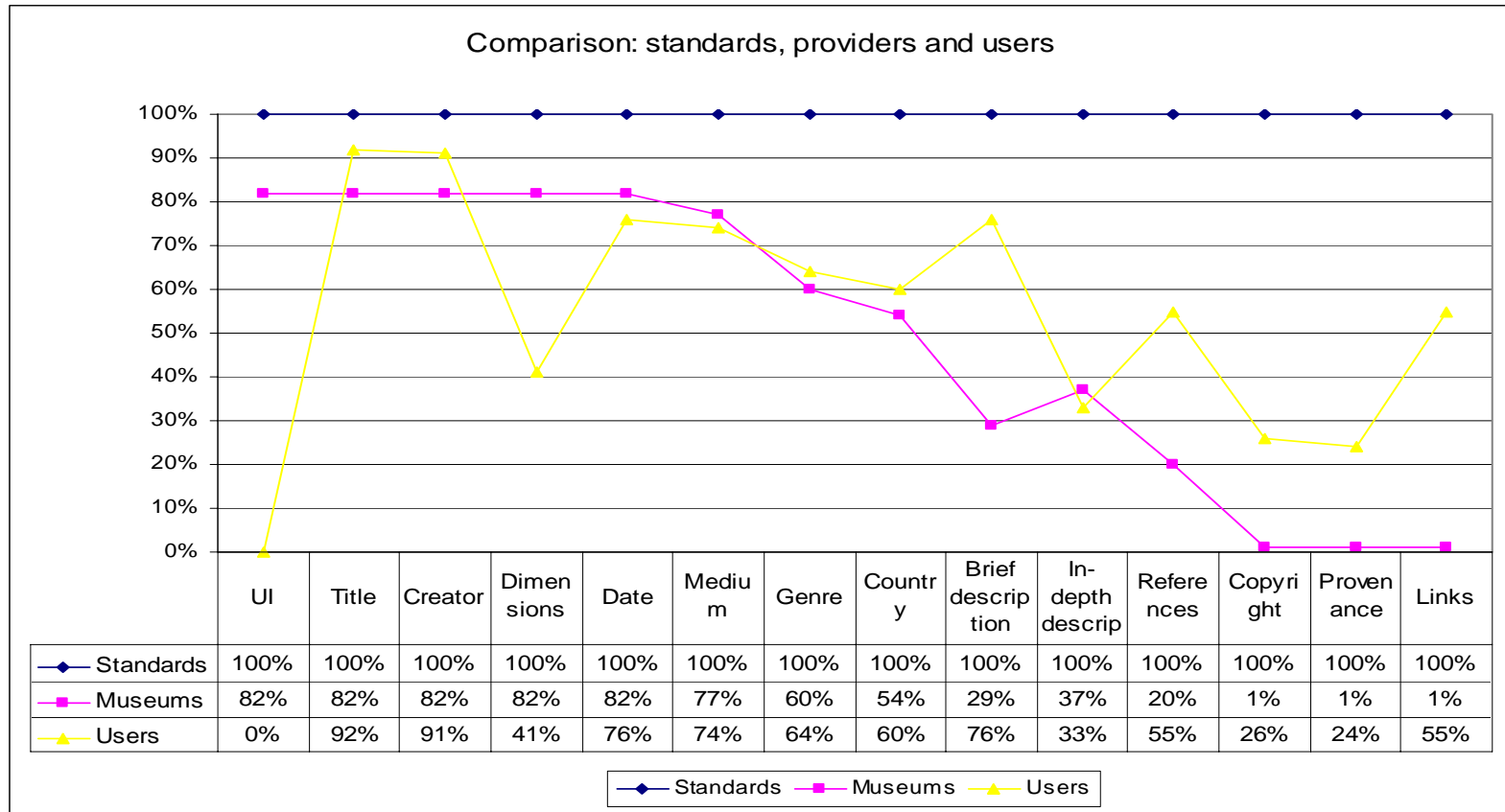


Figure 15 shows the difference between metadata set of elements, information provided on the museum Websites and information needs of virtual users. What museums consider as basic information, physical dimensions, is obviously not a priority for museum virtual visitors. Museum Websites partially meet users information needs providing information on title, name of creator, date of creation and medium an object was created of. The second part that meet virtual users information preferences is adding a brief description, additional reference resources on this particular artwork or artists and links to other museums that have similar, related objects or works of the same artist.

Respondent 34, a member of museum staff: "I think all of the ideas listed here are great ideas for museum Websites, however, both of the museums I work for are very small, and would have great difficulty in developing Websites with that much detail!"

Respondent 76, a student: "Just about all of the options listed would be good to have on a website, I just marked the ones I would most like to see. Images are a must and I like the idea about links to other museums and educational resources related to the exhibit/artwork."

These comments suggest that the information that was mentioned in WWW survey is "nice to have" but small and medium museums have neither human resources to create such a detailed description of their online collections nor financial support.

### *Museum visitations*

During the pilot study and current research a question was asked to validate a Falk and Dierking (2000) assertion that virtual representation of museum collections on the museum Websites may jeopardize museum visitation. Both studies proved that museums don't have to consider this fact while making a decision to digitize their collections. Both, pilot study (124 respondents) and current research (550 respondents) have the same results – representation of museum collections on the museum Websites do not jeopardize museum visitation.

### *Virtual visitors as a public*

Five use categories were selected for this research having in mind that they are different in their occupation, purposes for browsing museum Websites, preferences for general information about exhibits, information preferences about images and multimedia. At the end of the research it is obvious that all these five user categories have many similarities in their information needs. Graphical representation of data (Figure 10, 11, 12, 13 and 14) shows significant congruencies among social groups. These congruencies can be defined as feature characteristics of a virtual public. Blumer (1954) defined a public as " a group of people (a) who are confronted by an issue, (b) who are divided in their ideas as to how to meet the issue, (c) who engage in discussion over the issue" (p.373). Blumer said that a public does not exist as an established group, but as natural response to a certain kind of situation. The public is spontaneous, not pre-established and amorphous group whose size and membership varies. The distinct characteristics of behavior patterns of the public are how to become a unit when

it is actually divided, of how to act concertedly when there is a disagreement as to what the action should be.

In this research a public is a group of people who (a) are interested in art museums and available activities in museums, (b) they have primary purposes for visiting museum Websites that are unique and common for each user category, (c) they have some common interests that can be discussed if interactivity is available on the museum Websites (e.g., emails, forums, etc.). Also their desire to participate in a self-selected Web-based survey strongly suggests that users want to be heard and to contribute to development of museum Websites that will provide them useful and rich information. Blumer's definition of the public, observed patterns on Figures 10, 11, 12 and define five user categories as virtual public that centers around art museums. In addition, Figure 13 supports the Blumer's description of the public. Blumer (1954) defined a public as "a group of people (a) who are confronted by an issue, (b) who are divided in their ideas as to how to meet the issue, (c) who engage in discussion over the issue.... A public does not exist as an established group, ... its existence centers on the presence of an issue" (p.373). Basic information about an artwork is an issue that centers the public.

#### *Virtual users and social roles and norms*

Another explanation of similar patterns within the virtual public is social roles and norms (Berlo, 1960). Museum staff, as an information provider together with scholars belong to a "must-know" (independent of individual) certain information to provide services. These similarities are found in image metadata ( $p=0.7451$ ), primary purposes



for browsing museum Websites ( $p=0.5628$ ), exhibit type ( $p=0.4845$ ), exhibit information ( $p=0.4086$ ) and multimedia ( $p=0.7601$ ).

Teachers and general visitors, according to Berlo (1960) play the role of “may-know” (dependent on the individual). Similarities are found in image metadata ( $p=0.7199$ ), exhibit type ( $p=0.8594$ ), exhibit information ( $p=0.9781$ ) and multimedia ( $p=0.41702$ ).

