The Visitor Has Left the Building: Using Technology to Extend the Museum Experience

by

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INTRODUCTION

Extend [eks•tend‘] v

To expand the influence of.
To cause (something) to be or last longer.
To make more comprehensive or inclusive.

— American Heritage Dictionary of the English Language, Fourth Edition

It was not what she imagined—this first direct experience with Impressionist art. Previously seen only in faded textbook reproductions and grainy slides in art history lecture halls, she had yearned to experience each painting close up in the hushed stillness of a great museum. Instead there were crowds and noise, lots of noise. Because of the mass of people, she could not get a clear view of the labels and the crush of the line moved her along more quickly than she would have liked. Later, in the quiet comfort of her living room, she logged onto the museum Web site that had been personalized with selections she made on an audio wand during her visit. Thus reminded of her favorites, she savored viewing them at length, zooming in on areas of particular interest, hyperlinking\(^1\) to find answers to her questions, and listening to audio clips of art experts from around the world. And then, a month later, she logged on again to pick up where she had left off—enjoying and learning more about Impressionist art.

\(^1\) A hyperlink is an element in an electronic document that links to another place in the same document or to an entirely different document.
“It worked!” the homeschool child exclaimed, looking at the bacteria growing in the petri dish marked with his name. Just yesterday he had gone to a science museum and performed an experiment that required twenty-four hours of curing in an incubator. Now he was looking at the results on the Web site that contained photos and results recounting much of his day at the museum. They had been captured by the unique radio frequency identification bracelet he wore throughout his visit and that was now his key to unlock both the memories of the day and additional learning. Hyperlinks on the Web site led him to a video interview with a chemist talking about the importance of the scientific process and to time-lapse photography of growing bacteria. Anxious for more hands-on activity, he was delighted to find instructions for experiments he could do at home.

Imagine receiving a personalized email newsletter informing you that your favorite artist will be speaking at your local museum next month. Another article describes an upcoming traveling exhibition of personal interest. In addition, the newsletter contains a customized list of books newly available at the museum gift shop. All of this personalized information was generated on the basis of items you expressed interest in during your last visit. You simply marked them with an electronic bookmark on the PDA that served as your virtual tour guide. Little did you
know, that as you identified objects of interest, you were tailoring your ongoing interaction with the museum.

These hypothetical scenarios—featuring a use of technology to defer museum engagement to a time and off-site setting better suited to the visitor’s needs; a field trip revisited and elaborated through on-line learning opportunities; and an on-going, tailored interaction with a museum—illustrate how and why visitors might want to extend their interaction with a museum. That there is a fervent interest in what museums have to offer the public on site, there is no doubt. A variety of sources have documented the unprecedented growth and popularity of museums in the United States over the past thirty years.\(^2\) John Falk and Lynn Dierking, founders of the Institute for Learning Innovation in Annapolis, Maryland, hold up as the primary reason for such unprecedented attendance the desire to learn. They wrote, “Learning is rapidly becoming the single most important leisure commodity in our society, and the free-choice learning sector has emerged as the primary vehicle for facilitating such learning.”\(^3\) This desire to learn does not confine itself to a schedule of opening days and hours, nor is it

\(^2\) One such source, James B. Twitchell, *Branded Nation: The Marketing of Megachurch, College, Inc., and Museumworld* (New York, NY: Simon & Schuster, 2004), indicates that 40 percent of American museums were founded since 1970 and claims that museums are the most popular cultural institutions in America – more popular than sporting events.  

conveniently fulfilled by the closing date of a special exhibition or even to the physical plant of a museum. For visitors, there are many hypothetical reasons to extend the museum experience.

Likewise, there are many reasons museums seek to provide an extended experience. These include the desire to take a leadership role in the application of technology, to attract new audiences, or to obtain funding. Yet the most frequently cited, and inevitably mission-driven, motivation is to increase opportunities for visitor learning. In a paper on personalizing the Web experience, computer scientist Jonathan Bowen and Ph.D. candidate Silvia Filippini Fantoni state that “[v]isitor studies seem to confirm that learning is stimulated when the information is described in terms that the visitor can understand and if it makes reference to their interests as well as concepts that the visitor has already encountered during their visit.”

This same paper suggests that using technology to establish a connection between the museum visit and post-visit experience is effective in prompting visitors to follow up from home on what interested them during their visit. In 1998, the San Francisco, California Exploratorium’s experimental Electronic Guidebook (a wireless handheld computer) project had as its goal in “to allow individuals and groups to

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5 Ibid.
engage in a continuum of activities before, during, and after a museum visit to support a deeper engagement with the exhibits;” 6 and its developers claim that “by adding personalized technology to the museum experience…we can greatly enhance the visit’s educational value.” 7

In a later trial at the Exploratorium in 2001, a device called the “Rememberer” used photos and notes to capture elements of the museum visit and was targeted at “those visitors whom we found to be overwhelmed by the vast amount of information presented in the museum.” 8 Technology allows these visitors to further explore the objects and concepts presented at their own pace—away from the volume of new information and stimuli encountered at the museum. This strategy is supported by current educational theories about how people learn. Another objective for the “Rememberer” was to help people to focus on the physical museum experience while there—and to the virtual experience afterward. The research for this master’s project revealed that institutions that focus intensely on the visitor’s immediate encounter with an object—

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without the mediation of technology—seem particularly to be interested in supplying collateral (for example, educational content) after the visit.

Yet, while the theoretical potential for using technology to extend the museum visit is well laid out in educational and museum studies literature, few such projects have been implemented in the United States. Furthermore, there is a dearth of evaluation data of such programs or of visitor studies polling museum visitors about their interest in such applications of technology. Among the questions that have yet to be addressed adequately by museums is whether technology projects designed to extend the museum visit are actually meeting their goals. To take one example, in 2002 the Tate Modern in London piloted a multimedia tour spanning three months. Visitors had the opportunity to use a handheld computer in the galleries to access audio, video, and still images as well as engage in interactive surveys and creative play. According to Nancy Proctor and Chris Tellis of project collaborator Antenna Audio, 61 percent of the 852 visitors who took the tour provided their email addresses to the museum in order to be able to receive content by email that would allow them to extend their visit.\(^9\) Opting to supply this information suggests an interest on the visitor’s part in extending the

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museum visit. Unfortunately, the Proctor and Tellis paper does not report how many of the visitors who supplied their email addresses actually followed up by visiting the Tate Web site to extend their visit.

Usage rates of another project implemented to extend museum visits have been published from the Visite + project implemented at the Cité des Sciences et de l’Industrie in Paris. Visite + uses radio-frequency identification chips to capture user information and create an electronic log of visitors’ actions and activities in the museum. This information then becomes available on a Web page personalized for the visitor. And, while personalized Visite + Web sites include a map of the visitor’s path through the exhibition spaces of the museum and results of tests and games completed while there, no combination of capture device and Web site is capable of chronicling the entirety of the visitor’s experience. The Cité found that of the more than 400,000 of these Web pages generated over approximately four years, 8 percent (32,000) were accessed at least once. This rate of use prompts questions about the level of return on investment for this kind of project. In the case of museums implementing a technology-based extended experience, return on investment might be defined as the magnitude of visitor participation compared to the cost of implementation and maintenance, which can be quite steep. Indeed, in

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\[10\] Bowen and Fantoni.
addition to other implementation costs, the cost of personalized Web sites can be up to four times the cost of regular Web sites.11

Equally important as capturing the absolute numbers of people who prolong their museum visit through technology, is considering who these people are. Robert Futernick, Associate Director of the Fine Arts Museums of San Francisco, speculates that the people who are inclined to re-engage with the museum experience through the Web site “might very well be the most important visitors for the museum—those who are most interested, most vocal, and most likely to be supporters of the museum. Essentially, that they may be the group the museum most wants to satisfy.”12 Thus, in order to maximize their financial investment, perhaps museums should focus on clearly defining their target audience and then creating an experience designed to their needs rather than attending solely to take-up rate.

Building relationships can be yet another explicit or concomitant benefit of extending the museum visit. In Mass Customization: The New Frontier in Business Competition, economist B. Joseph Pine postulates that one way to add value to a product or service (thus increasing its

11 Ibid.
worth) is by mass customization.\textsuperscript{13} For example, some museums, like the Cité des Sciences et de l’Industrie, create personalized newsletters tailored to the interests of the visitor as gathered by the device they used during their visit. Through this type of ongoing communications, the museum is attempting to create a longer term, sustained connection. In business parlance, such endeavors are called “relationship marketing” which has its roots in management guru Peter Drucker’s precept that the basic purpose of any business is not to sell a product but to create and keep customers.\textsuperscript{14} Both mass customization and relationship marketing can be integrated with the extended museum experience, yet research shows most American museums are not maximizing these opportunities.

Nonetheless, the theoretical promise of the extended visit has caused an increasing number of museums to speculate about making such offerings, despite the absence of compelling evidence as to their efficacy. In June of 2001, the Smithsonian Institution appointed a Blue Ribbon Commission to advise the National Museum of American History on “the most timely and relevant themes and methods of presentation for the


Museum in the 21st century.” Among its recommendations in the area of advanced information technology is the following: “Through the use of information technology, we will: Help visitors begin their connection to the Museum before they come and extend it after they leave” (italics mine). The Smithsonian is not alone among U.S. museums looking at technology as a means of extending the museum visit. Diverse museums such as The Tech Museum of Innovation in San Jose, California, the Peabody Essex Museum in Salem, Massachusetts, and the Experience Music Project in Seattle, Washington have undertaken such initiatives. Numerous other museums, including San Francisco’s Exploratorium and Fine Arts Museums have conducted pilots and are considering harnessing technology as a permanent feature to extend the museum visit.

Some professionals familiar with these endeavors caution that excitement over using technology to enfranchise visitors can lead to the implementation of technology for technology’s sake, without clear goals and objectives and an analysis of the costs and benefits of selecting a technology-based solution. During the Electronic Guidebook Forum hosted by the Exploratorium in 2001, consultant Daniel Molitor asked, “why are we doing this [type of project]? Is it just because the stuff is out

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16 Ibid.
there and we’re hip and cutting edge, or is this adding something fundamentally?” There is no lack of signs suggesting an increased interest in using technology to extend the museum experience. Museum consultant Susie Wise observed that even small and medium sized museums are clamoring to implement handheld computers—perhaps with the intent of creating an extended experience.

The burgeoning interest in these projects underscores the timeliness of this inquiry into technology-based extensions of the museum experience. First, by elucidating the historical precedents and theoretical underpinnings of the extended museum experience, this study provides a framework for understanding both the need and potential for these types of projects. Secondly, case studies of existing implementations highlight the importance of alignment with mission and establishing clearly defined goals and objectives. This, in turn, leads to recommendations for successful implementation and evaluation of extended experiences. This master’s project focuses on museums’ use of technology to extend the museum experience for individual, leisure-time visitors in the United States. Its purpose is to advance the nascent discourse about the motivations for and efficacy of such projects. Case studies of three

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implementations illuminate rationales for these endeavors, their goals and objectives, initial visitor experiences, and evaluation methodologies and results. Finally, this study examines some of the issues involved in using technology to extend the museum experience and includes a product designed to promote thoughtful consideration of such projects.

**Research Questions and Project Objectives**

This project involved research and analysis undertaken to answer the following six questions:

1. How have museums in the United States historically extended the museum experience for the individual, leisure-time visitor?

2. What learning theories and marketing concepts support these efforts?

3. What goals and objectives are museums trying to meet with technology-based projects designed to extend the museum experience?

4. What are the initial visitor experiences of programs that have been implemented?

5. Are museums evaluating the success of these projects? By what methods? What are the results?

6. What lessons can museums considering technology-based projects to extend the museum experience learn from pilots and completed implementations?

Behind these research questions lie four objectives. The first objective is to provide historical context by researching methods of
extending the museum visit offered my museums in the United States since the late 1800s. The second objective is to research and synthesize the theoretical rationale supporting projects to sustain the museum visit. Case studies and interviews provided the means to address the third objective, which is to study existing implementations in order to evaluate rationales for implementation, goals and objectives, initial visitor experience, and evaluation methodology and results. Finally, the fourth objective of this project is the development of a product to advance the discourse on the potential for technology-based programs to effectively extend the museum experience.

**Methodology**

Delving into the history of the extended museum visit, researching the theoretical support for projects using technology to extend the museum experience, and analyzing contemporary implementations of such projects necessitated an assortment of research methods. Collectively, a literature review, interviews, and case studies provided a substantial amount of research findings necessary to complete this project.

**Literature Review**

A literature review in the areas of museum retail sales, informal learning theory, marketing, and user-focused technology in museums
informed this project. Included in this review were periodicals, journals, texts, conference proceedings, master’s theses, and electronic resources. John Falk and Lynn Dierking’s books *The Museum Experience*, and *Learning from Museums* as well as the Web site Encyclopedia of Informal Education (http://www.infed.org) were of considerable help on the topic of learning theory. Two notable sources were invaluable in shaping aspects of this project dealing with both the theory and practice of using technology in museums. First, a variety of papers presented during the last eight years of Museums and the Web conferences (1998-2005), and second, *The Virtual and the Real: Media in the Museum*—a book of essays reflecting on museums in the information age. Moreover, *Daedalus*, the Journal of the American Academy of Arts and Sciences Summer 1999 issue on America’s Museums provided insight into many of the important philosophical issues facing our nation’s cultural institutions. In addition to being integral to my first-hand assessment of the extended experience, the Web sites of the case study institutions also provided information regarding the history and mission of the organizations.

The sources comprising the literature review provided a framework for understanding the history of how visitors have been able to take a piece of the museum experience home with them and were critical in establishing the context of both educational and marketing theories.
applicable to this topic. Finally, reviewing the literature provided a chronology of relevant projects as well as a rich source of experts and professionals active in this area who became sources of personal interviews.

Attendance at Relevant Professional Conferences

In an effort to understand the current issues in visitor-focused museum technology, I attended two topical professional conferences. The two-day Electronic Guidebook Forum hosted by the Exploratorium in San Francisco, California on January 13-14, 2005, focused on the use of wireless technologies in museums. Among the topics presented or discussed were device selection, content, and interface. The Museums and the Web 2005 conference held March in Vancouver, British Columbia, brought people together from around the world to explore the presentation of cultural and heritage content on the Web. The conference featured presentations on handhelds, online learning, and a particularly applicable four-part session called “Pre + Post-Visit.” In addition, the conference provided the opportunity to make personal connections with professionals who are actively involved in relevant projects, several of whom agreed to be interviewed for this project.
Interviews with Museum and Technology Professionals in the United States

Interviews were conducted with twenty-one museum and technology professionals who have been involved in the design, development, implementation, evaluation, or ongoing support of technology-based projects to extend the museum experience. The experts interviewed were largely from case study institutions and their collaborators. Interviews focused on the projects they were involved with and included questions about why the project was done, its goals and objectives, the intended visitor experience, methods of evaluation used or planned, as well as the results of any evaluation that had been performed.

Case Studies

At the core of this inquiry are case studies of three implementations of technology to extend the museum experience. They are ARTscape at the Peabody Essex Museum in Salem, Massachusetts; TechTags at the Tech Museum of Innovation in San Jose, California; and the GettyGuide at the J. Paul Getty Museum in Los Angeles, California. These museums were chosen because they are diverse in discipline (art and culture, science, and art, respectively). In addition, each of the implementations uses a different kind of intra-museum technology (audio
wand, radio frequency identification, and kiosk computer, respectively) to establish the foundation for the extended experience.

Case study research was conducted to provide concrete answers on five topics: the rationales for implementing the specific project, the goals and objectives it was designed to meet, development and implementation-related organizational challenges, the initial visitor experience, and evaluation methodologies and results, if any. To that end, the case studies bring together a variety of information and sources. They comprise a review of print and electronic resources covering the history of the institutions and their use of technology; interviews (in person or by phone) of professionals associated with three projects being studied; an examination of documents, data and other collateral materials made available by the studied institutions; and a description and analysis from the user perspective as I experienced it first hand. Finally, in order to familiarize myself with the visitor experience, I conducted site visits of both the Tech and the Getty during the research phase of this project. Having utilized the Peabody Essex ARTscape in August 2003, I did not make a return visit. The data gathered on the three institutions provided the information for cross case analysis and reflection.
Limitations

This examination of technology-based projects designed to extend the museum experience has been circumscribed by limitations of geography and a self-imposed demarcation of specific applications of technology for specific audiences. The scope of this project is limited to museums in the United States. While a number of otherwise pertinent projects exist in Europe and Asia, time and geography dictated a United States focus. And, although a number of United States museums are considering future implementations of technology to extend the museum experience, only a few are presently in use by museum visitors. Thus, restricting research to implementations in the United States severely reduced the number of projects available for study.

The definition of the extended experience I chose to apply imposes another limitation. This master’s project focuses specifically on extended experiences that begin with a visit to the physical museum where interaction with technology establishes the foundation for the extended experience. This definition eliminates consideration of technology-based experiences that are available independent of an actual museum visit – for example, the majority of museum Web sites. In addition, this definition precludes pre-visit extensions which, however promising an aspect of the
extended experience and meritorious of future research, will remain beyond the scope of this project.

Additional limitations lie in the decision not to evaluate the relative merits of technologies that can be used to create an extended museum experience. So, although the focus of the project is on technology-based extensions of the museum experience, it is beyond the scope of this project to consider the advantages and disadvantages of various devices (for example, radio-frequency identification, audio wands, and personal digital assistants) and interfaces that have been implemented to this end. The rapid rate of technological change makes futile any attempt to compare and contrast for the purpose of theoretical recommendation. Therefore, those seeking resources to inform platform and device decisions would be better served by seeking the most up to date information from cultural institutions and for-profit hardware, software, and content companies specializing in this kind of work.

This project focuses on individual, leisure-time museum visitors—consciously eliminating consideration of the experiences of school and other organized groups. In addition, the focus on the experiences of these individuals outside of the museum building limited my ability to gather firsthand feedback from visitors. The time available for this project—as dictated by the graduate degree requirements of John F. Kennedy
University—and the challenges of institutional cooperation combine to make conducting firsthand evaluation impracticable. Therefore, my analysis of the efficacy of the studied projects is limited to existing evaluation results made available by the implementing institutions.

Additional aspects of my research were restricted by time as well as by geography and financial constraints. Given additional time and resources, I would have revisited the Peabody Essex Museum and refreshed my experience of ARTscape. In addition, I would have conducted all of my interviews in person—rather than doing some by phone. Face-to-face interviews tend to produce richer and more substantial information.

Research and scope limitations notwithstanding, the literature review, participation in conferences, interviews, site visits, and case studies have combined to provide a depth and breadth of information and experiences necessary to meet the objectives of this project. As a result, this project will move the museum field’s dialogue forward on the topics of the justifications for and efficacy of technology-based projects designed to extend the museum experience.
Product Description

A critical objective of this project is to develop a product that advances the discourse on the potential for technology-based programs to effectively extend the museum experience. To that end, I will apply to present a panel discussion at the next American Association of Museums (AAM) conference to be held April 27 – May 1, 2006, in Boston, Massachusetts. Founded in 1906, AAM is the preeminent professional association for museums, representing over 16,000 individual, institutional, and corporate members in the United States. Held annually, the AAM conference attracts educators, curators, administrators, technologists and other professionals who work in museums as well as representatives from for-profit companies involved in museum-related activities.

In celebration of its one hundredth anniversary, the 2006 AAM Conference is called *A Centennial of Ideas: Exploring Tomorrow’s Museums*. According to the organization’s session application, the meeting is an “opportunity to look ahead to the future and the challenges that await us over the next 100 years.” My topic aligns well with a number of the themes of the conference. Session applicants are asked to consider are several questions relevant to my topic. These include: “What will the museum of tomorrow look like?”, “…how will museums provide faster
access to information and make themselves indispensable sources of lifelong learning?”, and “How will museums broaden access to…their collections, programs, or operations?” My application describes a session anchored by a panel comprising knowledgeable professionals who have experience evaluating extended museum exhibits. The session will begin with an introduction of the panel members and the topic. Attendees will be reminded of the purpose of the session and the format will be explained. The remainder of the introduction will include a brief historical context and panel members—each of whom has been a member of a development or evaluation team—will concisely describe the relevant projects they have worked on with a particular focus on evaluation strategies and methodologies. Following closing comments by the panelists, attendees will be invited to ask questions.

By its very nature, a panel with open discussion is the most appropriate product to meet the objective for advancing discourse on using technology to extend the museum visit. The format lends itself to the sharing of professional experiences and the discussion of different points of view. This pairing of an apposite format with a promising venue will result in achieving the objective to give impetus to the dialogue that is taking place on the topic of this final project.
Glossary

This glossary provides definitions of terms used in this project that may not be familiar to all readers. While a detailed analysis of technology is not the primary focus of this study, these definitions may help provide context and an understanding of some of the technologies being employed to extend the museum experience. The definitions offered are specific to the context of this project.

Audio wand
A wireless handheld device used to provide audio interpretation for museum tours. Analogous to an elongated telephone handset, content delivery can be triggered by manually entering a code or automatically by infrared beam.

Bar code
A series of vertical bars of varying widths, in which the digits zero through nine are represented by a different pattern of bars. Bar codes are read by a bar code reader or scanner requiring a direct line-of-sight.

Bookmarking
As a verb, bookmarking means to electronically mark a document or a specific place in a document for later retrieval. A feature commonly found in Web browsers, it allows users to save the address (URL) of a page so they can re-visit it at a later time.

As a noun, a bookmark is an electronic marker that identifies a document or specific place in a document.

Content
All of the information and experiences available through an electronic device or Web site. Common formats for content delivery include text, images, interactives, audio, and video.
Context Aware/Context Sensitive (also Location Aware/Location Sensitive)
A feature associated with wireless devices that changes functionality based on what visitors are doing or where they are located. For example, when a visitor is standing in front of a specific artwork, information about that piece can be delivered automatically through a context aware device.

Cyberlog
A record of a visitor’s actions captured by technology.

Extended Museum Experience
For the purposes of this inquiry, an extended museum experience is one that begins with a visit to the physical museum where technology is employed to create a customized foundation for a post-visit experience that typically is accessed through the Web.

Handheld
A portable computer that is small enough to be held in the hand. Small screen size and limited or non-existent keyboards typically limited use.

Hyperlink
An element in an electronic document that links to another place in the same document or to an entirely different document. Hyperlinks may be icons (objects, images, or pictures) or text. Text hyperlinks convention requires them to be underlined and to change color when selected.

Infrared
An invisible band of radiation at the lower end of the visible light spectrum. Widely used in audio and video remote controls, infrared transmission is also used for wireless connections between computer devices.¹⁹

Interface
The connections and interactions between hardware, software, and the user. Hardware interfaces include plugs, sockets, and wires. Software interfaces are made up of the languages and codes used for communication. User interface comprises input devices (e.g., keyboard,

mouse, stylus) and the commands and menus a person uses to communicate with the device.  

**Internet**  
A global network connecting millions of computers. Internet is not synonymous with World Wide Web. 

**Location Aware/Location Sensitive**  
See Context Aware/Context Sensitive  

**PDA**  
Short for personal digital assistant, a handheld device that may combine computing, telephone/fax, Internet and networking features. A typical PDA can function as a cellular phone, fax sender, Web browser, and personal organizer. Unlike portable computers, most PDAs began as pen-based, using a stylus rather than a keyboard for input. PDAs today are available in either a stylus or keyboard version and some can react to voice input by using voice recognition technologies. 

**Recommender Algorithm**  
A computer program that suggests products or information of interest by executing a logical step-by-step procedure on a body of data such as past browsing or purchasing history and personal demographics  

**RFID**  
Short for radio frequency identification, a technology similar in theory to bar code identification. RFID is a unique identification system consisting of an integrated circuit containing the information to be transmitted and an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device. In the context of this project, the integrated circuit can be contained within a bracelet or card and the antenna and transceiver in a box attached to an exhibit. One advantage of RFID over bar code technology is that RFID can pick up a signal in its proximity whereas bar codes require direct line-of-sight. 

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20 Ibid.  
22 Ibid.  
23 TechEncyclopedia.
**Take-up Rate**
The degree to which people make use of a product or service made available them. In the context of this study, the percent of people who take action to extend their museum experience after leaving the building: for example, logging onto a Web site personalized with selections made during the museum visit.

**Technology**
Electronic or digital products and/or systems. In this project, technology takes the form of hardware (for example, handheld computers, radio-frequency identification chips, audio tour wands) and software (for example, the applications that run on the hardware).

**Web**
A system of Internet servers that support specially formatted documents. The documents are formatted in a markup language called HTML (HyperText Markup Language) that supports hyperlinks to other documents, as well as graphics, audio, and video files. Not all Internet servers are part of the World Wide Web.²⁴

**Wireless (also Mobile Computing)**
Refers to technology that is not tethered by wires making it completely mobile. It communicates using radio transmission via the airwaves. Examples of wireless technology include cell phones, PDAs, and audio wands.

²⁴ Webopedia.
BACKGROUND

Museum visits are sometimes so enjoyable or significant that visitors want to take a souvenir of the experience home. Encounters with wonderful objects, challenging ideas, and stimulating activities move museum visitors to desire something tangible as a memento of their experience—or perhaps to extend the experience. Museums in the United States have an established history of providing opportunities for visitors to extend their museum experience. These opportunities have evolved from the sale of penny postcards at the turn of the twentieth century to today’s high-tech implementations combining wireless handheld electronic devices and the Internet. As the depth and variety of these experiences grow through burgeoning content and increasingly sophisticated methods of delivery, museums are investing more resources in designing ways for visitors to continue their museum experience after leaving the building.

There are several areas worth exploring to understand the opportunities and challenges presented by technology-based extended museum experiences. Opportunity exists in the areas of supporting learning, attracting new audiences, and strengthening connections between visitors and museums. Challenges are inherent in extending the museum experience beyond the museum building where the physical space and technology are beyond the control of the museum. These challenges exist
in each aspect of these complex projects, including technology, content, design, and delivery. The desirability of an extended museum experience has been demonstrated by sustained demand for the means historically offered by museums. Learning theories and concepts support the potential educational impact of extended museum experiences and relevant marketing concepts suggest their social congruence and potential to attract visitors. Finally, early implementations provide insight into the evolution of these types of projects.

**A Brief History of Extending the Museum Experience in America**

As early as 1872, just two years after the opening of two of America’s oldest art museums—the Metropolitan Museum of Art in New York City (The Met) and the Boston Museum of Fine Arts—the Met began offering etchings for sale to visitors. Although it is uncertain which institution was the first to offer merchandise for sale, it is likely that museum retail sales began with a small-scale postcard and publication stand situated near the admissions desk. Illustrated souvenir postcards first appeared in the United States in 1893 and became fantastically popular in the first decade of the 1900s, when lower postage rates were

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approved.\textsuperscript{27} It is likely museums took advantage of that popularity, making postcards among the earliest means available for visitors to extend their museum experience. In the ensuing decades, the general public gained access to exhibition catalogs and other scholarly publications that had initially been written for a limited, intellectual audience.

By the early 1940s, museum gift shops had expanded beyond postcards and exhibition catalogs to offer a variety of books, posters and other souvenir items.\textsuperscript{28} Some larger museums started offering custom reproductions of objects held in their collections.\textsuperscript{29} Even today, when museum store inventory ranges from mugs and magnets to furniture and reproductions or commissioned products selling for thousands of dollars, postcards and exhibition catalogues remain very popular. For example, during a four month long Monet exhibition at the Boston Museum of Fine Arts in 1999, the museum store sold 50,000 Monet postcards.\textsuperscript{30} In 1991, Laing Research Services performed a survey of United States museums to evaluate the correlation between attendance at special exhibitions and the

\textsuperscript{27} Lew Baer, San Francisco Bay Area Postcard Club. Email correspondence with the author. In addition to a special lower postal rate, the introduction of the divided back postcard, which allowed senders to write on the reverse side (previously reserved exclusively for the address), also contributed to their increased popularity.


\textsuperscript{29} Shannon McNamara, "Looking Forward: Looking Back," \textit{Museum Store} 33, no. 1 (Spring 2005).

sale of exhibition catalogs. Overall, 2.58 percent of special exhibition
attendees purchased an exhibition catalog. Yet, one museum, The
Renaissance Society of the University of Chicago, reported an astounding
70 percent of visitors to their Thomas Smith exhibition purchased a
catalog.  
31 The museum store for the de Young Museum in San Francisco
projects that, after its reopening in the Fall of 2005, 40 percent of its
multimillion dollar sales will come from books, posters and other paper
goods (including postcards).  
32

According to a December 1997 article in the New York Times, 20
percent of visitors to New York’s Museum of Modern Art make a
purchase in the museum store.  
33 And the 2002 Museum Store
Association’s Museum Retail Industry Report documented that,
nationwide, the average net sales per visitor in art museums was $3.42,
and among all museums, $2.11.  
34 Clearly, many visitors to museums want
to take a piece of the experience home with them. The question is
“why?”

33 Dobrzynski, "Art to Go: Museum Shops Broaden Wares, at a Profit."
35 Certainly, not all museum store purchases are mementoes chosen to extend the memory of the museum visit. Untold numbers of museum-purchased postcards are sent to friends and family and all manner of museum gift items are selected to give as presents.
In her book *On Longing: Narratives of the Miniature, the Gigantic, the Souvenir, the Collection*, Susan Stewart considers the lure of souvenirs and their ability to mediate experiences. According to Stewart, “the souvenir speaks to a context of origin through a language of longing, for it is not an object arising out of need or use value; it is an object arising out of the necessarily insatiable demands of nostalgia.”

Some visitors to cultural institutions feel this kind of yearning and seek to capture their experience with a tangible memento. In *The Museum Experience*, John Falk and Lynn Dierking observe that visitors purchase items at museum stores that connect them to the museum collection. “Souvenir purchasing can be a powerful part of the museum experience, helping the visitor recall an exhibit or program long after leaving the museum.”

What Falk and Dierking describe is the ability of the museum purchase to serve as a particular kind of *signifier*—an image or object that stands in for, in this case, the museum experience and cues a mental rehearsal of it (or parts of it) with associated affect. For example, consider the story of a museum professional who treasures the small, somewhat faded print of Gauguin’s

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Still Life with Three Puppies that rests in a frame hung prominently above her desk. The print was a gift from her grandparents following her first visit to a museum when she was just shy of six years old. Decades later, this framed image holds the power to surface all the memories of that museum visit—ranging from detailed recollections of the physical space to the feelings elicited by the paintings and sculptures she saw.39 The strength of this phenomenon is described by James Gilmore and Joseph Pine in their book The Experience Economy when they describe such items as “often among an individual’s most cherished possessions, worth far more to them than the cost of the physical artifact.”40

There is another important way museum store purchases can extend the museum visit: through their ability to support learning. When asked about the phenomenal success of the Smithsonian Institution museum stores, Ann R. Leven, former treasurer of the Smithsonian, noted,

> When a family visits the [Smithsonian] Institution, they want something tangible to take home to remind them of their experience. They buy a Smithsonian guide book [sic], for example. They carry home with them that education and hopefully read it again and again, and it is a continuing experience.41

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Leven’s recognition of the role of museum stores in supporting learning would delight members of The Museum Store Association, a professional association founded in 1955 that now claims over 1,800 member institutions worldwide. The Association’s code of ethics, revised in 2000, describes museum stores as “primarily an extension of the education aspect of the museum.”42 This focus on education is likely a response to the American Association of Museums’ *Excellence and Equity*. This 1992 policy statement—indeed, field-wide mandate—makes several recommendations. The first is that “[t]he commitment to education as central to museum’s public service must be clearly expressed in every museum’s mission and pivotal to every museum’s activities.”43

Museum stores address this educational mission in a variety of ways. In addition to selecting products with educational content (such as a children’s backstrap loom kit sold in connection with an exhibition of Central American textiles), some museum stores feature interpretive labels44 or include educational information with purchases.45 In the classic

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45 While a focus on education often serves to align a museum store with the institutional mission, that alignment may equally be a response to United States tax code, which
museum studies book *Museums in Motion*, Edward P. Alexander’s chapter on “The Museum as Interpretation” identifies the museum store as a contributor to this interpretive role. “The museum sales desk and merchandising program is more than a source of revenue. It is an extension of the museum collection outside its walls, a form of interpretation.”

In fact, according to Falk and Dierking, “the gift shop may be one of the best educational tools a museum possesses…to augment the educational agenda of the institution.”

Retail stores in science museums have a unique opportunity to support visitors’ desire to continue learning at home through experimentation. The Exploratorium, San Francisco’s museum of science, art, and human perception, published the first of three *Exploratorium Cookbooks* in 1975. The cookbook series provides instructions for duplicating museum exhibits at home, exploring such areas as hearing, speech, magnetism, and electricity. The Tech Museum of Innovation (San Jose, California) goes a step further with their IDEA (Innovation, Design, Exploration Activities) kits, which, when funding is available, are

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given away free. According to Laura Anderson, museum programs developer, the kits include items such as “paper clips, craft sticks, PVC pipe, and of course the instructions for families to do fun science and design activities at home.”49 According to Anderson, kits empower parents and children to engage in shared learning activities at home that build upon their museum experience. During the summer of 2004, approximately 700 kits offering “Circus Acts” or “5 Senses” experiences were distributed at the museum. Future plans include offering a greater variety of kits including a greatest hits version and kits with instructions in Spanish.50

Opportunities to extend the museum experience come in many forms—and at many prices. Ranging from fifty-cent postcards to sophisticated technology projects, museums continue to experiment with ways to extend the museum experience. Two of the rationales supporting these efforts are improved visitor experiences resulting in a strengthened relationship with the museum and increased learning.

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**Business Concepts Applicable to Extended Visits**

There are several contemporary business trends that strengthen the case for the extended museum experience. Far from compromising the mission of the museum, thoughtful and appropriate application of successful business strategies can contribute to the ability of the museum to meet its goals. Among the business practices worth considering in the context of the extended museum visit are customization and personalization, as well as relationship and viral marketing. In addition, the overall trend of engaging individuals through creating “experiences” rather than simply offering goods or services can be exploited to great advantage by museums.