Students fall between two groups. It can be explained that student participants are students from Visual Art School. They don't belong yet to professionals “must-know” and they don't belong to “may-know” group. In addition, correspondence analysis identified a hidden component related to students (Evangelopoulos & Kravchyna, 2004). It maybe assumed that correspondence analysis also identified students as a “transitional” social group. Future studies may investigate this phenomenon and this finding has to be tested in different environment.

#### *Websites for virtual public*

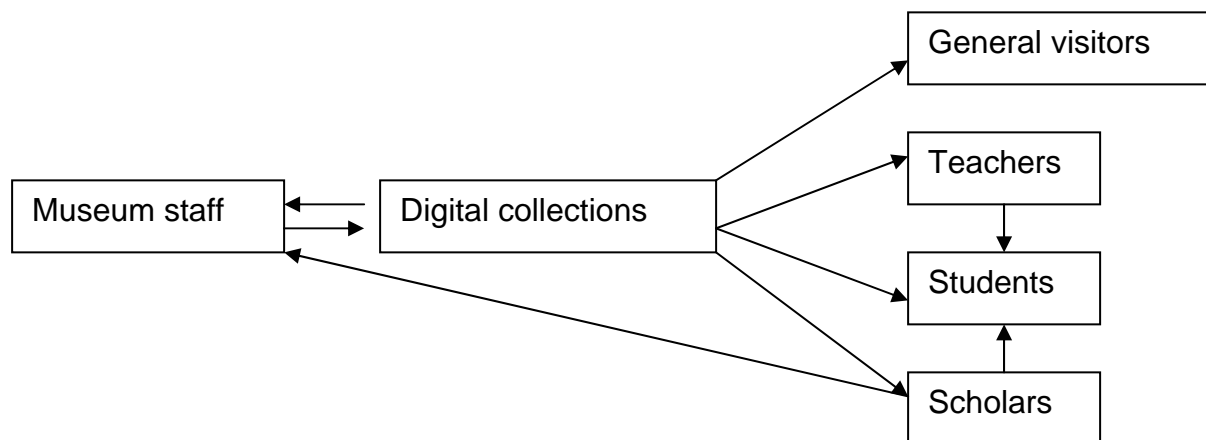
There is no need to build two separate Websites for general visitors and for scholars. All selected five user categories have many similarities in their information needs. Regardless of occupations, all users categories have similar primary purposes, similar preferences for types of the exhibits and information about exhibits, information about an artwork and multimedia preferences. Siegel and Grigoryeva (1999) think that the research Websites are easier to design than public sites. Consideration of the nature of humanities scholars, their information needs, suggestions for including specific fields in databases, and search strategies have to be taken into account. Basic information needed by general visitors is also primary information for scholars. Building

digital collections and providing basic information on the museum Websites will assist both scholars and general visitors with their information requests. Later in-depth information can be added to fulfill scholars' information needs.

### Implications

Museum staff plays a major role in communication with different user categories. This category has been selected to see if it has similar interest with the rest of museum visitors. According to Morgan and Welton (1986) a successful communication between a provider (museum staff) and an information receiver (users) is when a provider and a receiver have similar interests. When building digital collections, a museum staff, as a provider of information, has to identify “those areas of common interests shared by both parties and use these areas as a means of carrying the message “ (p.116). For more effective communication between parties common and unique information interests have to be combined.

Figure 16. Communication between users.



## Limitations

The design of the web-based survey did not allow separation of different museum job positions and job responsibilities. Museum staff that answered the survey may consist of museum educators, curators, registrars and information technology professionals. These positions may require access to different information resources, e.g., provenance is important for registrars and it is not important to museum educators.

The design of WWW survey had an option for “other” information preferences under each question. The check box should be replaced with a text box for people to provide their responses. Although there was a text box for comments and suggestions at the end of the survey, more detailed information might have been received if under each question there has been a comment box rather than at the end of the survey. Respondent 55, a visitor: “...would be better for your survey design if you could either provide a field where respondents could specify what *Other* information they are looking for or to remove this answer option at all because even if respondents do check *Other* option, it doesn’t really give you any information.”

The Web-based survey was a self-selected survey. There is an option that one respondent answered it several times.

## Recommendations and Future Research Agenda

Museum visitation is one of the obstacles for digitizing museum collections. This study has demonstrated that representation of museum collection on the WWW is not an issue. Online visitation can be counted towards museum visitation statistics. “Visitor counters so that online users that access a particular exhibition can be included in a visitor count” (Respondent 126, a member of museum staff). Another study that can be

done to support this finding: statistical comparison of real visitation for the set of recent years and statistical analysis of virtual visits. There is a possibility that museums have to redefine their role from counting physical “traffic” and being guardians of cultural treasures into museums that provide services via emails, Websites, forums, publications, etc. (personal conversation with Phillip Turner).

It would be interesting to investigate how education departments in museums create educational materials and how these educational materials are used within school curriculum. The knowledge of real obstacles that prevent teachers from using these materials may help educational department to improve their services for schools.

The design of virtual exhibits is still an issue that has to be investigated. Comments from respondents and evaluation of museum Websites suggest that many museums provide selected images with information that is too limited for many users. It is possible that an educational approach should be taken while creating virtual exhibits. In addition to interpretive information, exhibits could be designed as a short tutorial, a lesson that helps visitors to grasp the idea of exhibits. It is known from studies of real visitors that they read labels for the first ten minutes. After that they are generally looking at displayed works of art. Labels are written in small fonts. To read a label you have to come close to an artwork and sometimes you have to wait while other visitors finish their reading. Virtual exhibits can provide enough information and when virtual visitors become real visitors they can spend more time enjoying a work than trying to read a label.

Considering the fact that museums are understaffed and have financial problems, virtual exhibits can be created and can travel the same route as real exhibit.

All museums that create and host a traveling real exhibit may contribute to a virtual exhibit. If exhibit can travel with gift shops why should a virtual exhibit be different?

As was mentioned in the data analysis, image usage is one of the concerns, “a fear factor,” for museum staff. In many cases, images on the museum Websites are watermarked and they are low-resolution surrogates. Such images are useless for commercial purposes, e.g., printing posters, cards, etc. Zoomable image, like images on the Hermitage Museum website provide only slices of an artwork. Further studies are needed to provide better understanding of how images are used and to reduce the image fear factor for museums.

Finding two defines five user categories as a virtual public. This finding has to be tested in different environments, e.g., science museums, zoos, aquariums, botanical gardens, airplane and car museums. Identifying virtual visitors as members of a virtual public can provide useful information for museums and their plans for digitizing their collections. Understanding of information needs of the virtual public can provide basic information for an evaluation plan while building digital collections. Such data identifies common information needs of virtual public and this information can serve as a core that has to be provided via virtual representation.

Information preferences for descriptive metadata for an artwork may suggest some strategies in users image retrieval process. Using their preferences it maybe assumed that users will use these descriptive elements as primary for their searching. In addition it would be interesting to investigate what information should be provided in in-brief and in-depth descriptions.

Figure 10 shows that scholars are the only user category that is interested in specific images. It can be assumed that scholars use images for their research and image usage can fall into the category of “fair use”. The true source for research for scholars is in an original work rather than digital surrogate. It is unclear from the current research why scholars look for specific images that are digital surrogates. Many scholars commented that they use original work for their studies. Possible reasons for looking for specific images by scholars are to identify where an object of their research is located and if a particular object is in fact an object that would be useful. The surrogate images may serve the same screening process as books jackets.

Virtual tours provide information on exhibits and permanent collections. The design of virtual tours can be presented as an educational tool for high school students and college students as educational resources. More studies have to be done to investigate educational design of virtual tours.