A customized product or customized experience is one the users can make or modify to their own personal specifications. In their book *The Experience Economy*, B. Joseph Pine II and James H. Gilmore liken customization to providing customers with a set of Lego building blocks and allowing them to make whatever they want out of the pieces.51 Burger King’s “Have It Your Way”® campaign is an excellent example of offering patrons the opportunity to customize. Burger King’s customers are invited to order their food exactly the way they want it—for example, a sandwich with extra cheese, no onions, and only a little bit of

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51 Pine and Gilmore, *The Experience Economy*, 73.
mayonnaise. For some consumers, customizing is a mundane activity. The level of customization available at places like Starbucks Coffee Company is so ingrained in popular culture that it has become fodder for stand-up comics and bits on television and in film. One memorable example comes from the movie *L.A. Story* that features the following dialogue:

Guy with neck-support: I'll have a decaf coffee.
Trudi: I'll have a decaf espresso.
Movie critic: I'll have a double decaf cappuccino.
Policeman: Give me decaffeinated coffee ice cream.
Harris: I'll have a half double decaffeinated half-caf, with a twist of lemon.
Trudi: I'll have a twist of lemon.
Guy with neck-support: I'll have a twist of lemon.
Movie critic: I'll have a twist of lemon.
Cynthia: I'll have a twist of lemon. \(^52\)

The Web is well suited to customization. MyYahoo! is a typical illustration of how customization can be offered online. Yahoo! (www.yahoo.com) is a portal or entrance point to the vast amount of content on the World Wide Web. MyYahoo! allows users to create their own unique home page. By selecting the content, which they need and are interested in (for example, news, sports, stock reports, weather), modifying the page layout, and even changing the colors, users can customize their entrance to the Web. The advantage of customization is that the user knows what to expect and can avoid having to wade through information that is not of interest.

A related, and equally current, business trend is personalization. Personalization takes customization a step further by using technology to individualize content or make recommendations for the user. Personalization technologies gather and analyze user preferences and habits to make individualized recommendations. One company that relies heavily on personalizing the customer experience is Amazon.com. Amazon.com is an online store that sells everything from books to antifreeze and pet supplies to loose diamonds. Their vision is “to be earth's most customer centric company; to build a place where people can come to find and discover anything they might want to buy online.” To help shoppers find what they might want to buy online (and perhaps some things they didn’t know they want to buy online), Amazon encourages new customers to tell “us your interests, we’ll remember them and personalize the site just for you.” Amazon then relies on a recommender algorithm to turn browsing and purchasing history into recommendations for additional purchases. The personalization appears with the first set of search results. For example, after creating a new account and performing

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53 TechEncyclopedia.  
only three searches—for John Kennedy Toole’s *A Confederacy of Dunces*, the Dixie Chicks *Fly* CD, and Brita water filters—I was supplied with about fifteen suggestions including Dave Eggers *A Heartbreaking Work of Staggering Genius*, a number of Alison Krauss CDs, and a four-pack of deodorant soap.

Personalization technologies, like the recommender algorithm, help people manage the plethora of information available to them. User-based and item-based collaborative filtering are the two most commonly used strategies for creating personalized recommendations and they may be used singularly or in tandem. User-based collaborative filtering compares a target user’s choices with those of other users to identify similar-minded people. Once this group has been identified, the content chosen or highly rated by the group can be recommended to the target user. For example, in the Amazon.com scenario described above, the algorithm identified that people who order music by the Dixie Chicks also tend to order music by Alison Kraus—and thus the recommendation. Item-based collaborative filtering uses characteristics of the items on the target user’s list to find other content or items that are similar. For example, the Dixie Chicks are female, play bluegrass/country music, and

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are Grammy winners. The same can be said for Alison Kraus – and thus the recommendation. Personalization technologies can help users navigate through the complexity and disorder of the online world.

Two marketing concepts that bear particular relevance to the topic of extended museum experiences are relationship marketing and viral marketing. Relationship marketing is designed to sell or distribute a product or service by establishing a lasting association with customers or visitors. Therefore, relationship marketing focuses on a long-term (extended?) horizon as opposed to a single transaction or interaction. One example of a marketing strategy designed to retain customers is the airline industry’s ubiquitous frequent flyer programs. Such programs award credits each time a customer flies on the participating airline. Accumulated credits may be redeemed for rewards such as free flights, travel upgrades, hotel accommodations, and rental cars. Such programs are designed to create an on-going relationship with the travelers, so they will focus their business with that airline in order to earn awards. One critical aspect of relationship marketing, according to John Petrof, former marketing department head at Quebec’s L’Université Laval is customer satisfaction. It is so important that it must become the responsibility of everyone in the organization; “hence the concept becomes instrumental in
coordinating the activities of all departments."58 Southwest Airlines is renowned for its upbeat customer service. In fact, its mission is to provide “the highest quality of Customer Service delivered with a sense of warmth, friendliness, individual pride, and Company Spirit.”59 Nowhere in this mission are airplanes or transportation mentioned. Southwest Airlines employees use such strategies as remembering the names of frequent flyers and using humor to make passengers feel welcome - and to create a relationship.

Viral marketing, despite its connotation of contagion, is a healthy strategy for increasing visitorship. Viral marketing is any strategy that encourages people on the Internet to relay a marketing message to others, creating the potential for exponential growth in the message’s exposure and influence.60 In essence, viral marketing is word-of-mouth with the speed and reach of the Internet. The first major success in viral marketing was the launch of Hotmail.com – one of the first free Web-based email services. Hotmail gave away free email addresses and services. At the bottom of every free message sent was an invitation for the recipient to

sign up for Hotmail. People emailed their friends and associates, many of whom saw the message and signed up for the free email. In turn, they sent the Hotmail invitation out to an ever-widening circle of friends and associates. Thus, with a very small marketing investment, Hotmail created a wave of recognition and rapidly became one of the most popular email providers. Another commonly used viral marketing strategy is to invite visitors to recommend a Web site to others by simply entering an email address and a personal message. Viral marketing, like relationship marketing, may be a natural fit with technology-based extended museum experiences. So too, customization and personalization may be adapted from the for-profit world to enhance the in-museum and post-museum visit experience.

In their book *The Experience Economy*, authors Joseph Pine and James Gilmore identify Las Vegas as “The experience capitol of America.”61 This may explain why, for some, the word “experience” connotes a scripted and staged extravaganza of sound, light, and interactivity and why there are museum professionals who resist the idea of museum experiences altogether. Certainly, even though some museums have offered theme-park-like experiences such as Star Wars: The Magic of Myth, or Jelly Belly Presents: Candy Unwrapped, even a hint of museum

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experience comprising vacuous sensory overload is anathema to those who believe education is the raison d'etre for museums and that education and entertainment are incompatible. Barbara Kirshenblatt-Gimblett, professor of performance studies at New York University, suggests the growing trend toward offering experiences has created identity crises for many museums: whether to reject the creation of experiences and risk being “bypassed as boring, dusty places, places of death—dead animals, dead plants, defunct things” or to negotiate the competing expectations of their diverse audiences and find ways to engage those who are not drawn to solitary encounters with artifacts in the hushed halls of the museum.62

There are those who wonder whether a shift to providing experiences will erode the very essence of the museum. Philosopher Hilde Hein cautions that museums moving from object-centered exhibitions to story-centered experiences may deviate from their educational and aesthetic roles.63

Pine and Gilmore define an educational experience as one that combines active participation and absorption to engage visitors in an inherently personal and memorable way.64 They identify engagement as the key to creating successful experiences—not necessarily entertainment.

64 Pine and Gilmore, The Experience Economy, 30.
One wonders then, if museums can identify a middle ground—somewhere between tomb and spectacle—that will allow them to both respect their missions and pay heed to the desires and expectations of their diverse audience.

**Learning Theories Supporting Prolonged Museum Experiences**

A number of learning theories support the underlying educational intentions of the extended museum experience. Several of these, including experiential learning, reflection, and constructivist learning were influenced by the work of philosopher John Dewey. Additional theories, including John Falk and Lynn Dierking’s work on free-choice learning and the Contextual Model of Learning, also underlie the educational possibilities of the extended museum experience.

American educator and philosopher John Dewey contributed a great deal to the development of educational thinking in the twentieth century. Central to Dewey’s philosophy of education are concepts significant to the extended museum experience as an opportunity for informal learning. Of primary interest here is his focus on inquiry and reflection.

In his 1938 book *Experience and Education*, Dewey grounded his educational philosophy in the premise that all learning is experience-based
and postulated the importance of inquiry in this process. Many years later, Dewey’s ideas influenced the founding of such museums as the Exploratorium in San Francisco. Thus, it is no surprise that The Institute for Inquiry at the Exploratorium, describes inquiry-based learning in “Deweyesque” terms as “an approach to learning that involves a process of exploring the natural or material world, that leads to asking questions and making discoveries in the search for new understandings.” Museum consultant Ted Ansbacher clearly presents the connection between inquiry-based learning and the extended museum experience in his examination of Dewey’s ideas for the journal Curator. Ansbacher suggests that, while encounters with museum exhibits may initiate inquiry, supplementary programs and materials are necessary for the continuation of the learning process through a cycle of inquiry.

A related concept, reflection, played a role in Dewey’s earlier writings on thought. He described two interconnected qualities of reflection. The first quality is the state of being perplexed and doubting the evidence at hand; the second is the desire to find information or solutions

to dispel that confusion. In *How We Think*, Dewey described this second quality of reflection as a phase in which the learner pursues “…one suggestion after another as a leading idea, or hypothesis, to initiate and guide observation and other operations in collection of factual material.”

By making available a variety of information and activities, the extended museum experience has great potential for facilitating this phase of reflection.

Reflection also plays an important role in the experiential learning theory of David Kolb. Building on Dewey’s early concept of experience-based learning, Kolb, an organizational behaviorist, developed a model of learning comprising four elements: experience, critical reflection, conceptualization, and experimentation. In the first phase of the model, the learner encounters new information or experiences a new task or activity. In Kolb’s model, experience is followed by reflection, the process of stepping back from the concrete experience and reviewing what happened. This involves noticing similarities and differences and is highly dependent on the learner’s vocabulary to be able to describe and verbalize the experience. The third phase, conceptualization, occurs when the learner forms abstract concepts by interpreting events and understanding

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relationships between them. Finally, in the experimentation phase, the learner is able to take this new understanding and apply it to predicting future outcomes or to influence or change situations.\textsuperscript{70} The concept of the extended museum experience supports this continuous cycle of learning and can foster life-long learning. The actual experience may take place during the museum visit and can be followed by reflection, abstract conceptualization, and experimentation encouraged through the extended experience.

Furthering Kolb’s experiential learning theory, educator and learning theorist Bernice McCarthy developed the 4MAT System that recognizes the unique learning styles of individuals. Using a quadrant analysis of learners’ preferences ranging from observation to experimentation on one continuum and their preference for the concrete or abstract on the intersecting continuum, McCarthy defined four learning styles. Type One learners (called divergers) are innovative, and the question that guides their learning is “why?” Type Two learners (assimilators) tend to be analytic and pursue the answer to the question “what?” Type Three learners (convergers) are governed by common sense and want to know “how” things work. Finally, Type Four learners (accommodators) are dynamic and active processors of new information.

and continually ask the question “what if?” as they strive to make connections between their world and what they are learning. Two of these types of learners are particularly suited to benefit from the extended museum experience. Analytic learners (Type Two - assimilators) like to learn the facts, enjoy independent research, and want to know what experts have to say. Dynamic learners (Type Four - accommodators) enjoy self-directed discovery and independent study. Because of the volume and variety of information available in an Internet-based extended experience and the inherently self-directed experience it provides, the extended experience may be effective and fulfilling for these types of learners.

Another influential learning theorist was cognitive scientist and developmental psychologist Jean Piaget who focused much of his research on understanding the process of acquiring knowledge. According to Piaget, “the growth of knowledge is a progressive construction of logically embedded structures superseding one another by a process of inclusion of lower less powerful logical means into higher and more powerful ones up to adulthood.” The work of both Piaget and Dewey influenced George E. Hein, a leading authority on museum education, who seized upon these

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constructivist theories of knowledge development and sought to explore and expand the theory in relation to learning in museums. In his seminal work *Learning in the Museum*, Hein articulated the constructivist theory:

“[The constructivist theory] emphasizes the active participation of the mind in learning, and recognizes that the process of learning is not a simple addition of items into some sort of mental data bank but a transformation of schemas in which the learner plays an active role and which involves making sense of a range of phenomena presented to the mind.”

In a speech delivered at the 1991 International Committee of Museum Educators Conference, Hein contrasted constructivism with the dominant western perspective on learning that existed from the period of the Enlightenment to the early twentieth century. The focus of the earlier approach was on the creation of disciplines and taxonomic schemes whose content was delivered to all learners in the same way. This earlier mode of education centered on the content and viewed the learner as an empty container into which knowledge could be delivered. This approach is in stark contrast to the constructivist theory, which centers on providing each learner with the means to construct their own knowledge.

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According to constructivist theory, success is dependent on educators understanding that learners already have a vast wealth of knowledge when they arrive at a museum and that, in order for learning to take place, links must be created between the new information and the pre-existing knowledge.\textsuperscript{75} The creation of these links takes time. According to Hein,

for significant learning we need to revisit ideas, ponder them, try them out, play with them and use them. This cannot happen in the 5-10 minutes usually spent in a gallery (and certainly not in the few seconds usually spent contemplating a single museum object). If you reflect on anything you have learned, you soon realize it is the product of repeated exposure and thought.\textsuperscript{76}

By providing visitors with the opportunity to revisit—or extend—a museum experience, museums can offer the repeated exposure and opportunities for reflection necessary for the formation of links between new knowledge and old—and encourage the learning that can result.

Psychologist and educator Mihály Csikszentmihályi has explored another perspective of the type of visitor who may benefit from an extended museum experience—the intrinsically motivated learner.

Csikszentmihályi considers two types of motivation for learning, extrinsic and intrinsic. Extrinsic motivators include positive external factors—like


\textsuperscript{76} Hein, "The Museum and the Needs of People."
praise and good grades—as well as negative factors—like avoiding punishment. In “Intrinsic Motivation in Museums: What Makes Visitors Want to Learn?” Csikszentmihályi described extrinsically motivated learning as “a means to some other end.” In contrast, intrinsic motivation induces people to do something for the joy, excitement or personal interest of performing the activity—even without the incentive of external rewards. The great majority of leisure-time visitors to museums are by definition, intrinsically motivated since there are no rewards or punishments influencing their decision to attend.

Intrinsically motivated learning is highly effective learning. Therefore, since it has already been established that a primary goal of museums is for people to learn, the challenge is for museums to create experiences that are intrinsically rewarding for visitors. Csikszentmihályi described the “Flow Experience” as one in which people are willing to invest energy—in the absence of extrinsic rewards—because of the quality of the experience. These experiences are accompanied by “a state of mind

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78 Ibid.
79 An exception to this intrinsically motivated leisure-time visitor is one who attends at the behest of a family member or friend. In this situation the extrinsic motivation likely emanates from a desire to maintain the relationship.
80 John H. Falk and Lynn D. Dierking, *Learning from Museums* (Walnut Creek, California: Alta Mira Press, 2000), 16.
81 For more information on the characteristics of activities that produce flow, see Csikszentmihályi and Hermanson, "Intrinsic Motivation in Museums: What Makes Visitors Want to Learn?" 35.
that is spontaneous, almost automatic, like the flow of a strong current.”

Characteristics of activities conducive to engendering a flow experience include the existence of clear goals and rules, the availability of immediate and unambiguous feedback, and activities that are in line with the person’s abilities. The kinds of activities identified as favorable to flow include playing video games, rock climbing, dancing, and performing jazz.

Csikszentmihályi suggests that, “[i]f a museum visit can produce this experience, it is likely that the initial curiosity and interest will grow into a more extensive learning interaction.” One way of fostering an extensive learning interaction may be through a technology-based extended museum experience.

John Falk and Lynn Dierking, founders and directors of the Institute for Learning Innovation, have coined the term “free-choice learning” to describe the type of learning “people do when they get to control what to learn, when to learn, where to learn, and with whom to learn.” They identify museums as an important source of opportunities for free-choice learning along with other vehicles of learning experiences such as broadcast media, books, and periodicals. As described by Falk and Dierking,

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82 Ibid.
83 Ibid.: 36.
museums are learning settings in which visitors have the opportunity to exercise considerable choice over what they will learn, or, framed in another way, visitors have the opportunity to control their own learning.\textsuperscript{85}

Interestingly, several of the characteristics of free-choice learning link directly back to earlier learning theories and models. The first echoes are those of the intrinsic motivation and flow experience theories of Mihály Csikszentmihályi. According to Falk and Dierking, free-choice learning is most often “motivated not so much for the purpose of learning facts and concepts, but out of a desire for personal self-satisfaction and relaxation, a strong indication that it is intrinsically motivated.”\textsuperscript{86} In their book \textit{Lessons Without Limit: How Free-Choice Learning is Transforming Education}, Falk and Dierking claimed that intrinsically motivated learning has been proven highly effective and, therefore, because free-choice learning is intrinsically motivated, it too is highly effective.\textsuperscript{87}

Csikszentmihályi’s concept of the flow experience is also revisited in free-choice learning. Because of the level of individual preference inherent in free-choice learning experiences, they are more likely to result in a flow experience. For example, engaging in activities that are in line

\textsuperscript{85} Falk and Dierking, \textit{Learning from Museums}, 84.
\textsuperscript{86} Falk and Dierking, \textit{Lessons without Limits: How Free-Choice Learning Is Transforming Education}, 16.
\textsuperscript{87} Ibid.
with the learner’s abilities—one of the fundamental characteristics of the flow experience—is a hallmark of free-choice learning. Falk and Dierking also developed a learning model based on factors that influence free-choice learning. Their Contextual Model of Learning posits that learning happens in three overlapping contexts—the personal, the sociocultural, and the physical. They then overlaid the dimension of time to arrive at the Contextual Model of Learning. 88

The personal context includes motivation, interest, the assimilation of new information into an existing body of knowledge and experience and the expression of learning in response to external cues. 89 Interest is the component of personal context that serves as a filter that allows people to sort through the huge volume of information to which they are constantly exposed. According to Falk and Dierking, “[t]he human brain is designed to sift through this abundance of information to selectively determine what to attend to and what to ignore.” 90

Integral to the personal segment of this theory is the role that environmental cues play in forging the connection between new information and old. According to the constructivist theory that connection is the only way learning can occur. This idea is illustrated by the story of a

89 Ibid., 16.
90 Ibid., 22.
woman who, while delayed at a drawbridge, realized she understood the physics and mechanics involved in making the bridge operate. A full year before this experience she had visited an exhibition on bridges at the Cleveland Children’s Museum. She had no idea that she had understood the concepts presented in that exhibition until the knowledge was called up by the real world situation of watching that drawbridge over the Cuyahoga River.\textsuperscript{91} Falk and Dierking cap off a summary of the personal context by highlighting the importance of such cues:

\begin{quote}
Not only does learning require prior knowledge, appropriate motivation, and a combination of emotional, physical, and mental action; it also requires an appropriate context within which to express itself. In the absence of contextual cues from the outside world, the patterns and associations stored within each person’s head would remain dormant or meaningless.\textsuperscript{92}
\end{quote}

The extended museum experience has the potential to become part of an ongoing cycle of inquiry. Environmental prompts may trigger a desire to confirm prior learning or to search for answers to new questions, either of which may lead to more questions, more seeking, and more learning.

The second part of the Contextual Learning Model is sociocultural context. This layer of the model is based on the principle that humans are inherently social beings and therefore how, why, and what people learn is

\textsuperscript{91} Ibid., 16.  
\textsuperscript{92} Ibid., 33.
influenced by cultural and social constructs. First among these factors is that learning often occurs in groups, for example, families, school groups, or groups of friends. Learning in groups can be aided by the experiences and knowledge held in common and such groups are conducive to collaborative learning. When learning is mediated by people outside of the learner’s social group, for example by teachers or others perceived to be knowledgeable, it has the potential to be highly effective. Additionally, cultural constructs influence learning. For example, cultural perspectives on the value of learning, and familiarity and comfort with institutions of learning—such as museums—all influence free-choice learning.\textsuperscript{93}

Social interaction is an important feature of museum visits and therefore the impact of handheld technologies on the social aspects of museum visits has been a topic of debate in recent years. The amount of social interaction in exhibitions is reduced by audio tours utilizing headphones or wands and by personal digital assistants (PDAs).\textsuperscript{94} In the article “Art & Gadgetry” written for Museum News, Marjorie Schwarzer suggested, “[h]and-helds reinforce the societal trend toward isolated,

\textsuperscript{94} Beverly Serrell, \textit{Exhibit Labels: An Interpretive Approach} (Walnut Creek, CA: AltaMira Press, 1996), 178.
individualized experiences.⁹⁵ Additionally, although there is an increase in Internet activities that foster social interaction, the majority are still solitary pursuits. In *The Museum Experience*, Falk and Dierking demonstrate that learning is more successful when visitors communicate amongst themselves.⁹⁶ Therefore, this potential weakness in the sociocultural context may result in a less effective learning experience. Because the extended experience, as defined in this project, uses technology both during the museum visit and after, the question of social isolation is an important consideration.

Finally, the third aspect of the Contextual Model of Learning is physical context. According to Falk and Dierking, “the ability to later make sense of an experience—in fact, the ability to learn—is strongly dependent upon individuals’ ability to frame prior experiences within the context of their physical setting.”⁹⁷ A number of studies have shown that, even after many years, the most powerful recollections of museum visits tend to be of what was done, what was seen, and what was felt.⁹⁸ The power of the physical context was conveyed earlier in the story of the woman for whom a glimpse of Gauguin’s *Still Life with Three Puppies*...
still conjures up memories of the physical space and feelings experienced
during a museum visit decades ago. According to Falk and Dierking

when the external world is thoughtfully constructed,
the physical context can be manipulated to produce
wonderful outcomes, including learning. This is
what a well-designed museum is: a well-thought-out
physical context designed to facilitate learning.99

The Museum Experience: On-Site vs. Virtual

Many theorists believe that the essence of a museum experience is
in “being a place that stores memories and presents and organizes
meaning in some sensory form.”100 One is museum consultant Elaine
Heumann Gurian in her contribution to the Daedalus 1999 issue,
America’s Museums. Gurian avers that in offering physical, real-time
interactions with objects, a museum building is fundamental to a
museum’s mission. In the same issue, Susanna Sirefman, who teaches and
writes about architecture and design, underscores the importance of the
museum edifice as

the very notion of a museum embodies physicality.
The word itself implies a built structure, where the
activities on offer revolve around human motion
through articulated space. The experiential narrative

99 Ibid., 65.
100 Elaine Heumann Gurian, ”What Is the Object of This Exercise? A Meandering
Exploration of the Many Meanings of Objects in Museums,” Daedalus: Journal of the
American Academy of Arts and Sciences 128, no. 3 (1999): 165.
that a museum embodies is inseparable from its physical condition—its architecture.\textsuperscript{101}

Because of the significance of the physical surroundings of the museum, it is important to consider the implications of extending the museum experience outside the physical environment of the museum.

According to Rob Semper, Executive Associate Director of the Exploratorium, edifices like the Museum of Modern Art and the American Museum of Natural History are an important part of the museum experience.\textsuperscript{102} In another example, architect James Ingo Freed designed the United States Holocaust Memorial Museum building to invoke the subject at hand through “subtle metaphors and symbolic reminiscences of history [that] are vehicles for thought and introspection.”\textsuperscript{103} Falk and Dierking contend that the museum building contributes to the “ambience, smell, sounds, and the ‘feel’ of the place.”\textsuperscript{104} Some museums, as in the case of historical homes and ships, literally embody the story they exist to tell. Others, like Frank Lloyd Wright’s Guggenheim Museum or Frank Gehry’s Guggenheim-Bilbao, are works of art in and of themselves.

\textsuperscript{104} Falk and Dierking, \textit{The Museum Experience}, 147.
Museum buildings are not merely catalysts for the museum experience, but rather play an active—and some would say essential—role.

Undoubtedly of greater importance than the building itself is the experience that waits within. Housed within most museum structures are its collections. Historically museums existed for the care, study, and display of collections of art, artifacts, and living specimens. Gurian describes objects as “the pivot around which we [museums] justified our other activities.” In an essay that tackles the complexities of the role of objects in the contemporary museum, Gurian harkens back to her early days working in museums when the definition of objects was easy. They were the real stuff. Words were used like “unique,” “authentic,” “original,” “genuine,” “actual.” The things that were collected had significance and were within the natural, cultural, or aesthetic history of the known world.

Most museum visitors value the experience of being in the presence of authentic objects. Whether standing next to the skeleton of a Tyrannosaurus rex, touching a moon rock, examining Abraham Lincoln’s stovepipe hat or an original Georgia O’Keeffe painting, few would deny the special nature of a direct experience with the bona fide article.

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105 Gurian, "What Is the Object of This Exercise? A Meandering Exploration of the Many Meanings of Objects in Museums," 166.
106 Ibid.
In *Civilizing Rituals*, Carol Duncan suggests this assemblage of objects and place in art museums may “enable individuals to achieve liminal experience—to move beyond the psychic constraints of mundane existence, step out of time, and attain new, larger perspectives.”\(^{107}\) She describes the visitor experience in art museums as almost theatrical in nature with the organization of the objects in galleries featuring special lighting as akin to a stage set with the visitor moving through the spaces as if following a script. Further, Duncan suggests that having completed this experience, “museum visitors come away with a sense of enlightenment, or a feeling of having been spiritually nourished or restored.”\(^{108}\)

The restorative nature of a museum experience is one of the benefits sought by museumgoers. Falk and Dierking have learned that the reasons people visit museums generally fall into three categories: social-recreational, educational, and reverential—any of which may lead to a restorative encounter. Studies show the predominant rationales for visiting a museum are social or recreational.\(^{109}\) University of Michigan researchers have found empirical evidence to support the claim that museums can offer such an experience. The group, headed by Stephen Kaplan, suggested that


\(^{108}\) Ibid., 13.

in addition to its educational function, the museum may play a restorative role. It may create a sense of peace and calm that permits people to recover their cognitive and emotional effectiveness.\footnote{110} Kaplan’s group identified four properties characterizing an environment that may be restorative in nature. The first property is that of “being away” in an environment that is different from the norm. This includes an abeyance of the issues of everyday living. The second property is “extent”. The restorative experience must extend over a period of time and space. “Fascination,” the state of being engaging and interesting, is the third attribute necessary for a restorative experience. Finally, “compatibility” requires that the purposes and expectations of the individual be aligned with the available experience. The researchers found that museum experiences were inherently strong in the first two properties but that the third and fourth properties were far more problematic because of their dependence on the unique experience of the individual visitor.\footnote{111} Nevertheless, it is clear that, for many people, a visit to a museum may produce a liminal, restorative, or even ameliorative experience.

At other times though, that quality or power of experience may be elusive or unattainable. Museum experiences can be hampered by bustling groups of school children, the madding crowds at a special exhibition, or

\footnote{111} Ibid., 16.
even by tired feet. Additionally, novice visitors who are uncomfortable with the protocol of museum visits or for whom finding their way around a museum building is difficult are not likely to reach a state of liminality or conclude their museum experience feeling restored.112 Not only is a museum experience not always restorative, occasionally it is quite the opposite. For example, often visitors experience “museum fatigue” a term used to describe the exhaustion that can overcome a visitor after hours spent in a museum.113 As much as they might wish to continue their visit, people experiencing museum fatigue become desensitized and simply cannot absorb any more input.

Museum fatigue caused by prolonged mental effort is unlikely to befall the average museum visitor. According to Kathleen McLean, former Director of the Center for Public Exhibition and Public Programs at San Francisco's Exploratorium, the average museum visit lasts only one-and-a-half to two-and-a-half hours and visitors usually spend less than twenty minutes in an exhibition.114 George Hein goes so far as to claim that visitors spend as little as a few seconds and rarely as much as one minute

112 Ibid.
113 The term “museum fatigue” was likely coined by B.I. Gilman, secretary of the Museum of Fine Arts, Boston in the early part of the 20th century.
at individual exhibits and that their attention to exhibits declines sharply after about thirty minutes.\textsuperscript{115}

In addition to museum fatigue, museum visitors may encounter other situations that result in a diminished or incomplete museum experience. Limitless in variety, these range from a parent whose child needs to be taken home for a nap to an out-of-town enthusiast who arrives just thirty minutes before closing. Although the level of engagement for each of these visitors is disparate, they have something important in common: they have not availed themselves of everything the museum experience has to offer.

Although each one is unique, museum experiences are generally a synthesis of the physical location in which they take place, the kind of environment that space provides, the nature of the objects and activities offered, and how they are presented. The extended museum experience can take place in any number of physical environments, its objects are of a very different nature, and they are experienced in an inherently different way.

As they are most frequently implemented, technology-based extended museum experiences rely on the Internet for access to museum sites on the World Wide Web (the Web). Visitors extend their museum

\textsuperscript{115} Hein, \textit{Learning in the Museum}, 138.
experience by using their computer to log onto the museum Web site. One place this connection can be made is at home. Never mind that some museum professionals have described the typical home computer environment as “ugly,” “cramped,” and “not conducive to wonder,”¹¹⁶ in fact, it may also not be conducive to learning. According to Falk and Dierking,

> learning depends upon our ability to experience the world, but more importantly, learning is enhanced when the quality of the environment is maximized. In other words, the more appropriate the physical setting to what is being learned, the more meaningful the learning that results.¹¹⁷

For instance, for those who do not have the opportunity to spend time in an historic neighborhood in China, it would be more effective to learn about life there during the early 1900s while standing in an authentic Qing dynasty merchant’s home transported to the Peabody Essex Museum than while sitting at a computer surrounded by the comforts of an internet-connected twenty-first century home. Nevertheless, while it is doubtful that many home computers enjoy a location capable of influencing the museum experience like the buildings described earlier, the prospect of being comfortable and relaxed, as one might in one’s own home, can


contribute greatly to an enjoyable and satisfying experience. But this, of course, is out of the museum’s control.

Still, the Internet seems to be an ideal medium for the extended museum experience, this lack of museum control notwithstanding. According to Falk and Dierking, the “Internet has been viewed by many as the answer to opening up access, since individuals can log on any time of day and night, from virtually anywhere on the globe. And unlike airwaves or the real world, virtual space is functionally limitless.”118 Thus, one of the advantages of the extended museum experience is that it may be enjoyed anytime and from anywhere that a computer with a free Internet browser is connected to the Internet. According to statistics from Nielsen//NetRating, 74.9 percent of people in the United States have access to the Internet.

Access, though, is not spread evenly across all sectors of society. The term “digital divide” characterizes the demographic disparity in the effective use of the Internet. Using U.S. Government statistics from the 2000 Census, the National Science Foundation reports that, while overall access and proficiency are increasing in all segments of the population, people with higher incomes and higher education are more likely to have access to the Internet. Additionally, whites and Asians have a much higher

118 Ibid., 136.
level of access than blacks, Hispanics, and Pacific Islanders. Another factor important in the quality of the Internet experience is the speed of the connection. Half of all Internet users in the United States connect to the Internet using dial-up (narrowband) modems of 56Kbps or less.\textsuperscript{119} Sometimes referred to as the “worldwide wait,” dial-up connections are at least ten times slower than DSL or cable connections (broadband) and are prone to dropping connections resulting in a frustrating experience for the user. This, in addition to the variety of physical environments in which it might take place, is another example of the kinds of variables that can have a considerable effect on the extended experience but that are not under the control of the museum.

Connectivity challenges notwithstanding, the Internet can serve as a pathway back into the museum. The vast majority of museums, whether they focus on art, history, or science, have collections of authentic artifacts or objects. For the extended museum experience, these objects are recreated digitally and experienced virtually. Yet the question arises: can virtual objects substitute for the sensory experience that writers like Elaine Gurian deem so central to a museum’s essence? In his 1935 essay “The Work of Art in the Age of Mechanical Reproduction,” German cultural theorist Walter Benjamin argued that art (and by extension other objects)

lose their authenticity when they are reproduced. Further, he argued that with every stage of reproduction, an original work of art loses some of its original “aura” which he defines as that which can be conveyed by a work of art. As the artwork is reproduced, it loses its uniqueness and, as a result, its genuine aura diminishes. Important to Benjamin, as a Marxist, is his assertion that in losing its uniqueness, reproduced art gains alternative resonances that make it more accessible to the broader population. Benjamin viewed this democratization of art as positive and I believe he would likely have seen even greater advantage in this age of digital reproduction and electronic distribution. Benjamin’s position is in fact antithetical to the prevailing attitude among many museum professionals, such as Gurian, who place great value on the uniqueness and authenticity of the objects in their care.

Ensconced within a museum, the authenticity of the object’s context also changes. Museum curators and exhibit designers go to great lengths to select and group objects and arrange collections in ways that convey particular definitions, meanings, and stories to the viewer. Once the museum visitor has left the building and reengages with the museum virtually, the grouping and arrangement of objects—perhaps in the form of images, sound, or pieces of information—is largely out of the control of

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the museum. Visitors become the curators and designers of their extended museum experience freeing them to make choices that may influence the meaning of individual objects in the museum’s collection.\textsuperscript{121}

Still, while aura, authenticity, and even the meaning of objects may be at risk in the virtual world, there are advantages to encountering art and artifacts there. For example, close up images can allow viewers to see a level of detail imperceptible in a museum setting. Expanding on that idea, technologies such as i-Map\textsuperscript{122} can make art accessible to the visually impaired. Technology can also be used to virtually remove layers of dirt and varnish reverting a fragile centuries old oil painting to a state closer to the original. It can also virtually return objects to their original context.\textsuperscript{123} For instance, a visitor could view a Mayan stele in the virtually created context of Copán instead of in the confines of a museum gallery. Three-dimensional recreations of objects and space using graphic, sound, and

\textsuperscript{121} These ideas are grounded in the work of German philosopher Martin Heidegger and Harvard University professor Philip Fisher. In his seminal work \textit{Being and Time}, Heidegger advanced the thesis that the world is not made up of discrete entities but rather of conditions and context. \textit{History of Philosophy}, Martyn Oliver (New York: MetroBooks, 1997), 126-7. Fisher is noted for using the example of a sword to illustrate his point that “each object becomes what it is only as part of a community of objects in which it exists.” "Art and the Future's Past," in \textit{Making and Effacing Art: Modern American Art in a Culture of Museums} (Oxford: Oxford University Press, 1991), 4.

\textsuperscript{122} i-Map incorporates text, image enhancement and deconstruction, animation and raised images to facilitate the examination of small areas of a painting in detail enabling all viewers, but especially those with low vision, to better understand the whole picture. It is currently in use on the Web site of the Tate Modern: http://www.tate.org.uk/imap/index.htm

motion software like Apple Computer’s QuickTime can allow visitors to virtually handle artifacts, zoom in on details, and even roam around contextual settings. According to Brad Johnson of Second Story Interactive Studios, as museums continue to increase the size of their online collections, broader and more in depth access is also practicable. He observed that when objects are liberated from the hidden recesses of storage, archives and unvisited gallery walls; audiences are empowered to make new discoveries and connections, and our collective cultural heritage is enriched.

This demolition of the spatial and temporal boundaries of the museum may be seen as the technological realization of André Malraux’s museum without walls. In his 1965 book *Musée Imaginaire*, Malraux proposed the liberation of artworks from the museum’s stuffy, reverential, white-walled galleries and identified reproductions as the tools of emancipation. He wrote:

> A museum without walls has been opened to us, and it will carry infinitely farther that limited revelation of the world of art which the real museums offer us within their walls: in answer to their appeal, the plastic arts have produced their printing press.\(^{124}\)

Ameliorating the twentieth century museum without walls engendered with ink on paper, the twenty-first century has produced digital imaging of

extraordinary depth and clarity and made it available electronically through the Internet. Great quantities of high quality museum images from all corners of the world wait patiently in the ether to materialize in an admirer’s museum without walls.