All virtual visitors expressed their needs for a brief description of an image. In some cases image description (virtual and on labels) repeats visual information in textual form, i.e. label text present information that is obvious from a museum object, e.g., “this landscape depicts forest.” Looking at the painting, a visitor sees a forest and those visitors who go to museums often can distinguish a landscape from a still life. What information should be included into brief description of an artwork? Further research may investigate this subject.

## Conclusion

The current research was a first attempt to provide a broader picture of information needs for the museum Websites. While most previous studies have investigated individual user categories (e.g., Bates' studies on humanities scholars), this study attempted to see the whole virtual public in order to find similarities and differences that will help to provide information basics. These basics can be used for a museum evaluation plan for development of digital collections. While developing museum collections museum staff may choose to provide common information for all users. Subsequently with available financial and human resources, the museum can add more detailed information to an already existing "skeleton". Although it is not the best approach to digitize any collection, this way maybe practical for small museums. Another approach is to prioritize museum collections for digitization; select artworks that will be digitized and provide necessary information about an artwork considering the information needs of each user category.

In comparison with digital libraries, museums are at the very early stage of development of digital collections. Frustrations and development mistakes are common issues for museums. Respondent 126, a member of a museum staff, expressed doubts "...if a museum website can ever be a real research tool other than to locate works by a particular artist or to examine works. Museums are notoriously understaffed, and, irrespective of what people may want in a website, someone has to enter the data/images/do the research etc. This seems to be the arena in which the theoretical world smacks up against the real one." Fortunately, there are many studies and

successful collections online in the digital libraries area that can serve as an example of a good usable collection.

Unfortunately, nowadays museums only provide general information. “I wish museums had a better balance between their educational mission and the marketing of the museum. There is nothing more frustrating to a researcher than to go to a museum site with nothing but visitor information, online store, etc. with little (or NO) research information. I want to know about their collection - not just 5 works and what time the cafe is open until....” (Respondent 121, a scholar).



APPENDIX A  
EVALUATION OF MUSEUM WEBSITES

Table A -1. Evaluation of Museum Websites

Criteria	N	Criteria	N
Exhibit type		Information on an artwork	
Past exhibit	18	Title	29
Present exhibits	31	Name of creator	29
Upcoming exhibits	25	Dimensions	29
		Date of creation	29
Exhibit Information		Country	19
Virtual exhibits	9	Texture	27
Duration	30	Genre	21
Open Hours	31	Brief narratives	8
Tickets Price	28	Broader narratives	13
General information	31	Additional information/bibliography	3
Highlights of the exhibits	15	Copyright	6
Thumbnails for exhibits	8	Provenance	3
List of art works of the exhibits	6	Links to other museums	4
Creator of the exhibit	4	Painting location -maps	8
Sponsor of the exhibit	7		
Lectures concerning exhibits	8	Multimedia	
Free tours to the exhibits	3	3-images	0
Online tours of exhibits	5	Audio description	4
		Educational games	9
Collection Information		Larger Images	28
All works digitized	9	Thumbnails	27
Free access to the collection	25	Video description	2
Online tours to the collection	12	Virtual tours to the building	11
		Zoomable images	6
		Educational programs	33
		Online course	1

Note. N= number of museum websites that provide visual and textual information, mentioned above on their websites.

APPENDIX B  
LIST OF LISTSERVS

L MUSEUM-L: [LISTSERV@HOME.EASE.LSOFT.COM](mailto:LISTSERV@HOME.EASE.LSOFT.COM)

Description: Museum-L is a general purpose, cross-disciplinary electronic discussion list for museum professionals, students, and all others interested in museum related issues. All museums related topics are acceptable for posting and discussion at this time.  
Subscribers: 3097 subscribers

H-MUSEUM: [editor@museumslist.net](mailto:editor@museumslist.net), [h-museum@h-net.msu.edu](mailto:h-museum@h-net.msu.edu)

Description: The H-Net Network for Museum Professionals is a moderated mailing list and information forum. The mailing list addresses themes and questions primarily relating to museums and memorial places, but is also intended to be interdisciplinary, so that archaeological, historical, cultural and artistic information can be posted alongside other more established, central spheres of activity. Subscribers: 2000 subscribers

MCN-L: [info@mcn.edu](mailto:info@mcn.edu)

Description: The Museum Computer Network is a nonprofit organization of professionals dedicated to fostering the cultural aims of museums through the use of computer technologies. Beginning in October 1995, MCN launched a discussion list that is devoted to the exchange of information relating to all aspects of automation in museums. The list is open to all interested parties.

MUSEDOMA-L: <http://listserv.nic.museum/archives/musedoma-discuss.html>

Description: This list is intended for the free discussion of any and all matters relevant to the Top Level Domain "museum" and MuseDoma. Subscribers: 421 subscribers.

[Canadian Heritage Information Network \(CHIN\)](#)

Information gateway to museums, galleries, and heritage in Canada and around the world.

NINCH-ANNOUNCED: [ninch-announce@cni.org](mailto:ninch-announce@cni.org)

Description: National Initiative for Networked Cultural Heritage (NINCH - USA), Digitization of cultural heritage; mostly announcements of events, publications, calls, etc. Subscribers: 556 subscribers

List serves Hosted for Hardin County Teacher

[http://www.hardin.k12.ky.us/res\\_tech/TeckyTips/hcslistserves.htm](http://www.hardin.k12.ky.us/res_tech/TeckyTips/hcslistserves.htm)

Online Communication

[http://k12science.ati.stevens-tech.edu/exploration/listservs\\_hs/](http://k12science.ati.stevens-tech.edu/exploration/listservs_hs/)

High School Professional Development

[http://www.ieanea.org/oldSite/resources\\_mr/Websites/HS-pd.htm](http://www.ieanea.org/oldSite/resources_mr/Websites/HS-pd.htm)

List of list serves related to museums and cultural heritage

APPENDIX C  
LETTER TO MUSEUMS

To Whom It May Concern:

The School of Library and Information Sciences at the University of North Texas undertakes a research project “ Information Needs of Museum Visitors: Virtual and Real”

The study of information seeking behavior of users groups of museum digital collections or cultural collections will allow examination and analysis of users' information needs, the organization of cultural information, including descriptive metadata and the quantity of information that maybe required. In addition, the study will delineate information needs that different categories of users may have in common.

The survey consists of five sections designed to collect data from teachers, students, museum staff and donors, general visitors, and scholars. These five users groups will provide the data for analysis. To conduct this research, a web-based survey will be created and hosted on one of the SLIS servers.

School of Library and Information Sciences at the University of North Texas requests the Dallas Museum of Art to create a link to the survey on the index page of the museum's website.

Your help will be highly appreciated. The results of the collected data will be made available for you.

Yours truly,

S.K. Hastings, Ph.D.,

Victoria Kravchyna

Interdisciplinary Ph.D. Program in Information Sciences

APPENDIX D  
SURVEY QUESTIONS

## **Information needs of virtual museum visitors (English version)**

It will take 10-15 minutes to answer this survey. You may quit anytime, however your input will be invalid.

Please select one of the categories that you think is the most applicable to you.

1. Teacher (teacher of middle and high schools)
2. Student (student of colleges and universities who use museum Websites to complete their assignments)
3. Museum staff and donors (people who work in museums, funding agencies, foundations)
4. Scholar and/or art historian (scholars, cultural heritage professionals, who use museum Websites for educational and informational purposes)
5. General visitor (people who use museum Websites for recreational, personal informational and educational needs).



*Table D-1. Survey Questions (English)*

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Survey question 1. Will you visit the museum after you have visited a museum website?

---

- 1 Yes
- 2 No
- 3 Maybe

---

Survey question 2. What is the primary purpose of using a museum website?