A concomitant benefit of increased electronic access to collections is a diminution of the museum as sole interpreter of objects and content. In “Museums as Centers of Controversy,” Willard L. Boyd notes that the selection of which objects to display and what information to make available are strong filters governed by the expert voice of the museum.¹²⁵ According to Second Story’s Brad Johnson, with access to on-line collections individuals can forge new, personalized paths through the site, finding new connections and meaning in the objects to reflect their own interests, experiences and curiosities.¹²⁶ Indeed, on-line collections allow virtual visitors to amass their own collections and create their own taxonomies. Some even allow the visitor/curator to add their own interpretation and share their revision of the museum with others.

Another attribute of the extended experience is the volume and variety of information that can be made available and the manner in which visitors access it. The Web-based extended experience can provide almost limitless information that can prompt and sustain a cycle of inquiry. Equally important is the way information is accessed on the Web. Maxwell L. Anderson, former director of the Whitney Museum of American Art, suggests that hyperlinking “engages the infinite spectrum of fact and imagination” and is “as unfettered as the human imagination, whereas books are convenient precisely because they confine speculation and information into prescribed routes—unlike conversation, which is the most natural way to learn.”

As mediators of free-choice learning, Web sites can be organized in ways that meet the needs of many types of learners. In writing about the capability of technology in a museum setting, museum educator Ruth Perlin wrote that they can

...“recontextualize” works of art by providing more information than can be offered in an object label and by presenting it in a form that responds to the inquirer. The fluid, open-ended nature of such systems enhances the experience for the public, because it engages individuals in the act of exploring the art and in discovering ideas and relationships. Programs encourage viewers to

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actively seek information that bridge personal experience, knowledge, interests, and the object.\textsuperscript{128}

All museum Web sites that have learning as an objective—including those intended to extend the museum experience—should leverage the affordances (perceived properties that provide clues about how something can be used) of the Internet, and be designed to maximize their effectiveness for a variety of cognitive styles.

Clearly, there are fundamental differences between the experience that takes place within the confines of a museum and an extension of that visit. They diverge in physical space and context, the presentation of real or virtual objects, and the means by which visitors engage with the objects. Fortunately, the extended museum experience, as defined in this project, emanates from an experience inside the museum that is extended beyond the building—thus having the potential to incorporate the positive attributes of each.

**Heuristic Research, Pilots, and Early Implementations**

In 1998’s *The Virtual and the Real*, Stephen Borysewicz, an exhibit developer at the Field Museum of Natural History in Chicago,

wrote that people visited museums expecting to encounter new technologies. He observed that

governments and businesses continue to underwrite technology-based museum exhibits to educate the public and promote their own agendas. And exhibitors attempt to keep up with the latest technology, experimenting with ways to include it in our exhibits and keep them “relevant.”

In that same year, as if to illustrate his point, The Exploratorium launched a project called The Electronic Guidebook: Extending Museum Experience Using Networked Handheld Computers. The project was undertaken in partnership with Hewlett-Packard Labs and The Concord Consortium (a non-profit education research and development organization) and received funding through a 1999 grant from the National Science Foundation (NSF). Audio guides had been introduced to museums over a half-century before and pilots involving the use of handheld computers in the galleries had been undertaken as early as the mid-1990s; but the Exploratorium appears to be the first institution that sought to explore applications of technology to extend the museum experience beyond the physical institution. In a fall 1999 announcement of the grant award, Stephen Bannasch of the Concord Consortium indicated

the project would look at ways of using handheld computers and wireless networks to enhance and extend the museum experience.\textsuperscript{131}

Throughout the intervening years, the Exploratorium has run pilots on a variety of prototypes using three different wireless technologies—
infrared beacons, bar codes, and radio-frequency identification. Each successive iteration had been informed by the results of previous pilots and by advances in technology. According to Exploratorium’s Rob Semper and Mirjana Spasojevic of Hewlett-Packard Labs, the objective is to provide visitors with

an augmented museum experience so that they can better plan their visit, get the most out of it while they are in the museum, and be able to refer to their visit once they have returned to their home or classroom.\textsuperscript{132}

The Electronic Guidebook was a research project designed to study the potential of handheld devices and wireless networks to contribute to the museum experience. This early project identified three critical areas for investigation: information technology infrastructure, human interface, and content.\textsuperscript{133} This triad of components illustrates the complex nature of the extended museum experience incorporating, as it does, capture and

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\textsuperscript{132} Semper and Spasojevic, "The Electronic Guidebook: Using Portable Devices and a Wireless Web-Based Network to Extend the Museum Experience."
\textsuperscript{133} Ibid.
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delivery technologies (for example, electronic devices and the Internet),
the content that is accessible using these technologies, and the way in
which the visitor accesses the information or experiences provided. The
extended portion of the Guidebook experience comprised bookmarks
created by visitors during their interaction with exhibits and personalized
photographs automatically taken during those interactions. Describing one
group’s after-visit experience, Bannasch wrote about their encounter with
the MyExploratorium Web site that served as the connection point to the
extended visit. He observed that

some head straight for the computer, where they can enter their name to see a detailed record of their visit in the form of a series of web pages of each exhibit visited. These web pages are created automatically with links to the graphs the museum guests created, background information about the phenomena they observed, and questions and idea for further exploration. Some students are typing notes to accompany a picture they took of an exhibit. Others are digging into online materials about the properties of electricity or the discovery of magnetism.\textsuperscript{134}

Although the Electronic Guidebook was well received by test subjects,
ergonomics proved to be its downfall. According to Sherry Hsi, Director of Research and Evaluation at the Exploratorium’s Center for Learning and Teaching, visitors felt socially isolated when using the PDA or pocket

\textsuperscript{134} Bannasch, \textit{The Electronic Curator: Using a Handheld Computer at the Exploratorium}. 
PC and found that it interfered with their ability to engage with the intensively hands-on exhibit environment.\textsuperscript{135}

The Exploratorium’s next series of pilots focused on keeping visitors’ hands available for exhibition play. Bar code readers or radio-frequency identification (RFID) tags are read by infrared beacons automatically triggering photos and bookmarking select exhibits.\textsuperscript{136} Their current pilot project, eXspot, relies on wireless radio-frequency identification. The resulting MyExploratorium Web page provides the visitor with an opportunity to remember their visit and extend their learning. According to Sherry Hsi and Rob Semper, eXspot is “intended to support, record, and extend exhibit-based, informal science learning at the Exploratorium.”\textsuperscript{137} Hsi and Semper describe the post-museum online experience as an opportunity to revisit museum exhibits and explore further using a broad variety of content.\textsuperscript{138} Museum-floor testing of eXspot has continued throughout the summer of 2005.

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\textsuperscript{136} Ibid.
\textsuperscript{138} Hsi, \textit{Evaluation of Electronic Guidebook Mobile Web Resources}.
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In addition to focusing on their own projects, the Exploratorium has done a great deal to advance the understanding and application of technology for extending the museum experience. In the fall of 2001, the Exploratorium hosted the Electronic Guidebook Forum—a two-day gathering of thirty-nine researchers and developers from across the United States. These professionals from the fields of museums, technology, and academia came together to focus on the use of handheld computers and wireless networks in museums. The goal of the forum was “to identify key issues that will inform further work in the museum field on wireless handheld devices and stimulate research and implementation.” The second Electronic Guidebook Forum was held in January 2005 and was attended by over fifty museum, technology, and industry professionals from as far away as Singapore. This illustrates the continued and growing interest in wireless networked technologies that can be implemented to extend the museum experience.

While the Exploratorium has focused on study and research, Seattle’s Experience Music Project (EMP), a museum focusing on American popular music, was the first American museum to complete an implementation. The dream child of Paul Allen, music lover and co-

founder of Microsoft, Seattle’s EMP is an interactive music museum with a mission to provide

dynamic, multifaceted, ever-changing experiences through new and exciting explorations of American popular music, which both entertain and engage visitors in the creative process.140

Housed in an ultra-modern building designed by world-renowned architect Frank Gehry, the museum sought, according to its Web site, to “redefine what it means to be a museum.”141 Technical innovation was one path to this goal and was employed extensively to create a high degree of interactivity and provide state-of-the-art audio and video. To deliver music and interpretive content to visitors, EMP created a custom-designed and custom-built device called the Museum Exhibit Guide (MEG). When the museum opened its doors in June 2000, the Mobile Exhibit Guide (MEG) was available to visitors. Described on the EMP Web site as a “virtual companion,” MEG boasts a 4GB hard drive able to supply visitors with 20 or more hours of high-quality audio.142 An early user described the custom-designed MEG as “a small box with shoulder strap, headphones that plug in at the strap, and a tethered handheld unit that is a cross

142 Ibid.
between a PDA and a TV remote control. Throughout the galleries, infrared beacons trigger MEG to retrieve information pertinent to that part of the exhibition. Available video and audio clips are rendered up on the small touch screen that allows visitors to navigate and make selections. Bookmarking functionality allows users to select any piece of content to replay in environs of the museum’s Digital Lab or from anywhere else with an Internet connection, on the EMP Web site. Ergonomic issues seem to be a glaring deficiency of MEG. The device is large, awkward, and heavy—especially when compared to newer handheld devices. Another disadvantage is that EMP charges a $3 fee for using the MEG in addition to the $19.95 admission charge.

The sleeker, lighter handhelds are gaining ground in museums. As one type of technology that can form the basis of an extended museum experience, handhelds are being used for traditional interpretive information for adults as well as for way finding, chat rooms, bookmarking, disabled visitor access, and interactive family tours. Other technologies—like hands free RFID—offer bookmarking and image capture. Chicago’s Museum of Science and Industry and the American

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144 Ibid.
145 Karen Kroslowitz, Jamie Mohatt, and Allison Wenz, personal conversations with the author 2005.
Museum of the Moving Image in New York City are among the institutions that have undertaken pilots. Full implementations have been done at Peabody Essex Museum in Salem, Massachusetts, the Tech Museum of Innovation in San Jose, California, and The Getty Museum in Los Angeles, California—these last three serving as case studies for this project.
FINDINGS AND CONCLUSIONS

This master’s project explores the rationales, goals and objectives, and efficacy of technology-based projects designed to extend the museum experience. The findings reported here emanate from three research methods: a literature review of pertinent published, unpublished, and electronic sources; interviews with twenty-one museum and technology professionals, most of whom are associated with relevant implementations (existing or pending); and case studies of three projects currently available for use by visitors. These case studies are preceded by a preamble of early research, pilots, and implementations. My findings, derived from information gleaned from all research methodologies, are organized by theme—rationale, goals and objectives, and efficacy—and are followed by overarching conclusions based on those findings.

Precursors and Defunct Efforts to Extend Museum Visits

To understand the current state of the use of technology to expand the reach of the museum beyond its physical space, it is important to consider how these ideas were developed, how projects evolved, and how they contributed to the findings and conclusions of this project. On September 1, 1999, the National Science Foundation awarded a grant to

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146 The questions that formed the framework for the interviews may be found in the Appendix.
the Exploratorium for a proof of concept research study\textsuperscript{147} called “The Electronic Guidebook: Extending Museum Experience Using Networked Handheld Computers.”\textsuperscript{148} Well aware of the importance and promise of technology for museums, Dr. Goéry Delacôte, Executive Director of the museum, had issued a directive for the Exploratorium to establish a wireless museum and take a leadership role among museums working with technology.\textsuperscript{149} Partnered with the Concord Consortium (a nonprofit research and development organization) and researchers at Hewlett-Packard labs, the Exploratorium set out to utilize a wireless handheld computer to “serve as a ‘mobile learning partner’ supporting sustained ubiquitous inquiry and investigation in a seamless museum experience before, during, and after the visit.”\textsuperscript{150} The Electronic Guidebook provided content related to exhibits, guidance for interaction with the exhibits, and recommendations for further exploration through experimentation and research. Such content was delivered wirelessly to the handheld units through the use of infrared beacons and bar code scanning. During their interactions with various exhibits, visitors were able to electronically

\textsuperscript{147} Proof of concept studies seek evidence to prove the feasibility of an idea.
\textsuperscript{149} Holly Auborn Fait (Researcher, Exploratorium), interview with the author, San Francisco, CA, March 30, 2005.
\textsuperscript{150} Hsi, \textit{Evaluation of Electronic Guidebook Mobile Web Resources}. 
save—or “bookmark”—items of interest that they could access later on a personalized “MyExploratorium” Web page.

One of the strongest pieces of feedback from initial visitor studies was that “[a]bove all, visitors liked the idea of being able to bookmark information to look at later.”¹⁵¹ Less positive was the feedback that the handhelds captured users’ attention to such a degree that they interfered with exhibit interaction and disrupted social interaction with fellow visitors.¹⁵² This conflict—of using an absorbing handheld device in a hands-on museum—prompted the Exploratorium to pursue other technologies to achieve its goals. The Exploratorium has since applied its findings to a series of ensuing projects, most recently eXspot, which uses radio-frequency identification (RFID) to capture photos and bookmark exhibits of interest during the museum visit, which, along with additional information and suggestions for further experimentation, can be accessed on a personalized Web site afterward.

The Exploratorium has conducted extensive formative evaluation on exSpot including prototyping both RFID vehicles (ranging from yo-yos to the ultimately adopted credit card style) and RFID readers. They have also conducted surveys and interviews with recruited subjects and random

¹⁵² Ibid.
visitors at the museum—but have yet to tackle the challenge of evaluating the efficacy of the post-visit experience. Sherry Hsi, whose organization is responsible for the design, implementation, and support of exSpot, recognizes the difficulty of measuring the effectiveness of the extended experience and has some ideas about how that task might be approached. One idea is to email a questionnaire requesting qualitative feedback on the extended experience. Hsi has identified intentionality as a promising indicator of learning during the extended portion of a museum visit. She describes intentionality as actions that are purposeful and done with skill and awareness.¹⁵³ Many such actions can be captured through the extended visitor’s use of their personalized Web site. For example, observing how deeply they delve into a particular topic by tracking the number of related layers visited. Hsi describes another creative way of capturing intentionality as a virtual basket into which the user can gather a collection of resources. Building on that idea, stronger intentionality could be discerned in what she calls the shift from “consumer to producer” wherein the visitor can annotate or modify something from his or her basket and then communicate with someone else.¹⁵⁴ For example, a user could select a photo of their interaction with an exhibit, add a description

¹⁵³ Sherry Hsi (Director of Research and Evaluation, the Exploratorium), interview with the author, by telephone, San Francisco, CA, April 26, 2005.
¹⁵⁴ Ibid.
of what they learned, and then email it to a friend. These are just a few of
the creative approaches that may prove successful in evaluating extended
museum experiences.

Unfortunately, with the end of its funding cycle in August 2005,
the future of exSpot is uncertain and the opportunity to test Hsi’s post-visit
evaluation strategies may not come to pass. Nevertheless, The
Exploratorium’s work on this and other projects has resulted in valuable
research and a series of trials and pilots exploring wireless networking,
infrared technology, radio frequency identification, bar codes, and
personalized Web services—all potential components of an extended
museum experience.¹⁵⁵ The Exploratorium actively seeks to share its
learning with museums around the world through publications and
conferences. To that end, in 2001, they held the first Electronic Guidebook
Forum, bringing together museum and high tech resources from across the
United States to share knowledge and experience. The most recent
Guidebook Forum, held in January 2005, attracted interest from more than
the fifty or so people that could be accommodated and drew participants
from around the world. Several of the participants have implemented

¹⁵⁵ Detailed information on a variety of pilots can be found on the Exploratorium Web
site for the Electronic Guidebook, see http://www.exploratorium.edu/guidebook. For
information on their latest pilot—the RFID-based eXspot—see
http://exspot.exploratorium.edu/research.html.
technology-based extended experiences and many more are exploring the possibilities.

As discussed in the Background section of this paper, on June 23, 2000, the Experience Music Project (EMP) became the first museum in the United States to move beyond a pilot to full implementation of an electronic device in the museum to lay the foundation for a post-visit experience. The Mobile Exhibit Guide (MEG) was created to customize the visitor’s experience by making audio and visual content available on demand, MEG comprises a 4 Gigabyte hard drive with shoulder strap, headphones, and a handheld unit with a PDA-sized screen and a numeric keypad. MEG can deliver up to twenty hours of audio content but has the disadvantage of weighing several pounds. While some introductory content is triggered by infrared beam and delivered automatically to the MEG user, the majority of the content is prompted either by pressing the “select” button while in the vicinity of an infrared beacon, by using a touch screen, or by entering a number into the keypad. In addition to offering a great deal of flexibility in accessing an impressive depth and breadth of interpretive and musical content, MEG also allows users to bookmark content to be revisited later on the emplive.org Web site. Initially visitors could access their bookmarks from any computer with an

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156 Hedberg, "On the Cutting Edge of Cool: Seattle's Interactive Music Museum."
Internet connection. In a mid-2004 effort to reduce costs, EMP ceased to support access to bookmarks from outside of the museum, and therefore, they are now only available during the museum visit.

Nine months after the implementation of MEG, the American Museum of the Moving Image in Astoria, New York, tested a prototype of a wireless museum guide called eDocent. Developed in conjunction with Organic, Inc., a Web development and marketing firm, the handheld computer provided text, images, audio, and video about a limited number of objects in the museum.157 Bookmarking was one of the functionalities offered to eDocent users, who could then access additional information about items of interest on the museum’s Web site. According to Tim Schwartz of the museum’s digital media department, although the prototype operated well, funding constraints prevented the continuation of the project.158

Another relevant effort that was cut short began in June 2001 when CIMI, an international consortium of cultural heritage institutions and organizations (formerly known as the Consortium for the Computer Interchange of Museum Information), launched the Handscape project.