---

- 1 To have fun
- 2 To determine what to see in a museum
- 3 To search for a specific image(s)
- 4 To gain knowledge about a museum collection
- 5 To find textual information on a museum object(s)
- 6 To gather information for scholarly research
- 7 To look for educational materials
- 8 To purchase gifts from the museum store
- 9 To learn about community programs
- 10 To check calendar of events
- 11 Other

---

Survey question 3. When you visit a museum website and look for information about exhibit which of the following is most important?

---

- 1 Upcoming exhibits
  - 2 Current exhibits
  - 3 Past exhibits
- 

---

Survey question 4. What information about current exhibits would you like to read on a museum website?

---

- 1 Exhibit duration (opening date/closing date)
- 2 Open hours of a museum/exhibit
- 3 Location
- 4 Ticket prices/entry fees
- 5 Highlights of an exhibit
- 6 A complete list of artworks displayed for the exhibit
- 7 A creator of an exhibit
- 8 If guided tours are available
- 9 Other

Survey question 5. What kind of information about work of art would you like to access on a museum website?

---

- 1 Title of an artwork
- 2 Name of a creator/artist
- 3 Physical dimensions of an artwork
- 4 Date of creation
- 5 Medium object is created with (oil, glass, etc.)
- 6 Genre (Renaissance, Impressionism, etc.)
- 7 Country an artwork was created
- 8 Brief description of an artwork (50-70 words, a paragraph)
- 9 In-depth description of an artwork (70-200 words, a couple of paragraphs)
- 10 Additional reference resources about an artwork or artist
- 11 Copyright of an artwork or an owner
- 12 Provenance (Proof of authenticity)
- 13 Links to other museums that have similar artwork(s), or works of the same artist
- 14 Contextual or historical information about an artwork or artist
- 15 Other

---

Survey question 6. Which of the following types of multimedia would you like to access on a museum website?

---

- 1 Small image (thumbnail)
- 2 Full size image
- 3 Zoomable image
- 4 3-D images
- 5 Online educational games
- 6 Virtual tours of an exhibit
- 7 Virtual tours of a museum building
- 8 Audio description (1-5 minutes)
- 9 Audio description (5-10 minutes)
- 10 Audio description (more than 10 minutes)
- 11 Video description (1-5 minutes)
- 12 Video description (5-10 minutes)
- 13 Video description (more than 10 minutes)
- 14 Other

---

*Note.* Respondents had a choice to select all answers that apply, except survey question 1 where they select only one answer.

## **Besoins informationnels des visiteurs réels et virtuels de musées**

Nous vous remercions pour votre participation à ce projet de recherche. Veuillez s'il vous plaît lire la formule de consentement suivante avant de commencer à répondre au questionnaire. Afin de participer à ce sondage, veuillez choisir une langue  
Ce sondage vous prendra de 10 à 15 minutes de votre temps. Si jamais vous deviez quitter avant d'avoir terminé, vos données ne seront pas conservées.

Veuillez choisir la catégorie qui s'applique le plus à vous.

1. Enseignant (Europe : primaire-collège ; Amérique : primaire-secondaire)
2. Étudiant (Europe : lycées et universités; Amérique : collèges et universités); je consulte les sites Web de musées pour effectuer mes travaux scolaires
3. Personnel de musée ou donateur; je travaille dans un musée ou dans une fondation)
4. Gens de lettres, historiens de l'art (Intellectuels, professionnels de la culture et du patrimoine qui utilisent les sites Web à des fins éducatives ou informationnelles)
5. Visiteurs occasionnels (personnes qui consultent le site Web d'un musée à des fins récréatives, éducatives ou informationnelles)

COMMENTAIRES ET SUGGESTIONS (qu'aimeriez-vous retrouver d'autre sur le site Web d'un musée ?). Merci!

Pour toute question, commentaire ou suggestion, veuillez vous adresser à : Victoria Kravchyna à l'adresse [vkravchyna@hotmail.com](mailto:vkravchyna@hotmail.com)

*Table D-2. Survey Questions (French)*

Survey question 1. Si l'occasion se présente, est-ce que vous iriez visiter un musée sur place après avoir exploré son site web ?

---

- 1 Oui
- 2 Non
- 3 Peut-être

Survey question 2. À votre avis, quelle est la fonction première du site web d'un musée?

---

- 1 S'amuser
- 2 Planifier une visite
- 3 Rechercher une image spécifique
- 4 Se familiariser avec la collection du musée
- 5 Trouver de l'information descriptive à propos d'un objet de musée
- 6 Rassembler de l'information pour une recherche académique
- 7 Trouver du matériel éducatif
- 8 Acheter des cadeaux à la boutique du musée
- 9 S'informer sur les événements publiques à venir (conférences, concerts, etc.)
- 10 Consulter l'agenda des activités
- 11 Autre

Survey question 3. Lorsque vous visitez le site web d'un musée pour en savoir davantage sur ses expositions, qu'est-ce qui vous attire?

---

- 1 Les expositions à venir
- 2 Les expositions en cours
- 3 Les expositions passées

Survey question 4. Quel type d'information relatives aux expositions aimeriez-vous retrouver sur le site web d'un musée ?

---

- 1 Les dates de début / de fin d'une exposition
- 2 Les heures d'ouverture du musée / de l'exposition
- 3 Des informations sur la localisation
- 4 Prix des billets / Droits d'entrée
- 5 Les points saillants d'une exposition
- 6 La liste complète des oeuvres exposées
- 7 Les artisans de l'exposition
- 8 Un tour guidé
- 9 Autre

---

Survey question 5. À quel genre d'information à propos des œuvres d'art aimeriez-vous avoir accès lorsque vous visitez le site web d'un musée?

---

- 1 Le titre de l'œuvre
- 2 Le nom du créateur / de l'artiste
- 3 Les dimensions physiques de l'œuvre
- 4 La date de création
- 5 Le médium utilisé pour créer l'œuvre (huile, verre, céramique, etc.)
- 6 Le style (Renaissance, Baroque, Impressionnisme, etc.)
- 7 Le pays d'origine de l'œuvre
- 8 Une brève description de l'œuvre (un paragraphe)
- 9 Une description approfondie de l'œuvre (de deux paragraphes à deux pages)
- 10 Des références additionnelles sur l'œuvre ou sur l'artiste
- 11 De l'information sur les droits d'auteur (à propos d'une œuvre ou de son auteur)
- 12 Des informations sur la provenance de l'œuvre
- 13 Des hyperliens vers des sites web de musées offrant des œuvres similaires ou offrant d'autres œuvres du même artiste
- 14 De l'information d'ordre contextuelle ou historique à propos de l'œuvre ou de l'artiste
- 15 Autre

---

Survey question 6. Quel type d'image ou de média aimeriez-vous retrouver sur le site web d'un musée?

---

- 1 Une image réduite (miniature)
  - 2 Une image pleine grandeur (résolution de 800x600)
  - 3 Une image zoomable
  - 4 Une image 3-D (pivotante sur 360 degrés)
  - 5 Des jeux éducatifs en ligne
  - 6 Des visites virtuelles d'expositions
  - 7 Des visites virtuelles du musée
  - 8 Un commentaire audio d'une durée de 1 à 5 minutes à propos d'une œuvre
  - 9 Un commentaire audio d'une durée de 5 à 10 minutes à propos d'une œuvre
  - 10 Un commentaire audio de plus de 10 minutes à propos d'une œuvre
  - 11 Un commentaire vidéo d'une durée de 1 à 5 minutes à propos d'une œuvre
  - 12 Un commentaire vidéo d'une durée de 5 à 10 minutes à propos d'une œuvre
  - 13 Un commentaire vidéo de plus de 10 minutes à propos d'une œuvre
  - 14 Autre
-

## **Informationsbedarf der realen und virtuellen Besucher des Museums**

Es dauert 10-15 Minuten, um diese Umfrage zu beantworten. Sie können jederzeit aufhören, obwohl Ihr Beitrag dann nicht gewertet wird.

Wählen Sie bitte eine der Kategorien aus, die am ehesten auf Sie zutrifft.

1. Lehrer (Lehrer der mittleren und höheren Bildungsebenen)
2. Student (Student einer Hochschule und Universität, die Museumswebseiten benutzen, um ihre Studienarbeiten durchzuführen)
3. Museenspersonal und Spender (Leute, die in Museen Finanzierungsagenturen oder Stiftung arbeiten)
4. Gelehrter und/oder Historiker (Gelehrte, Fachleute des kulturellen Erbes, die Museumswebseiten für pädagogische und informatorische Zwecke nutzen).
5. Allgemeiner Besucher (Leute, die Museenswebseiten in Ihrer Freizeit oder für persönliche Information und Weiterbildung nutzen).

Fragebogen

KOMMENTAR UND VERBESSERUNGSVORSCHLÄGE (was wollen Sie sonst noch auf einer Museumswebseiten sehen)

Vielen Dank! Wenn Sie Fragen, Kommentare oder Vorschläge haben, schreiben Sie bitte an Victoria Kravchyna: [vkravchyna@hotmail.com](mailto:vkravchyna@hotmail.com)

Table D-3. Survey Questions (German)

---

Survey question 1. Wenn Sie Gelegenheit dazu haben, besuchen Sie ein Museum nachdem Sie ein Museumswebseite besucht zu haben?

---

- 1 Ja
- 2 Nicht
- 3 Vielleicht

---

Survey question 2. Was ist Ihrer Meinung nach der Hauptgrundeine Museumswebseiten zu benutzen?

---

- 1 Zum Spaß
- 2 Um Sehenswertes im Museum auszumachen
- 3 Um nach einem spezifischen Bild oder Bildern zu suchen
- 4 Um sich über eine Museumssammlung zu informieren
- 5 Um Textinformationen über Museumsobject zu erlangen
- 6 Um Informationen für wissenschaftliche Forschung zu sammeln
- 7 Um Unterrichtsmaterialien zu finden
- 8 Um Geschenke im Museumshop zu kaufen
- 9 Um Informationene über gesellschaftliche Programme (Vorträge, Konzerte, usw.) zu erhalten
- 10 Um in Kalender nach Veranstaltungen zu suchen
- 11 Sonstiges

---

Survey question 3. Jedesmal wenn Sie eine Museumswebseiten besuchen und nach Informationen über Ausstellungen suchen, was ist Ihnen am wichtigsten?

---

- 1 Zukunfftige Ausstellungen
- 2 Aktuelle Ausstellungen
- 3 Vergangene Ausstellungen

---

Survey question 4. Welche Informationen über Ausstellungen wurden Sie gerne auf einer Museenswebseiten?

---

- 1 Ausstellungdauer (Öffnungsdatum / letzter Termin)
- 2 Öffnungsdatum eines Museums / einer Ausstellung
- 3 lagebeschreibung
- 4 Eintritts Preise
- 5 Hohepunkte einer Ausstellung
- 6 Eine komplette Liste der Kunstwerke die Ausstellung zu bieten hat
- 7 Informationen über den Ausstellungsveranstalter, Sponsoren oder Kuratoren
- 8 Ob Führungen angeboten wereden
- 9 Sonstiges

---

table continues

Survey question 5. Was Informationen über Kunstwerke wurden Sie gerne auf einer Museumswebseiten finden?

---

- 1 Titel eines Kunstwerkes
- 2 Name des Künstlers/in
- 3 Abmessungen eines Kunstwerkes
- 4 Zeitpunkt der Fertigstellung der Schopfung
- 5 Verwendete Materialien eines Kunstwerke(Öl, Glas, Keramik, usw.)
- 6 Genre (Renaissance, Barock, Impressionism, usw..)
- 7 Land, in dem eine Kunstwerks hergestellt wurde
- 8 Kurze Beschreibung eines Kunstwerks (ein Abschnitt lang)
- 9 Eingehende Beschreibung eines Kunstwerke (Mehrere Abschnitte bis zu mehreren Seiten)
- 10 Zusätzliche Informations über des Künstwerke oder Künstler
- 11 Copyrightinformationen über ein Kunstwerk oder den Inhaber
- 12 Herkunft (Beweis der Echtheit oder Infomationen über vergangene Besitzer)
- 13 Links zu anderen Museen, die ähnliche Kunstwerke oder Werke des gleichen Künstlers ausstellen
- 14 Kontext- oder historische Informationen über ein Kunstwerk oder Künstler
- 15 Sonstiges

Survey question 6. Welche der folgenden Arten von Bildern und Multimedia wurde Sie gerne auf einer Museumswebseiten verwenden?

---

- 1 Kleine Bild (thumbnail)
  - 2 Großes Bild (800x600)
  - 3 Skalierbares Bild (Zoom)
  - 4 3-D Bilder (wenn Sie ein Bild um 360 Grad drehen können)
  - 5 Pädagogische Onlinespiele
  - 6 Virtuelle Touren einer Ausstellung
  - 7 Virtuelle Touren eines Museums gebaudes
  - 8 Audiobeschreibung eines Kunstwerks, die 1-5 Minuten dauert
  - 9 Audiobeschreibung eines Kunstwerks, die 5-10 Minuten dauert
  - 10 Audiobeschreibung eines Kunstwerks, die mehr als 10 Minuten dauert
  - 11 Videobeschreibung eines Kunstwerks, die 1-5 Minuten dauert
  - 12 Videobeschreibung eines Kunstwerks, die 5-10 Minuten dauert
  - 13 Videobeschreibung eines Kunstwerks, die mehr als 10 Minuten dauert
  - 14 Sonstiges
-



## APPENDIX E. Card Design

## *Information Needs of Real and Virtual Museum Visitors*

The study will analyze users' information needs for museum websites. In addition, the study will delineate unique and common information needs of different user categories.

The survey consists of five sections to collect data from teachers, students, museum staff and donors, general visitors, and scholars.

It is available in English, French and German.

Please give me 10-15 minutes of your time and answer the survey located at

<http://www.digitallab.lis.unt.edu/survey3L/>

Collected data will be used for dissertation research.

Thank you very much!

For information or survey results, please contact:

**Dr. S.K.Hastings** [hastings@unt.edu](mailto:hastings@unt.edu)  
**Victoria Kravchyna** [vkravchyna@lis.admin.unt.edu](mailto:vkravchyna@lis.admin.unt.edu)

Credits: Sculpture by Gerald Balciar at the University of North Texas  
Photo by Victoria Kravchyna



APPENDIX F  
RESPONDENTS' COMMENTS

## Information Needs Of Museum Real And Virtual Visitors Survey Statistics

### Comments

Users Group: all - Survey(s): 550

1. museum staff -- English - I think it would also be helpful to have department and staff information (contact points). History information on a museum would also be interesting.
2. teachers -- English - Handicap accommodations
3. museum staff -- English - I would like to see a page of links to other sources of information related to the information presented on the website, exhibits, etc.. The links could include other Websites, reference books, documentary films or other research materials.
4. museum staff -- German - wenn ich als potentieller Museumsbesucher die Seite besuche: unbedingt alle technischen und organisatorischen Daten auf einer Seite zum einfachen Ausdruck. Wenn ich als Fachfrau die Seite besuche, einfache e-mail-Kontakt-Adresse f?r Anfragen.
5. 3/14/03 -- students -- English - I like what you are trying to research and discover. I hope my answers are as helpful as possible. Steve Gilmer
6. 3/14/03 -- students -- English - map to facility, availability of restaurants, childcare availability, discounts for students and senior citizens, tie-ins with local programs or people if the exhibit is traveling
7. 3/14/03 -- visitors -- English - non-displayed items available to view or reference materials available in museum library for review.
8. 3/14/03 -- students -- English - As long as the information listed above is provided straight forward, I would be happy.
9. 3/14/03 -- visitors -- English - Full list of the permanent collection and the list of the works of the permanent collection that are currently on display.
10. 3/14/03 -- visitors -- English - Great work! It will be desirable to add to the museum website the following options: Current museum news, Museum service and Publications.
11. 3/14/03 -- students -- English - Regarding #6, I would like to see thumbnail images that I can expand if I wish to see them in a larger format. I would also like to be able to choose the resolution since I know how long it will take to load. That way I can have the image be as sharp as I need.
12. 3/15/03 -- students -- English - When my sister and I knew we were going to Florence we researched it first on the web. We made notes and researched getting a live tour guide for our time there. We were so fortunate to find an American art/architecture student to guide us through the maze. That was the best real/virtual tour we have ever had. It pays to research ahead of time.