According to the project’s Web site, its goal was to learn more about the potential of mobile computing “for enriching the visitor’s experience of a museum… before, during, and after the museum visit.” Unfortunately, on December 15, 2003, CIMI ceased operations due to inadequate funding. So, although the Handscape project had three years of funding through a research grant from the Intel Corporation, the project focused only on the use of mobile technology within museums and never advanced far enough to include an extension of the museum visit. Nonetheless, the Handscape Web site remains available and contains the history of the project as well as providing access to a wide variety of articles on wireless computing, mobile applications, and the related user experience.

Although such research has been undertaken, proof of concept studies have been completed, prototypes tested, and pilots executed, only a few U.S. museums currently have technology available to visitors that lays the foundation for continuing the museum experience after they have left the premises. Among these are the three selected for in-depth case study: ARTscape at the Peabody Essex Museum in Salem, Massachusetts;


TechTags at the Tech Museum of Innovation in San Jose, California; and the GettyGuide at the J. Paul Getty Museum in Los Angeles, California.

Case Studies

**ARTscape – Peabody Essex Museum**

Established in 1799, the Peabody Essex Museum (PEM) is the oldest continuously operating museum in the United States. PEM, a museum of art and culture, boasts collections numbering 2.4 million objects including twenty-four historical buildings and a renowned collection of Asian Art. In the mid-1990s PEM began a $150 million campaign to “conceptually and physically integrate, interpret, and exhibit the full breadth of museum collections for the first time in its 200-year history.”\(^1^6^1\) John Grimes, Deputy Director of Research, New Media, and Information, notes that it was in 2001, during the lengthy planning for the new museum, that discussions began in earnest about the project that would eventually be realized as ARTscape.\(^1^6^2\) The desire to have ARTscape available for the grand opening of the new building in June 2003, prompted PEM to shorten their development cycle by expanding on a proven concept—the museum audio tour. Using ARTscape in the

\(^1^6^2\) John Grimes (Deputy Director of Research, New Media, and Information, Peabody Essex Museum), interview with the author, by telephone, Salem, MA, April 6, 2005.
museum building is exactly the same as using an audio tour of the kind that has become so popular in museums. By entering a number associated with an artifact into a digital audio tour player that looks like an elongated telephone handset, users can access rich audio content about the items on display. The ARTscape experience differs from the standard audio tour in that the visitor can also choose to bookmark items for retrieval after leaving the museum building. Before leaving the museum, the visitor downloads the bookmarks at a kiosk docking station and records his or her email address (see Figure 1).

According to Chris Tellis, Vice-Chairman of Antenna Audio, over 35 million audio tours are distributed worldwide in museums and similar venues each year. Chris Tellis, "Multimedia Handhelds: One Device, Many Audiences," in Museums and the Web 2004, ed. David Bearman and Jennifer Trant (Toronto: Archimuse, 2004).
The post-visit experience is available on the PEM Web site through an interface customized with the visitor’s bookmarks. An email describing the ARTscape experience and how to log in prompts the visitor’s initial access. On the Web site, visitors can learn more about the objects in their bookmarked collection and add to their collection from nearly 2,300 images available online. Previously bookmarked images appear along the top of the Web page and results of searches appear along the bottom of the page (see screenshot 1.1). The information available for each selection includes title, date, creator, origin, medium, and donor. By clicking on the “View Record” button, more information, in the form of additional images (for example, enlargements or close-ups), text, and even audio clips, are available (see screenshot 1.2).
New objects for bookmarking may be discovered in a variety of ways. The visitor can select a collection to browse (for example, Asian Export Art: China, Maritime Art, or Photography) or search by key word. A functionality called “Connections” allows the user to explore works by any of the six major data categories (title, date, creator, origin, medium, and donor). According to John Grimes, the logic used in making these “connections” is fuzzy—affording a certain degree of serendipity in the results, thus allowing people to “find things they didn’t know they were looking for” and to “encounter things in unexpected ways.”

Multiple sets of bookmarks may be created to meet the user’s personal organizational style and needs. Additional functionality allows the users to

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164 Grimes, interview.
email their bookmarks, thus inviting others to experience the Peabody Essex and ARTscape.

The rationale for ARTscape extended far beyond the desire to make a splash at the grand opening of the new building. According to Vas Prabhu, Deputy Director for Interpretation and Education, ARTscape was conceived as part of the museum’s overall interpretive strategy to “nurture the relationship between mind, heart, and intellect.” Prabhu noted the importance of ARTscape’s capacity to expose visitors to more objects than can be displayed at any one time at the museum, thus allowing them to identify more relationships that will be meaningful to them.\textsuperscript{165} John Grimes echoed this rationale and highlighted the customized nature of the ARTscape experience.\textsuperscript{166} Additionally, Grimes commented on the desire for extremely limited wall text in the new building and the necessity to find alternative ways of conveying information.\textsuperscript{167} Both Prabhu and Grimes noted the advantage of having a technologically savvy staff—beginning at the top with Executive Director and CEO Dan Monroe—as a critical factor in PEM’s decision to undertake the project and its ability to implement it successfully.

\textsuperscript{165} Vas Prabhu (Deputy Director, Interpretation and Education, Peabody Essex Museum), interview with the author, by telephone, Salem, MA, February 14, 2005.
\textsuperscript{166} Grimes, interview.
\textsuperscript{167} Ibid.
Successful implementation required a great deal of cross-departmental cooperation including participants from the new media group, interpretation, curatorial, and collections—including photographers. Christy Sorenson, Director of New Media, identified the curators as the internal resource from whom they would most like to gain additional support.\footnote{168 Christy Sorenson (Director of New Media, Peabody Essex Museum), interview with the author, by telephone, Salem, MA, April 6, 2005.} John Grimes explained the challenge of gaining support from the curatorial staff. He said that curators view ARTscape as just another database, in addition to the collections management database, into which they must enter data. Because some curators fail to appreciate the type of experience ARTscape offers visitors, they see it only as extra work.\footnote{169 Grimes, interview.} In addition to internal resources, third party companies were also integral to the success of the project. Acoustiguide, a company specializing in interpretive audio tours, was central to the implementation of the in-gallery electronic device, including writing and producing the audio content. Another external resource heavily involved with ARTscape was Second Story Interactive Studios who created the interactive Web site experience critical to extending ARTscape’s reach beyond the physical constraints of the museum building.
The goals and objectives of ARTscape were described differently by different interviewees. Vas Prabhu highlighted the goals of supporting the museum’s interpretive strategy, prompting return visits, and supporting a sustained commitment to learning.\(^{170}\) John Grimes and Christy Sorenson focused on the goals of creating a structure to pull disparate resources together in a format that could continually be added to and on allowing visitors to customize their museum experience.

The American Association of Museums acknowledged the ARTscape Web site with an honorable mention for its 2004 MUSE award in the category of Collection Database/Reference Resource, but formal evaluation of ARTscape has been limited during its first two years in use. Although some exit surveys were conducted during the pilot phase, none have been done since then due to a lack of resources. According to Jim Forrest, PEM’s Web Creative Director, the Urchin Web analytics program they use offers limited useful data. Statistics reflecting such things as number of hits on an object or the number of bookmarks registered on a piece are a conglomeration of all Web site users—not just those who used the ARTscape handset during a visit to the physical museum.\(^{171}\) Thus, while they know the PEM Web site has 5,000 registered users and had

\(^{170}\) Prabhu, interview.

\(^{171}\) Jim Forrest (Web Creative Director, Peabody Essex Museum) interview with the author, by telephone, Salem, MA, May 9, 2005.
roughly 31,000 visitors during 2004, they cannot isolate the numbers representing visitors logging in after a visit to the museum. Therefore, PEM is not able to report basic take-up rate. The audio wand captures user data during the museum visit – for example, what objects people bookmark, but this data is not regularly reviewed. According to John Grimes, the number of visitors who use the bookmarking functionality is “relatively small.” He speculates this is because visitors are not familiar with bookmarking and are unaware of the added value it can offer. Grimes anticipates increased use as more museums offer similar functionality. He identified the education of visitors as something that would be of great benefit to all museums offering extended experiences. In the meantime, very little signage draws visitor’s attention to the availability of ARTscape. In addition, due to their other responsibilities, introducing or explaining ARTscape has not been a priority for the visitor’s services representatives. A request by the new media group to have a brief video introducing ARTscape visible to people standing in line for admissions was refused.
The Tech Museum of Innovation (the Tech) is an interactive science museum in the heart of California’s Silicon Valley. Its mission statement identifies the museum as

an educational resource established to engage people of all ages and backgrounds in exploring and experiencing technologies affecting their lives, and to inspire the young to become innovators in the technologies of the future.¹⁷⁵

In alignment with its mission, the Tech undertook a museum-wide initiative to connect in-gallery and online experiences using a computer network. This initiative, called the “Smart Museum” took shape during 2001, when front-end evaluations were conducted to ascertain the level of comfort visitors would have using RFID bracelets. The results of the evaluation were quite positive (a mean rating of 5.43 on an ascending 7 point scale), so The Tech moved forward with its plans.¹⁷⁶ Partially funded by a 2002 National Science Foundation Award of nearly $1 million, the Smart Museum found its way to the museum floor in the form of TechTags.¹⁷⁷

¹⁷⁷ National Science Foundation,"NSF Award Abstract - #0206399 - Build Your Internet: An Exhibition to Foster Public Understanding and Participation." National Science
TechTags are disposable bracelets that contain radio-frequency identification chips (see Figure 1). Visitors receive bracelets upon entry to the museum and wearing and using them is optional.

Simply by bringing a bracelet near an RFID reader, a visitor can register, and in some cases record, their participation at a variety of exhibits in two different exhibitions. In Genetics: Technology with a Twist (Genetics), which opened March 19, 2004, visitors collect electronic Gene Kids cards each time they visit a TechTag activated exhibit. For example, TechTags can activate cameras that take photographs of visitors or allow them to register their opinion in an on-the-spot poll on controversial subjects in the field of genetics. During the visit, this collection of Gene Kids cards can be viewed on in-gallery kiosk computers. In the NetPl@net exhibition, visitors can personalize their own Web page at Webpage Studio, create an avatar (a graphical representation of the visitor) to explore a three-

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dimensional virtual world with fellow visitors, and participate in a survey of Internet use. TechTags also serve to personalize the visitor’s experience. Many exhibits ask visitors to indicate whether they prefer to receive instructions and information in English or in Spanish. Once that selection is made, the TechTag will trigger the preferred language at all successive exhibits.

The extended visit begins on the my.thetech.org Web site, where the visitor enters the unique number printed on their TechTag. In the Genetics section, all of the Gene Kids cards earned during museum visits can be viewed (see screenshot 2.1).

Selecting a Gene Kids card may reveal the results of an experiment conducted during the visit or perhaps a photo of the visitor’s interaction. Many of the cards also offer suggestions for further exploration, such as the at-home Do-It-Yourself Strawberry DNA activity related to the
Making Medicine exhibit. The cards also link visitors to the wealth of information available on the Understanding Genetics section of the Tech Web site. Virtual visitors have the opportunity to ask questions of geneticists from nearby Stanford University. Queries such as “Can brown-eyed parents have a blue-eyed baby?” are posted on line along with an expert’s answer for everyone to see. An additional functionality allows users to send email postcards, perhaps to friends and relatives, of the results of their wet lab experiment. The extended portion of the more recently implemented NetPl@net serves more as a scrapbook of the visit (both to NetPl@net and Genetics) and provides a limited amount of additional content—all of which is accessed by links to external Web sites. According to NetPl@net exhibit developer Michelle Woods, the creation of content will have to wait until additional funding is secured.\textsuperscript{178}

The idea for the Smart Museum had been, according to Woods, “knocking around for years although it really got traction in 2003.”\textsuperscript{179} Peggy Monahan, former Director of Exhibits & Programs at the Tech, identified the use of technology as central to the museum’s mission and the primary rationale for implementation. She said, “Because we’re located right here in the middle of the Silicon Valley, people expect to

\begin{footnotesize}
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\item[\textsuperscript{178}] Michelle Woods (Exhibit Developer, The Tech Museum of Innovation), interview with the author, San Jose, CA, March 24, 2005.
\item[\textsuperscript{179}] Ibid.
\end{itemize}
\end{footnotesize}
encounter cool technology when they come to the Tech.”\textsuperscript{180} In fact, although bar codes—commonly found in grocery stores—would have been a less expensive solution, they chose RFID for the TechTags because of the “cool” factor. In addition, Monahan identified the desire to create networked personalized experiences that enhanced both the in-museum experience and the after-visit experience as another impetus driving the TechTag project.\textsuperscript{181}

Just as with ARTscape, the complexity of the TechTags project has required cross-departmental cooperation and the expertise of external resources. Internal resources include exhibitions, engineering, fabrication, and the Web and networking groups. The business operations department was involved in crafting the best way to distribute—and explain—the tags. External resources involved in the project include Squid Country Safari, a multi-media Web and exhibit development firm that helped design the Genetics exhibition, and Weatherhead Experience Design, which partnered on the NetPl@net exhibition. Finally, Hitachi, Ltd. was heavily involved during a recent changeover of hardware (both RFID tags and readers) to their products.

\textsuperscript{180} Peggy Monahan (Former Director of Exhibits and Programs, The Tech Museum of Innovation), interview with the author, San Jose, CA, March 14, 2005.
\textsuperscript{181} Ibid.
According to several Tech employees who work in a variety of roles on the TechTag project, one of the challenges they have faced is explaining the use of the tags to visitors. The explanatory brochure was simplified with fewer words presented in larger font size, volunteers and employees have been placed in TechTag-enabled galleries to provide guidance, and additional tags are made available on the exhibition floor. Not only do visitors often have difficulty understanding how the tags operate in the museum, people also throw the reusable tags away – perhaps an indication they either don’t understand or are not interested in the extended visit (which is dependent on the unique identification number from the bracelet).

According to the meeting notes from a Smart Museum project evaluation meeting, the original goals of the TechTag system were to personalize the museum visit and extend it through the Web site. These two themes were quite consistent during interviews with Tech employees. Technology developer Mike Drennan underscored the importance of the extended opportunity for learning when he remarked that visitors to the Tech spend an average of less than two minutes at each exhibit. During an interview, exhibit developer Michelle Woods identified the additional

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182 "Our Mission."
183 Mike Drennan (Technology Developer, The Tech Museum of Innovation), interview with the author, San Jose, CA, April 25, 2005.
goals of helping visitors make connections between exhibits and encouraging return visits.\textsuperscript{184} When asked if the museum has any marketing goals associated with the TechTag project, Peggy Monahan indicated there were none and that, because of privacy concerns, the entire TechTag experience is anonymous. According to Monahan, “It’s more about technology and education than about marketing.”\textsuperscript{185}

To date, most of the evaluation done on the TechTag project has been in the form of statistics captured by RFID readers attached to exhibits and data captured on the Tech Web site. In-museum information that is captured includes the number of TechTag accounts created by day of the week and by month, individual exhibit usage, and language preference. Statistics reflecting the extended visit are gathered from the my.thetech.org Web site. During the first year of the TechTags project (from March 2004 until March 2005), 82,902 TechTag accounts were created. Of these, 10,481 accounts (12.64 percent) were accessed at the my.thetech.org Web site. During this same time period, 19,930 visitors registered their TechTag at the Genetics Wet Lab where they are invited to “Be a Genetic Scientist” and create some glowing bacteria. The results of this experiment are not visible until the next day when photos are available

\textsuperscript{184} Woods, interview
\textsuperscript{185} Monahan, interview. Interestingly, it is possible to sign up for the museum’s bi-weekly newsletter by supplying an email address on their Web site.
online. Of the visitors who registered their RFID at the Wet Lab, 2,912 (14.61 percent) accessed the online photo showing the results of their experiment.\footnote{Michelle Woods, Exhibit Developer, The Tech Museum of Innovation, email communication to the author, March 10, 2005.}

In early 2005, the Tech issued a request for proposal (RFP) to conduct a research study for the NSF-funded Build Your Internet project (a realization of the museum’s Smart Museum initiative) that reached the Tech floor as the NetPl@net exhibition. The RFP states the “study should assess the effectiveness of the Smart Museum system at personalizing the museum visit and extending the experience after the visit through the Web site.”\footnote{Greg Brown, "Request for Proposal", to Kevin Crowley, UPCLOSE, January 14, 2005, The Tech Museum of Innovation, San Jose, CA.} The request indicates the “final report should include an assessment of the current Smart Museum system, and recommendations for improving and expanding it in the future.”\footnote{Ibid.} Among the questions the Tech seeks answers for are “What is it that motivates visitors to go to my.thetech.org after their visit?”; “What are the reasons that visitors do not go to the Web site after their visit?”; “Are visitors who use certain exhibits more likely to visit the Web site later?”\footnote{The University of Pittsburgh Center for Learning in Out of School Environments}
(UPCLOSE), directed by Kevin Crowley, secured the evaluation subcontract. Data collection is currently underway.