13. 3/15/03 -- visitors -- English - 1. How many people visited it during last year, or some definite period of time, and what is the age of the majority of visitors.
14. 3/16/03 -- visitors -- English - my current Internet connection at home is only 56K so I don't think I would click on audio or video links from my home computer. I might if I were at a computer with a faster connection.
15. 3/16/03 -- scholars -- English - Links to travel sites in the area or other places of interest that would complement my visit to that location.
16. 3/18/03 -- museum staff -- English- Educational programs, links
17. 3/18/03 -- museum staff -- English - Educational materials - curriculum and image resource kits
18. 3/18/03 -- museum staff -- English- I was a bit confused by question 2, which asks for a "primary purpose," then asks the respondent to select all that apply. I initially selected all, as all apply, then limited myself to fewer so it would be more primary. I'm a curator, so I asked for some things from the model website (such as provenance) that would not concern most visitors.
19. 3/18/03 -- visitors -- English -When museum Web sites include staff/contact information (including names with areas of responsibilities as opposed to the general auto email response), the site assumes more credibility. I'm often surprised by those sites that lack such information.
20. 3/18/03 -- museum staff -- English - Museums need to develop web-based interpretation and presentation of their collections - gallery style interpretation placed on the Web do not take advantage of the media.
21. 3/18/03 -- museum staff -- English - Staff lists with links to e-mail addresses or contact information loan policies forms to submit photographic requests touring exhibition information submission guidelines for artists / exhibition concepts
22. 3/18/03 -- museum staff -- French - Pas de Flash™ ou autres technologies «gadgets» qui nécessitent une machine vieille d'au plus 1 an ainsi qu'une connexion haute-vitesse. Il faut penser aux utilisateurs. La plupart n'ont pas acheté leur machine dans l'année et c'est eux qui utiliseront le site.
23. 3/18/03 -- museum staff -- English -Links to collections (behind the scenes) and staff.
24. 3/18/03 -- museum staff -- English - Access to information that is not part of exhibit or usual museum experience, ie: behind the scenes or conservation info. The website visit should be unique and offer something separate from the real object and an actual visit, which of course could never be replaced by the web.

25. 3/18/03 -- museum staff – English- 1) I go to museum Websites to find examples of policies, user forms, acquisitions strategies, in-house museology reports etc. 2) searchable databases of museum collections
26. 3/18/03 -- museum staff -- English - History of the museum institution. Things to see in the vicinity Transportation to the museum, including parking info Food services available Accommodations in the vicinity Guide for the visitor in a hurry! Can we have a copy of the survey??
27. 3/18/03 -- museum staff -- English - links to other related, associated institutions and organizations, information about getting involved with the organization, contact information for staff so that they can be approached by name as well as to ensure you approach the most appropriate staff person
28. 3/19/03 -- museum staff -- English - Who DESIGNED the exhibit. Credit always given to curator, never to designer. Contact info for staff.
29. 3/19/03 -- museum staff -- English - Simple ways to find information. No fancy flash stuff. Direct access to information.
30. 3/19/03 -- students -- English -Information about the holdings in a museum's archives/library relevant to the history of that institution. Information on how scholars can access this information.
31. 3/19/03 -- museum staff -- English - The names of sponsors/contributors to an exhibit. Ways to contribute to the museum online.
32. 3/19/03 -- teachers -- English - I like to be able to read comments about the exhibit made by people who have visited the website AND actually seen it.
33. 3/19/03 -- scholars -- English - It would be nice to have a directory of personnel with email addresses, so the scholar can contact the individual with which they need to deal for a particular project easily - especially for questions that are not necessarily pressing.
34. 3/19/03 -- museum staff -- English - Hello! I think all of the ideas listed here are great ideas for museum Web sites, however, both of the museums I work for are very small, and would have great difficulty in developing Websites with that much detail!!
35. 3/19/03 -- visitors -- English - Make item one(1) choices radio buttons instead of checkboxes (since the response will be only one of the three)
36. 3/19/03 -- visitors -- English - What do you think is the primary purpose of using a museum website? Checking museum hours and prices.
37. 3/19/03 -- museum staff – French- Je consid?re aussi int?ressant de visiter un site Web apr?s avoir fait une visite au Mus?e pour approfondir mes connaissances sur un objet en particulier qui m'a plus.
38. 3/19/03 -- students -- German - Keine zu grossen Bilder, da das Uploaden der Seite zu lange dauern w?rde. Generelle Informationen zu Bildern und

Künstlerinnen für Kunstinteressierte sowie Links zu weiterführenden Seiten / Kommentaren für Studierende bzw. Lehrende. Einfache Formulierungen und einfache Beschreibungen um auch Nicht-Kunstexpertinnen eine Sammlung näher zu bringen.

39. 3/19/03 -- museum staff -- German - Bezüge zwischen Kunstwerken (wieso wurden bestimmte Werke ausgewählt oder gegenübergestellt) interaktive seine eigene Tour durch ein Museum planen und ausdrucken können
40. 3/19/03 -- teachers -- German - (didakt.) Ausstellungskonzeption: was soll/will die Ausstellung wozu und wie zeigen; Vermittlungsprogramme und pädagog. Materialien (bzw. Links dorthin)
41. 3/19/03 -- museum staff – German - Leitung, Mitarbeiter u. Ansprechpartner, Angebote f. Kinder, Restaurant/Bistro/Café
42. 3/19/03 -- scholars -- English - More interactivity
43. 3/19/03 -- museum staff – German - Zum Punkt 6: Kleine Bilder, die sich beim anklicken vergrößern. Aber nicht auf 800x600, bei guter Auflösung dauert es momentan noch zu lange um mehrere Bilder dieser Größenordnung runter zu laden.
44. 3/19/03 -- visitors – German - Kunstpädagogik - Funktion und Zusammenhänge verstehen lernen
45. 3/19/03 -- museum staff -- German - Möglichkeiten der Förderung (Museumsverein etc) Gastronomie, Shop, Veranstaltungen (Lesungen, Vorträge...) Namen der Mitarbeiter / Kuratoren, Ansprechpartner, Museumspädagogik
46. 3/19/03 -- teachers – German - Smart virtual exhibitions, showrooms so to speak, which give more than just a diashow, but some sort of background 'behind' the objects.
47. 3/20/03 -- visitors -- English - Links/cross-references to other museum or informational sites for like items or for more in-depth information about an exhibit/item of interest. Also, a printable text version about an exhibit or object with appropriate references in APA format.
48. 3/20/03 -- scholars -- English - Contact info for museum staff; catalog info for holdings (I'm an archaeologist)
49. 3/20/03 -- museum staff -- English - Dear Colleagues, I would be very much interested in the result. My email is : konrad.jaggi@slm.admin.ch Best regards, Konrad Jaggi
50. 3/20/03 -- museum staff – English- on-line pubs museum staff have done
51. 3/21/03 -- visitors -- English - Directions to the museum. History of the museum itself.