*GettyGuide – J. Paul Getty Museum*

The J. Paul Getty Museum (the Getty) is endowed by the fortune of billionaire oilman J. Paul Getty and began with his private collection of art and antiquities. The museum comprises five buildings (known as ‘pavilions’) of the Getty Center complex designed by famed architect Richard Meier and located high in the Santa Monica mountains. The West Coast destination museum, which opened in 1997, attracts more than 1 million visitors each year. The collection focuses on seven areas: European paintings, drawings, manuscripts, sculpture, decorative arts, and photographs. According to its Web site, the museum’s mission is
to make the collection meaningful and attractive to a broad audience by presenting and interpreting the collection through educational programs, special exhibitions, publications, conservation, and research. One of the ways the Getty supports its educational aims is through the GettyGuide, an interactive multimedia system deployed at the museum in the summer of 2003, which lays the groundwork for post-visit interaction.

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According to the GettyGuide Web page, it is designed to facilitate learning about art and the exploration of the museum’s collection. Ten computer stations running the GettyGuide interactive application are available in the dedicated GettyGuide Room where visitors are encouraged to “explore, discover, and lead.” Kiosks can also be found between galleries in each of five pavilions (see Figure 3).

In addition to giving access to thousands of images of the collection, the touchscreen monitors feature an interactive timeline—stretching from the Neolithic period to the modern Color Revolution—that helps visitors put objects, artifacts in context. Users can zoom in to see an incredible level of detail and, in some cases, can explore magnifications, composite x-rays, and ultra-violet images. The guide also offers high quality audio and video clips of curators, conservators, and artists. While exploring the GettyGuide

192 Ibid.
kiosk at the museum, visitors can select artists and works of art to create their own set of bookmarks that serve as the foundation for the post-visit experience. The GettyGuide offers a variety of ways for the user to explore the collection. These include searching by artist name, type of art, country of origin, subject, or title; using the Art Timeline; browsing artifacts on display by their location (pavilion); or choosing from the most frequently selected GettyGuide entries grouped in categories such as Women Artists, French Impressionism, and Recent Acquisitions. While not all the features of the GettyGuide kiosks are available to be bookmarked and revisited after leaving the building, all of the images and artists can be captured and saved in an account connected to the visitor’s email address. The computer kiosks at the Getty and related Web experience are only two parts of a three-part GettyGuide experience. The third is a function-rich, context-aware handheld device (PDA) that, among many other things, will allow visitors to bookmark selections without returning to a computer kiosk. The handheld portion of the GettyGuide was implemented in early February 2005 and taken out of use shortly thereafter due to technical problems unrelated to bookmarking and the extended visit. It may be due to the combination of the uncertainty surrounding the handheld portion of the project and the departure of the head of interactive media to a new position at the Getty Trust that the
Getty Museum declined repeated requests for information about the project and for the opportunity to interview museum employees involved with the GettyGuide.

The post-visit experience begins when the visitor logs onto the Getty Bookmarks page of the museum’s Web site. Unlike ARTscape, where multiple sets of bookmarks can be created, GettyGuide bookmarks appear in a single grouping. Bookmarks appear in the order they were created and are shown as thumbnail images along with object name, artist, dates, and, if the object is currently on display, its location within the Getty complex (see screenshot 3.1).

Selecting a bookmark reveals a larger image and a detailed description of the object. The image can be further enlarged and vocabulary words, highlighted in color, can be clicked to reveal definitions. (See screenshot 3.2)
In addition, some records may include close-up views, links to related audio and video clips, and recommendations of related items from the museum bookstore (which can be ordered on-line). Furthermore, the “Use Bookmark” tab takes the user to a page where a map showing the location of each bookmarked item currently on display can be generated for a return visit (see screenshot 3.3). Screens sometimes carry suggestions of related publications from the Getty Bookstore that may then be ordered online.

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193While the map generating function can also be used for pre-visit planning, this project focuses only on the post-visit experience that, in this case, may lead to a return visit using the mapped bookmarks.
As with ARTscape and the TechTags projects, the creation of the GettyGuide kiosk and Web experiences also required skills not found within the Getty organization. External resources included Cooper, an application design and interactivity firm; Triplecode, a firm specializing in new media experience design and interface; and Sun Microsystems, which was responsible for the application architecture. The design merited a feature article on Design Interact—a Web site focusing on interactive media by the publishers of Communication Arts magazine. The article states that 16% of visitors access the GettyGuide kiosks and the average
time spent is twenty to forty minutes. The article claims this reflects slightly above average use and exceptional dwell time.

**Why Museums Create Technology-Based Extended Experiences**

My research revealed that museums undertake technology-based projects designed to extend the museum experience for a variety of reasons, including education, mission-driven applications of technology, the desire to advance the field, and even issues of funding. The most frequently cited is the opportunity to make their collections and educational content available beyond the bricks and mortar of the museum edifice. Whether thousands of images of works of art, or an in-depth analysis of DNA, museums realize the vast depth and breadth of information they have far exceeds the amount of time most visitors have to spend in a single visit.

Thus it makes sense that the Smithsonian Institution, which holds the nation’s largest collection, is working on technology projects to extend the museum visit at eight Smithsonian museums, including American History, Natural History, American Art, the Postal Museum, African Art, and Air & Space. For the Smithsonian, the rationale for this undertaking may be embedded in the June 2001 report cited in the introduction to this 194 Design Interact, "The Gettyguide Kiosks." http://www.designinteract.com/features/getty/ (accessed May 3, 2005).
paper that recommended the National Museum of American History strive for "the most timely and relevant themes and methods of presentation for the Museum in the 21st century." Among its recommendations in the area of advanced information technology is that "through the use of information technology, we will…help visitors begin their connection to the Museum before they come and extend it after they leave." (italics mine).

Another rationale for implementing these types of projects is the allure of the technology itself. According to Jasen Emmons, Curator, Producer, and Editor of content for EMP’s Museum Exhibition Guide (MEG), the directive from museum founder and co-founder of Microsoft, Paul Allen, was for the creation of a unique and technically special audio-device. For EMP, the focus was first on technology and second on content. For some science museums, such as the Tech Museum of Innovation and the Exploratorium, their missions suggest the exploration and application of advanced technology as one of the very reasons for their existence. Following the lead established by the Exploratorium, other science museums, such as Liberty Science Center in Jersey City, New

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196 Ibid.
197 Jasen Emmons (Curator, Producer, Editor, Experience Music Project), interview with the author, by telephone, Seattle, WA, April 19, 2005.
Jersey, identify the advancement of the use of technology in museums as part of their rationale for implementation. Liberty Science Center (LSC) is in the midst of a proof of concept study for Science Now, Science Everywhere (SNSE) a project that will use visitors’ own personal electronic communications and storage devices (for example, cell phones, PDAs, and MP3 players) to make exhibition content available both inside and outside of the museum. LSC is actively sharing what they learn through such vehicles as their SNSE Web site and by hosting an Association of Science-Technology Centers (ASTC) “Rap” session focusing on Personal Mobile Devices and Science Centers.\(^{198}\)

Interestingly, while one might anticipate cost as a prohibiting factor, funding has been identified as a rationale for implementing cutting-edge technology projects such as those featured in this paper. The National Science Foundation (NSF) promotes the advancement of science and technology in the United States through competitive grant making from a $5.47 billion dollar budget.\(^{199}\) The Exploratorium’s Electronic Guidebook and eXspot projects have both received funding from NSF. According to Wayne La Bar, Vice President of Exhibitions and Theaters at Liberty

\(^{198}\) Additional information on Science Now, Science Everywhere can be found at: http://snse.lsc.org.

Science Center, a June 2004 grant application for using technology in an upcoming exhibition called Communications, received “lukewarm” feedback from NSF whose reviewers suggested the project needed to be more forward looking.\textsuperscript{200} La Bar said the feedback from NSF, and LSC’s need for funding, caused the Science Center to rework its concept—which morphed into the SNSE project—and to rewrite the grant proposal.\textsuperscript{201} Thus, encouragement and direction supplied by potential project-funder NSF was a catalyst for the ambitious project underway at Liberty Science Center. Similarly, project impetus may come from technology companies that contribute both financial and human resources to projects that employ their technology or provide them with the opportunity to advance their research. One such example is the previously noted partnership between the Exploratorium and Hewlett-Packard. Another example is the choice by the Tech to transition from existing Phillips RFID chips and readers to very recently released Hitachi RFID chips and readers, stemming from a sponsorship agreement with Hitachi that will result in cost savings to the museum.

\textsuperscript{200} Wayne LaBar (Vice President, Exhibitions and Theaters, Liberty Science Center) interview with the author, by telephone, Jersey City, NJ, April 29, 2005.
\textsuperscript{201} The Liberty Science Center grant proposal is under consideration by the NSF. As of this writing, they have not yet received notification of whether or not the grant has been approved.
A variety of sources suggest that more and more museums are evaluating the rationales for undertaking technology-based projects to extend the museum experience. A literature search reveals articles on this topic in journals, books, and papers delivered at conferences. A number of interviewees commented on the increasing interest in this application of technology from museums of all types and sizes.\textsuperscript{202} In addition, the 2005 Museums and the Web Conference featured an entire session called Pre + Post Visit. Mike Drennan, the Tech’s technology developer, said he fields inquiries on the topic from museums around the world.

Still, there are those who question the wisdom of using precious museum resources to prolong museum experiences outside of the museum itself. This perspective was articulated during an interview with Peter Samis, Associate Curator of Education and Program Manager, Interactive Educational Technologies at the San Francisco Museum of Modern Art. Samis believes the best time to provide information and content is at the point of interaction between visitor and object (whether a work of art, a hands-on exhibit, or an historical artifact).\textsuperscript{203} Beginning at the upper left

\textsuperscript{202} Among those making this observation were Susie Wise, Ph.D. candidate in Learning Sciences and Technology Design at Stanford University; Laura Mann of Mediatrope, creators of interactive experiences; and Brad Johnson of Second Story Interactive Studios.

\textsuperscript{203} Peter Samis (Associate Curator of Education and Program Manager, Interactive Educational Technologies, San Francisco Museum of Modern Art), interview with the author, Berkeley, CA, November 29, 2004.
hand corner of a sheet of notebook paper, Samis drew a short crest followed by a line that dove precipitously toward the bottom of the page. Just before the bottom, the line flattened out and continued its path across the page. The peak of the crest represented the time during which the visitor encountered the object and, according to Samis’ belief, the most opportune moment for learning to take place. Once the visitor has walked away from the object, their interest in learning about it takes an abrupt plunge. As they leave the gallery, it continues to fall, and by the time they have left the museum parking lot, gotten stuck in traffic or stopped at the grocery store, their level of interest is only marginally greater than before they entered the museum. Samis believes providing information in the museum, at the height of the visitor’s interest is more effective—and a better use of resources—than extending museum experiences.

**What are the Goals of Extended Experience Technology Projects?**

My research found that these technology projects have few concrete objectives—especially in the area of visitor learning. Rather, the stated goals and objectives identified for the projects researched tend to represent the rationales for their implementation, not desired outcomes for success. Many have goals targeted to the successful implementation of the technology itself (that is, making sure the technology works). Research
revealed a variety of project goals (broad, abstract, and unmeasurable) but very few objectives (precise, concrete, and measurable). Also of note is that, based on interviews, it seems project goals are not necessarily understood—or at least communicated—in a consistent way from department to department and employee to employee within the same institution.

Technology goals that I was able to find are as simple (simply stated—not simply executed) as having the desired technology function in the way it was intended. For the Tech’s TechTags and the Exploratorium’s eXspot, the goal was for the RFID tags to successfully register on the reader. For the Peabody Essex ARTscape the goal was for bookmarks to be captured on the audio wand and successfully downloaded at kiosk docking stations. Technology-related objectives uncovered in my research were in the form of design criteria. For example, EMP’s Jasen Emmons stated that one of the important objectives of the MEG project was to create a visitor-defined, non-linear experience.\textsuperscript{204} Similarly, Brad Johnson, of Second Story Interactive Studios, described one of the design criteria objectives for ARTscape as “to provide visually-focused rapid access to lots of different images and information and…to allow inquiry to

\textsuperscript{204} Emmons, interview.
proceed from a broad to a narrow focus.” While these design criteria are invaluable, what seems to be missing is a tangible objective against which to measure the success of the design on visitor learning.

Visitor experience goals tended to be very general. For example, virtually every relevant article and every interviewee described some version of the goal of increasing visitor learning through the extended experience. Yet, no one communicated any specific—measurable—objectives for visitor learning. In other words, what would visitors learn and how would they learn it? Similarly, the goal of personalizing the visitor experience was frequently cited in project-related literature. Researcher Silvia Filippini Fantoni, Ph.D. candidate at the Sorbonne, has written extensively on the subject of museum Web site personalization and highlighted its relationship to learning. Additionally, many interviewees, including those from the Tech, the Peabody Essex, Liberty Science Center, the Exploratorium, and others, mentioned the importance of the personalized visit. Despite both the theoretical and practical recognition of the value of personalization (see discussion in Background section), my research surfaced no concrete objectives related to that goal.

Institutional goals were also cited by many of interview subjects and can be deduced from some case study projects. Joanna Champagne,

205 Brad Johnson (Creative Director, Second Story Interactive Studios), interview with the author, by telephone, Portland, OR, April 25, 2005.
head of new media initiatives for the Smithsonian American Art Museum, identified generating new audiences as one of the goals of the SIGuide they will implement in July 2006. Champagne said the project will target younger audiences as well as family and school groups. The desire to prompt return visits was explicitly stated by Michelle Woods of the Tech and John Grimes of PEM. Grimes noted that this goal directly supports the sustainability of the museum. Peggy Monahan, formerly of the Tech, commented on the popularity of collecting cards (for example baseball and Yu-Gi-Oh) as the design idea underlying the Gene Kids cards that can be collected at the Genetics exhibition. Their hope is that visitors will return to complete their set of cards. Grimes and Champagne both highlighted their respective museums’ desire to create life-long learners through their project—a goal that could be viewed from either an educational perspective or from an institutional perspective since life-long learners may be more inclined to return to, and perhaps financially support, their museums.

There may be an underlying institutional marketing strategy with the GettyGuide, PEM’s ARTscape and the Tech’s TechTags. In each case, the user can share part of their experience with others through email. This

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207 Grimes, interview.
208 Monahan, interview.
is a type of viral marketing (see Background section) where the information starts with one person and is passed on from there with the hope that it will generate new interest. The GettyGuide and ARTscape Web sites both allow visitors to send their bookmarks to anyone with an email account. Doing this with the GettyGuide experience generates an email with the subject line “Bookmarks from the Getty.” The text of the email describes the Getty Bookmarks and invites recipients to log on to the Getty Web site and to create their own bookmarks and plan a visit. The more friendly subject line from the Peabody Essex “invites you to experience ARTscape!” Both emails contain hyperlinks to the educational content supplied by the institutions’ Web sites. The Tech allows users to send an electronic postcard image of the glowing jellyfish cells they created in the museum’s wet lab. The postcard includes a coupon for reduced admission to the museum or a reduction in the price of a membership (see screenshot 4.1).
Joanna Champagne remarked on another marketing-related institutional goal. The Smithsonian Museum of American Art is located near the popular tourist destinations of the Spy Museum and the ESPN Zone. Recognizing that potential visitors have limited leisure time, they are hoping the SIGuide will serve as a marketing tool to attract people who might otherwise go to these nearby competitors. Champagne also

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209 Champagne, interview.
shared the only institutional goal with a specific objective that surfaced among all the museums I researched for this project. It is a usage goal, with the museum establishing an objective of an 8 percent take-up rate—the number of visitors who log on to the Web site to extend their museum experience.

Evaluating the Efficacy of Extended Museum Experiences

As host of the January 2005 Electronic Guidebook Forum, Sherry Hsi of the Exploratorium, acknowledged that there exists a “healthy skepticism” about whether these technologies actually extend the museum experience or learning.210 My research uncovered little or no evidence either to substantiate or controvert the efficacy of existing projects. Effectiveness should be measured against the objectives defined for each project but, as previously noted, existing projects have few concrete objectives. Still, some data is being gathered and some formal evaluations are planned or already underway.

The baseline measure of success for the projects researched for this paper may be in completing the implementation and making it available to visitors. Indeed, when asked how he measures the success of ARTscape, the first response of Jim Forrest, Web Creative Director at the Peabody

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210 Sherry Hsi, (Director of Research and Evaluation, Center for Learning and Teaching, Exploratorium), remarks made during Electronic Guidebook Forum, January 12, 2005.
Essex Museum, was “the online component is operationally solid.”

Forrest is not alone in identifying reliability of hardware and software and functionality of design as critical success factors. Each of the case studies cited in this work have forged a new path and led the way for others to follow. These projects are traversing new ground with their applications of technology and successful implementation is a notable achievement.

The most obvious measure of success is the take-up rate—based on the percentage of visitors who log onto the Web site after their visit to the museum. For the Tech, the take-up rate for twelve months from March 2004 until March 2005 was 12.64 percent. What remains unclear, because of the absence of a related objective, is whether this take-up rate is excellent, good, or poor. By mid-2004, the take-up rate for the EMP’s MEG was only 3 to 5 percent. According to curator, producer, and editor, Jasen Emmons, it is difficult for visitors to understand the value of the extended experience. In response to the low take-up rate, EMP has ceased to support the extended experience (although bookmarks can still be reviewed on-site in the museum’s digital lab). Thus, the nation’s first implementation of technology to extend the museum experience has ceased operate beyond the walls of the museum.

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211 Forrest, interview.
212 Emmons, interview.
Take-up rate is only one of the many statistics that can be generated from museum Web sites. Joanna Champagne of the Smithsonian American Art Museum provided the most comprehensive list. Using an Web analytics and statistics application from WebTrends, the museum plans to capture such information as the Web site entry and exit points of visitors, the search terms used while onsite, the platforms they are running, the bookmarks created, and the pages generating the most visits (“hits”).