52. 3/21/03 -- visitors -- English - When I go to museum Web site I usually know what exhibit I'd like to attend, so I check exhibit's details: dates, times, tickets info.
53. 3/21/03 -- museum staff -- German - Besucher-Kommentare
54. 3/21/03 -- students -- French - j'aimerais visualiser rapidement les oeuvres phare du mus?e puis avoir la possibilit? de voir toutes les oeuvres et une description technique.
55. 3/21/03 -- visitors -- English - Some questions do not apply to me, and other questions did not have the answer options that I liked, so I chose not to check anything. i think it would be better for your survey design if you could either provide a field where respondents could specify what Other information they are looking for or to remove this answer option at all because even if respondents do check Other option, it doesn't really give you any information.
56. 3/22/03 -- museum staff -- English - Short description of institution's mandate, description of any archival holdings, employment opportunities
57. 3/23/03 -- visitors -- English - I'd like to see a place where museum members could indicate that they would like to get emails re: new exhibits, etc. I get these in the mail, but they are often discarded before I see by other family members. If I could get notice, with a link to the museum website with some of the features of the exhibit, I'd go to the museum more often. I find that I access the Websites rarely unless prompted. So, some sort of monthly or quarterly update via email with links to coming and current attractions would be good.
58. 3/23/03 -- students -- English - re: No. 4. - also include a city map of the location of the museum.
59. 3/23/03 -- students -- English - membership fees and benefits, volunteer and employment opportunities
60. 3/23/03 -- students -- English - Links to other information sources about exhibited artifacts, not just to other museums.
61. 3/24/03 -- scholars -- English - Links to other museums in the area, local and regional art links for the museums community.
62. 3/24/03 -- teachers -- English - I want to know what is there, the hours and a little about the items. I'll go to almost any museum so I just need the basics.
63. 3/24/03 -- visitors -- English - Educational opportunities for families.
64. 3/24/03 -- scholars -- English - info about age appropriate activities for families & children info about hands-on activities & games info about tech aids like wands & cassettes info about docents & explainers tours



65. 3/24/03 -- visitors -- English - Links not only to other museums but if possible to good Web sites dealing with the art and artist in a collection or exhibit.
66. 3/24/03 -- visitors -- English - Links to other Websites that have information, articles, etc. about the piece of art one is looking at.
67. 3/24/03 -- students -- German - Ich haette gern Ausstellungen, die nur fuer das Web zusammengestellt sind. Diese 'Ausstellungen' waere kleiner (kurzer) als Hauptmuseumaustellungen und dazu griffiger. Die LOC hat viele solche Ausstellungen auf ihre Website.
68. 3/24/03 -- visitors -- English - I use a museum website for logistical purposes, as well as learning more about art piece in an exhibit (before and after). I like Web sites that provide more descriptive info about the artwork than can fit on the small block of text on the wall next to the piece.
69. 3/24/03 -- museum staff -- English - You may consider to add the Spanish version of this survey.
70. 3/25/03 -- museum staff -- English - Place for comments from Web site visitors; WHY certain exhibitions were chosen
71. 3/25/03 -- museum staff -- English - as a museum professional, staff lists and contact information specific to individual staff is important. I also want to see interpretive information about the exhibit as a whole i.e. intro panel so that i can determine the interpretive slant of a particular show. Information about specific works in the show is not as important to me.
72. 3/25/03 -- museum staff -- English - I'm always looking for staff contact listings and usually have to dig really deep to find them on most Websites.
73. 3/25/03 -- visitors -- English - A link to the museum art library catalog would be very useful.
74. 3/25/03 -- museum staff -- English - Enough to entice me in--with links or contacts to more detailed information.
75. 3/25/03 -- students -- English - The history of the art or artifact is often very interesting if it is a very old item. I like to know the story behind the object. It makes for a more interesting and memorable museum visit.
76. 3/25/03 -- students -- English - Just about all of the options listed would be good to have on a website, I just marked the ones I would most like to see. Images are a must and I like the idea about links to other museums and educational resources related to the exhibit/artwork.
77. 3/25/03 -- scholars -- English - bibliographic information on objects. Ability to ask questions about an object to a curator
78. 3/25/03 -- students -- English - Educational projects for school education, accessible scholarly reports. Could you send me the results of your research?

79. 3/25/03 -- museum staff -- English - History of the Museum, it's curators and staff. Educational Materials centering on how to study the specimens/objects, emphasizing methods, not facts, in order to enable critical thinking rather than authoritarian views.
80. 3/25/03 -- visitors -- English - Be able to view the entire collection if you want to.
81. 3/26/03 -- museum staff -- English - Your questions are all aimed at art museums, but the intro to this survey and titles do not suggest that... they suggest \*all\* museums. Therefore I'd suggest you change your titles and intro or else add questions or change questions that refer to other types of museum collections/exhibits besides art (history, science, natural history).
82. 3/26/03 -- students -- English - museum opening times, map of how to get to it, details of any local public transport that would be useful for getting to the museum, prices for entry
83. 3/26/03 -- museum staff -- English - Facility Rental Information Group Tour Information Human Resources Information (Current Job Openings)
84. 3/26/03 -- scholars -- English - Directory of personnel and contact information
85. 3/27/03 -- students -- English - A full description - with pictures - of ALL holdings (those on display and those that aren't), a tour of the preservation process.
86. 3/27/03 -- visitors -- English - Easy to navigate. Attractive.
87. 3/27/03 -- visitors -- English - Membership information, news about special events, information about member and group discounts
88. 3/27/03 -- scholars -- English - contact data vision-mission statement of the museum
89. 3/27/03 -- museum staff -- English- Map, option of information about becoming a member, taking classes, staff links, contact information for questions, and job listings
90. 3/27/03 -- scholars -- English - My interest in using a museum Web site is to get as much information as possible, as quickly as possible. Either logistics about coming to see an exhibit, lecture, film or information on specific collections items. I would not be interested in virtual tours, audio, or video because of the loading times of those programs--textual information is just fine for my purpose. I would rather that museums spend their resources in developing more content than "bells and whistles."
91. 3/27/03 -- visitors -- English- Access to museum library holdings, if any, such as catalogue, digital library collections, research services, online educational resources.

92. 3/27/03 -- students -- English - links to nearby museums, so that the visit can be combined with other museum visits. Also, information on the location (town, parking, restaurants, etc.)
93. 3/27/03 -- visitors -- English - not educ. games but educational materials - curriculum guides, info. sheets, items of interest to all grade levels, teach children the love of art
94. 3/27/03 -- scholars -- English - Critical reviews of art and culture objects.
95. 3/27/03 -- visitors -- English - Employment opportunities - while I am not currently looking for a job or working at a museum, I have worked in museums in the past and will probably be looking for museum jobs in the future. This is important both for finding jobs and for comparing jobs in the field - monetary amounts, job descriptions, responsibilities, and so forth.
96. 3/28/03 -- visitors -- English - Job Opportunities and Internship information
97. 3/28/03 -- students -- English - I am also interested in nearby resources, when planning a visit--cafes or parks that might offer pleasant relaxation after visiting the museum, and so on. Gardens that are associated with the museum are also of interest to me.
98. 3/28/03 -- scholars -- English - I would be interested in knowing if the museum had their own objects such as exhibited in specific displays....for example, a traveling exhibit of Chinese ceramics might pique my curiosity, but does the museum have similar pieces (perhaps not included in the display) that could be examined more closely.
99. 3/28/03 -- scholars -- English - Preservation and conservation information for conservation professionals and for the general public, i.e. more attempts at promoting pres/cons awareness.
100. 3/29/03 -- students -- English -- Are there any community events surrounding the opening of an exhibit?
101. 3/30/03 -- visitors -- English - a linked index, so I could look up to see if a certain piece of art was located in the museum --- menu bar so I could jump around without having to backtrack --- text only option (I know, that seems to defeat the purpose of a museum, but sometimes you just want some info about something where you know what it looks like, and loading images can take a long time or freeze up a computer.
102. 3/30/03 -- teachers -- English - Information for best viewing of the site and downloadable software, if needed.
103. 3/31/03 -- teachers -- English - curatorial staff charged with a particular collection
104. 3/31/03 -- museum staff -- English - Contact information
105. 3/31/03 -- museum staff -- English - Information on educational programs/public programs, links to other related attractions in the region.

106. 3/31/03 -- visitors -- English - I only use museum website's when I'm planning to visit that museum (or to steal images for my own site :( ). The more info I can find on the collection, the better, although video, audio, and games go a little too far. I've long been disappointed that so many museum's cater to children. This bugged me even when I WAS a child.
107. 4/1/03 -- museum staff -- English - Information about the museum itself; link to an e-newsletter; scholarly papers germane to the museum's collections; be able to view entire collection; information about membership & donations.
108. 4/2/03 -- scholars – German- seri?se Info ?ber staendige Schausammlung, Sonderausstellung, Sammlungsprogramm
109. 4/2/03 -- scholars -- English - My interests are more in history than in art. I like to see raw data, primary documents, historical photographs, archival materials, museological publications, policies, evaluation reports, staff directories, etc. I'm a consultant, working for museums, galleries and related organizations. The more information about the institution and its practices from a Web site, before contacting the institution the better.
110. 4/2/03 -- scholars -- English Museum catalog = illustrated list of holdings with catalog information
111. 4/3/03 -- visitors -- English - Reminder of upcoming exhibits
112. 4/6/03 -- visitors -- English - job opportunities, how to donate, contact information
113. 4/7/03 -- students -- English - A stunning image or graphic on the homepage that tells what the museum is about.
114. 4/8/03 -- visitors -- English - I would like to see short biographies of the artist/creator with links to additional sites where his/her works can be viewed. I would also like to know if a work is part of a larger collection at another museum if it is part of a temporary showing, traveling show, etc.
115. 4/11/03 -- visitors -- English - Another reason I go to a museum website is, after I have been to a museum, I sometimes look at the website because I've forgotten an artist's name or would like to see a favorite piece of art again or to show it to someone else. Also to find out more info about a particular piece I've seen and liked.
116. 4/12/03 -- visitors -- English - What other museums/cultural exhibits are nearby? Does the museum have a cafe? Places to stay overnight if needed. Nearby restaurants.
117. 4/14/03 -- museum staff -- German - ?bersichtlichkeit!! : Ort, ?ffnungszeit, Eintrittspreise Aktuelle Ausstellung der Institution, evntl. k?nftige Eine Rubrik f?r Statements : Kritik, Anregungen,... Sonder-Events mit Orts-, Zeit- und Preisangaben eine Tel. No + E-Mail Adresse f?r evetl. R?ckfragen

118. 4/15/03 -- scholars -- English - I am a Visual Resources Curator. I use Museum Websites for all kinds of things. I use them to check information or find information that I need. Plus I use museum Websites for making decisions on what I want to see and when I can see it. Good Luck!
119. 4/16/03 -- students -- French - l'historique d'acquisition de l'oeuvre ainsi qu'une ?valuation sommaire de l'ouvre pour les marchands d'art.
120. 4/17/03 -- scholars -- English - I wish museums had a better balance between their educational mission and the marketing of the museum. There is nothing more frustrating to a researcher than to go to a museum site with nothing but visitor information, online store, etc. with little (or NO) research information. I want to know about their collection - not just 5 works and what time the cafe is open until....
121. 4/18/03 -- students -- English - Would also like to have access to information about repairs---preservation and conservation efforts made on artworks. #2 question wasn't sure if it was what I personally think is of primary importance---didn't think all of the choices could be "primary." Maybe I would like to rate the choices in order of importance.
122. 4/22/03 -- scholars -- English - Contact information for an individual who can answer questions about an exhibition.
123. 4/23/03 -- museum staff -- English- How I can contact curatorial staff to learn more/make an appointment.
124. 4/25/03 -- visitors -- English - I would like to see which images are available as prints in the museum store or elsewhere.
125. 4/29/03 -- museum staff -- English - Staff listing with email, telephone, fax contact information, and mini bio. - listed by exhibition. Feedback response area. Visitor counter so that online users that access a particular exhibition can be included in a visitor count. I'm not sure if a museum website can ever be a "real" research tool other than to locate works by a particular artist or to examine works. Museums are notoriously understaffed, and, irrespective of what people may want in a website, someone has to enter the data/images/do the research etc. This seems to be the arena in which the theoretical world smacks up against the real one.
126. 4/29/03 -- visitors -- English - Easy to navigate!
127. 5/3/03 -- visitors -- English - history of the museums architecture
128. 5/3/03 -- scholars -- English - It would be great if there were an online database for the library (there probably is somewhere though, and it's probably beyond the scope of what a museum should have to provide the public to have this service...most people doing research can access the museum's holdings easily.
129. 5/22/03 -- visitors -- English - Something that will make me want to visit, something that will give me a good idea of what I will see there

130. 6/1/03 -- visitors -- English - I would probably like to know if pictures and/or video can be taken
131. 6/1/03 -- visitors -- English - It would be nice to ask specific questions of the museum staff. A place where you could email them and get a response in a day or two depending on what the question is.
132. 6/1/03 -- teachers -- English - Since I can't travel to see many of the famous exhibits I would love to view them through this via.
133. 6/1/03 -- visitors -- English - Photographs of the museum. Also, a comments section is nice, along with the ability to read others' reviews of various parts of the museum. Information about the exhibits geared to children are important.
134. 6/4/03 -- museum staff -- English - I would also include a section for teachers. A section to download pre and post visit activities as well as book group tours
135. 6/4/03 -- museum staff -- English - contact addresses for staff; online exhibitions that are strictly online (for example, MoMA's online exhibition about German expressionist prints, or the Whitney's ArtPort site of web-based works)
136. 6/4/03 -- museum staff -- English - I'm a bit prejudiced because, in my position, I am expected to safeguard the Museum's images from misuse. Therefore, although I'm sure that many museum web-site visitors would like to see full-size or zoomable images, the thought of allowing such visitors to download such images makes me cringe. Streaming is all well and good, but I'd still opt for smaller images.
137. 6/4/03 -- museum staff -- English - The ability to sign up on a listserve. The ability to contact curators.
138. 6/4/03 -- museum staff -- English - directions to the museum by car and public transit; staff list with email addresses; Up to date calendar of programs, events, etc.; a general contact email address for the museum.
139. 6/5/03 -- scholars -- English - information about their conferences and publications
140. 6/5/03 -- scholars -- English - Contextual video...object in situ
141. 6/5/03 -- scholars -- English - I'd like to see a directory of museum departments and staff and at least their department phone numbers, plus their e-mail addresses.
142. 6/5/03 -- museum staff -- English - Technical papers about the museum procedures
143. 6/5/03 -- museum staff -- English- Museum consists of more than just artwork - although many of your questions apply to other artifacts. Questions should take into account all forms of museum holdings from

small artifacts, like pottery fragments, to large artifacts such as aircraft or whole edifices.

144. 6/6/03 -- visitors – English - Not only highlights of temporary exhibits, but also highlights of a museum's permanent collection. Also, if they offer any "free days" or discounts.

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