In addition to the formal evaluation plans of the Tech Museum of Innovation (described in the TechTag case study), Liberty Science Center is also reaching beyond Web statistics by contracting with the Institute for Learning Innovation (ILI) for the evaluation required in their NSF grant proposal. In addition to front-end and formative evaluation, ILI will conduct summative evaluation interviews with visitors to LSC during pilot testing of the SNSE project. On-site interviews will be followed by phone interviews at three and six-month intervals to learn more about the success of the post-visit experience. It is noteworthy that all of the pilots and implementations undertaking formal evaluation (the Tech, LSC, and the Exploratorium) are NSF-funded—thus evaluation is a requirement of their funding. My first-hand experimentation with existing implementations shows that the post-visit experience relies exclusively on the interface and

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content of the museum’s Web site. This is true for the GettyGuide, TechTags, ARTscape and several other projects in planning or pilot stages. Because the extended experience is inextricably dependent upon the Web site, it must figure into the evaluation as well.

General Conclusions

From the findings reported in the previous sections, a number of general conclusions can be drawn. Both the literature review and interviews underscore the importance and timeliness of this topic because of the growing interest in using technology to extend the museum experience beyond the museum building. The most often cited justifications for these projects are to advance educational and technology goals of the institution. Some institutions that seek to be on the “cutting edge” of technology—such as Liberty Science Center, The Tech Museum of Innovation, and the Exploratorium—view their extended offering as central to their mission and actively strive to advance the museum field’s use of technology. At present, perhaps necessitated by the newness of the technology, there seems to be an equal or greater focus on the technical challenges of executing the extended visit than on the content supplied.

Research reveals that a visionary at the top of an organization often champions—or at least enthusiastically embraces—these projects. Paul
Allen at the Experience Music Project, Goéry Delacôte at the Exploratorium, and Dan Monroe at the Peabody Essex, have exemplified such critical leadership. For staff members implementing the projects, execution requires a substantial investment of thought and energy and the application of a variety of skills. Based on the interviews conducted, it would be a mistake to underestimate the importance of cross-departmental collaboration. This is equally true of the design and implementation phases as it is for the ongoing support needed from such departments as curatorial and visitor services. I believe that clearly communicated and commonly understood goals are essential to achieving a high level of cross-departmental support and commitment. The paucity of explicit goals and objectives disclosed during this project reveals both a vulnerability and an opportunity.

Case studies revealed that museums vary in the degree to which they have the necessary skills on staff, thus highlighting the complexity of these projects and the importance of finding, and aligning, suitable internal and external resources. Encouragingly, both museum professionals and those working at for-profit companies demonstrated a general willingness to share their ideas and experiences. Most everyone contacted for this project was generous with both time and information – concretely supporting claims that they have a goal of moving the field forward. This
community of learning and experience can be an invaluable resource to those starting a related project as well as those deliberating taking on the challenge.

Interestingly, while there is a growing investment in the time, energy, and resources necessary to implement these programs, evidence to prove existing projects are successful is virtually nonexistent. Because few projects have been implemented, and even fewer still formally evaluated, little is known about the efficacy of such projects. All of the extended experiences I found in the literature and through interviews rely on the museum’s Web site to host the post-visit experience—thus making it a critical part of any complete evaluation. Take-up rate is an interesting yet insufficient measure. Web analytics hold promise for capturing Web usage statistics but sites must be designed to distinguish between the extended visitor and one who visits the museum only in the virtual realm.

An even greater challenge is how to qualitatively evaluate the extended museum experience and where to find the resources necessary to conduct formal evaluation. Early evaluations—such as those conducted by the Exploratorium and the one currently underway at the Tech Museum of Innovation—are as important to the field’s learning of how to evaluate these projects as for the results they reveal. However, without tangible,
concrete, explicit objectives, what will be evaluated? Glaringly absent in my research were objective measures of success.

A promising aspect of the extended museum visit that is not being fully exploited is marketing. Personalization was frequently cited as a goal aligned with the desire to provide a customized learning experience. Although marketing concepts could help inform design criteria to achieve this end, it was not a consideration. Several projects seem to include a viral marketing component. Yet overall, beyond the Smithsonian SIGuide, none has an acknowledged marketing goal or objective. In the majority of interviews, the mere mention of marketing was met with a stony silence.

Finally, an important finding was expressed by a number of interviewees representing three different projects. Each spoke of the challenge of educating visitors about the concept of the extended visit and the possibilities it offers. They cited impediments that included the unfamiliarity of the concept, the newness of the technology, the limited amount of time visitors are willing to spend, and the lack of employees or volunteers available to do the explaining. It is clear this challenge must be resolved if the goals of the extended experience are to be met.

In conclusion, it is evident there are many in the museum field who believe in the potential of the technology-based extended museum experience. And, while more and more institutions seem able to find
theoretical justification for such projects, there is a striking dearth of proof they are effective. In order for museums to continue to receive funding and to justify paying the opportunity cost of dedicating scarce resources to these projects, they must be formally evaluated against clearly defined goals and objectives. It is incumbent upon project managers to align strong and enthusiastic leadership, multiple internal departments, and external partners to these commonly understood goals and objectives and to do so with a long-term view of sustained support. With this in mind, they must never lose sight of the needs of the user and must strive to find ways to acquaint visitors with the concept of the extended visit and excite them about the possibilities. These are the challenges that must be met for the potential of the extended experience to be realized.
RECOMMENDATIONS

The idea of the extended museum visit is generating an increasing level of interest from museums of many different types and sizes. As more institutions consider launching these types of projects they should learn from the work that has gone on before. To that end, I offer the following recommendations. These recommendations are targeted to museum professionals who have the responsibility to manage technology-based projects designed to extend the museum experience. Others who may find these recommendations useful include project managers and museum administrators considering undertaking such a project. Outside vendors seeking to partner with museums on these kinds of projects may also find valuable advice. These recommendations will probably be of greatest interest to large and medium-sized museums that have the funding and internal mandate to undertake costly technology projects. However, as with many technological advances, the cost of implementation may fall over time, bringing these kinds of projects within reach of more museums. In addition to the variety of museum professionals who will find these recommendations useful, external firms working with museums on these kinds of projects—most often on hardware, Web design, and user interface—can increase the value of their contribution by understanding and supporting these recommendations. And, while the focus of this
master’s project is limited to the United States, the recommendations presented here apply equally worldwide.

These recommendations have two major thrusts. The first is to help museums achieve their mission and meet the needs and expectations of their visitors through thoughtful design of extended experiences. The second focus of these recommendations is to lay a strong foundation during the planning and project management stages to increase the likelihood of successful implementation.

1. **Ground project design in current learning theories and business concepts**

   Extended museum experiences offer great potential for the application of established learning theories and business concepts. Skillful application of both may result in optimized learning as well as in an increased number of visitors who will avail themselves of the extended experience. Museums often create extended experiences with the primary goal of increasing learning. To that end, museums implementing such projects should base their content, interface, and on-line activity designs on applicable learning theory. By applying the concepts of experiential learning, constructivist learning, and free-choice learning—among
others—museums can maximize knowledge acquisition for visitors with a broad range of learning styles.

In addition to applying learning theories, museums should leverage contemporary business concepts in the design of extended museum experiences. The application of select business strategies can increase the attraction and familiarity of the extended experience for visitors. Personalization and customization are two such concepts that have a natural synergy with prolonged museum visits—and which can be seen to varying degrees in existing implementations. Much of the museum-going public has come to expect personalization and customization in their every day lives—whether ordering a customized coffee at Starbucks or perusing personalized recommendations on Amazon.com. By appropriating these ideas museums can meet the expectations of visitors for a unique and special experience and increase their level of engagement.

2. Allocate adequate resources for educational content creation and interface design

The primary goal of most projects to extend the museum experience is to increase visitor learning. To reach that goal, substantial time, money and resources must be concentrated on the educational content made available during the extension of the museum visit. A lack
of focus on content could lead to the dilemma faced by one institution that, having exhausted its project budget on technology and exhibit design, had no money left to create Web content for the extended museum experience. While technology may facilitate learning, without content, no learning can take place. Equally as important as the amount and variety of content that can be made available on a museum Web site, is the interface that mediates the user experience. The Web portion of the extended experience should be designed to reach a broad and varied audience. Learning theory can supply insight into the types of learners most likely to benefit from an on-line learning opportunity and the most effective ways to adapt content and design interaction. Educational concepts and theories such as constructivism, inquiry cycles, intrinsic motivation, and free-choice learning all deserve consideration when designing on-line extended learning. Strategic delivery of a depth and breadth of content during the extended visit will help museums meet their educational goals.

\[214\] Conversation with anonymous exhibit designer, March 2005.
3. Create a strategy to educate visitors about the potential of extended visits

The technology-based extended museum visit is a recent application of technology and is only available at a handful of museums in the United States. These may be the primary reasons for one of the most pervasive findings of this inquiry. Generally, visitors do not understand the technology involved in the extended visit, the benefits of it or how to avail of it. Museums including the Experience Music Project, the Tech Museum of Innovation, the Peabody Essex, and the Exploratorium have all identified visitor understanding as a weakness in the projects and a critical issue that must be addressed. The complexity of the extended experience is based in multiple uses of technology—some of which may be unfamiliar to visitors. RFID tags, bar codes, and even PDAs are not ubiquitous for the museum-going public. Museums must help visitors understand how to use these devices during their visit so they can establish the foundation for the extended visit. Subsequently, museums face the even more challenging task of educating visitors about what is available to them during an extended visit, why they should be interested, and how they can access it. Viable strategies include brochures; a brief, explanatory video at the admissions line; a souvenir reminder to log in to the Web site (for example, a message-bearing refrigerator magnet or pen), and
knowledgeable floor staff who can educate and guide users. Until the
obstacle of making visitors aware of the extended visit is overcome, usage
statistics (for example, take-up rates) will likely remain low—perhaps too
low to justify the cost of these projects. To demonstrate the value of these
projects the museums need to increase the level of use by visitors. To do
so, museums must create effective strategies to educate visitors about the
in-museum and post-visit components of the extended experience.

4. Maximize synergistic marketing

Internet-based prolonged museum experiences provide valuable
opportunities for synergistic marketing. Among these are viral marketing,
personalized newsletters, and museum store advertising. Viral marketing
principles can be implemented by providing visitors the opportunity to
share their museum experience with others. For example, by allowing
visitors to electronically share their digital art collections or the results of
an experiment performed during their visit, museums can avail of word-
of-mouth advertising at the speed of the Internet. A related marketing
strategy is to incorporate offers for discounted admission or memberships
to those who send or receive electronic viral marketing. Museums that
capture contact information for their extended visitors can use the data
gathered both in-museum and post-visit to create personalized newsletters
and invitations to special exhibits and events. Such efforts will increase the likelihood the visitor will be aware of museum offerings of particular interest—and hopefully that they will attend. Perhaps the most explicit marketing opportunity that is a natural fit with the continuing museum visit, is to make product recommendations from the museum store based on visitors’ online actions. This is an ancillary application of a recommender algorithm that may already be used to suggest new areas of exploration during the extended visit. Because each of these marketing synergies builds on components already existing in many extended experiences, museums should seriously evaluate the gains that can be made for incremental cost.

5. Research and leverage the existing knowledge base about the extended museum experience

Although still in its early development, there is an expanding body of literature on the topic of technology-based extended museum experiences and their elemental components. Resources include books, professional journals, conference proceedings and electronic resources. Because a variety of components, staff positions, and kinds of expertise conspire to create such experiences, research should include the

215 Personal information should be captured and used only with visitors’ explicit permission. Museums should establish a privacy policy for electronic data and make it available to all visitors.
constituent parts comprising technology-based extended experiences, for example, online learning, Web design, user interface, and the use of handheld and capture devices (RFID tags, for example) in museums. In most cases these elements have a history of application pre-dating the advent of extended museum experiences, so much can be learned from the literature.

Professional conferences are another excellent resource for museum professionals embarking on a project designed to extend the museum experience. Conferences provide an opportunity to learn about similar projects or about the components of the multi-faceted extended visit—for example, designing effective educational Web sites or using handheld devices in museums. In addition to general conferences like the annual conferences of the American Association of Museums (AAM), the Association of Science-Technology Centers (ASTC), and regional museum associations, there are gatherings specifically focused on museums and technology. For example, Museums and the Web is an annual conference focusing on the presentation of cultural and heritage content on the Web. The 2005 conference featured presentations on handhelds, online learning, and a half-day session on pre- and post-visit experiences. Equally important as the content of the conference sessions is the valuable opportunity to network with other professionals who may be
interested in technology-based extended visits or already working on them. The latest information—that which has yet to be published elsewhere—is typically presented at these conferences, making them an important complement to print and electronic resources.

Finally, to better understand the promise of the extended visit it is important to experience existing implementations to discover first-hand what is possible—what works and what does not work regarding design, content, and user experience. Museum professionals considering such projects should make use of all of these resources to learn from, and build upon, the research and experiences of others. In turn, those who avail themselves of these resources should add to the knowledge base by publishing their findings, giving presentations, and responding to inquiries from other museum professionals.

6. The museum’s director must be fully behind the project

Projects to extend the museum experience must have support from the upper echelons of museum management. These projects require substantial resources of time, money, and people in museums that typically have limited budgets and tight headcount restrictions. Projects sponsored by influential executives will have a greater chance of success. Museum founders and executive directors have championed many of the
successful U.S. implementations of technology-based extended museum experiences. Starting with the visionary leadership of Paul Allen at the Experience Music Project, to Dan Monroe at the Peabody Essex and Goéry Delacôte at the Exploratorium, each created a vision for their organizations that included using technology to extend the reach of their museums beyond the limits of the building.

7. Garner support and commitment from all the stakeholders including technology, education, marketing, and visitor services.

Extended museum experiences are complex undertakings – incorporating multiple technologies, volumes of content, and at least two user interfaces (one during the visit, one afterward). Each aspect of the design, implementation, and ongoing support of the project requires the work of one or more departments in the museum. While each project is unique, it often requires the collaboration of such diverse departments as technology, education, curatorial, exhibition design, marketing, and visitor services. Stakeholders are those people or groups with a direct interest, involvement, or investment in the project and, for a project to be successful; it is essential to garner the support and commitment of all the stakeholders. A collaborative relationship with stakeholders should be established early in the project. The importance of this alliance was
revealed in several projects examined for this inquiry that were hampered by a lack of support from a variety of stakeholders, including curatorial, visitor services, and exhibition design. Had the commitment of these stakeholders been secured early in the process, and had they been involved in aspects of the project that pertained to them, the likelihood of a smoother collaboration would have been increased. Roles and responsibilities of stakeholders—all aligned with the goals and objectives of the project—should be clearly defined. For example, if visitors’ services representatives will be responsible for distributing and explaining an in-museum device, these responsibilities should be agreed upon early in the project and their commitment to the task secured. Once commitment is established, the project manager should nurture that support by communicating regularly with stakeholders and keeping them informed about the progress of the project and involving them where appropriate.

8. Establish goals and objectives and communicate them clearly and consistently to all stakeholders

Project goals define the purpose of the project. They are like signposts guiding the project—and the people working on it—toward intermediate targets and a final destination. Goals direct decision-making and provide focus. By establishing goals and communicating them clearly
and consistently, all the members of the project team will be investing their time and energy toward the same end. Commonly held goals can mitigate the tendency, as illustrated in my findings, for people and departments to view the purpose of the project differently. In addition to time and budget goals, projects to extend the museum experience should have goals related to education, technology, the visitor experience, and perhaps marketing.

In addition to goals, the project should have objectives. Objectives are precise, concrete, and tangible and should be aligned with the project goals. They are the means by which the success of the project can be measured. As noted previously, the Smithsonian American Art Museum has established an objective of an 8 percent take-up rate (the percent of people who will make use of the extended experience). If they meet or exceed that rate, they have met that measure of success. Should they miss that objective, they will have an idea of where they need to focus to reach their goals. Without objectives, it is difficult to understand the precise impact of the extended visit and whether the promised benefits are being realized.
9. Museums must evaluate projects to extend the museum experience

At odds with the increasing level of interest in the extended museum experience is the finding that there is a dearth of evidence showing they are effective. Once project goals and objectives are established (as previously recommended) museums should establish a plan to evaluate performance. Not only can evaluation measure success, but it can also be used to identify aspects of the experience that need remediation. Web analytics software applications capture data about Web site use. They can provide a wealth of information about how many people came to the museum Web site, how they found it, and what they did when they got there. These kinds of statistics are useful for tracking take-up rates and identifying areas of greatest interest to visitors. Web analytics are very effective for gathering quantitative data. Other types of evaluation are required for understanding such things as the motivation behind the visitors’ actions and for appraising the quality of the extended experience and whether any learning has taken place. Methodologies used in pilots or planned for use in the near future include observation, surveys, questionnaires, and interviews. The intricacy of the technology-based extended museum experience demands the use of a variety of methods.

Evaluation should be a consideration in project design—especially for the Web site aspect of the extended experience. For example, the
addition of a simple design element can allow Web analytics program to segment visitors by whether they are extending a physical visit to the museum or if they have only visited virtually. Without this design element, it may be impossible to track basic take-up rate. In addition to designing with evaluation in mind, it is important to set aside money—typically about 10 percent of the project budget—to conduct evaluation.

As museums continue to explore the promise and possibilities of the extended visit, they should build upon their predecessors and apply sound project management principles. Any such project must have the support of senior management. Project managers can learn a great deal about how to achieve a successful implementation and how to avoid some of the hazards by researching literature, attending conferences, exploring existing implementations, and networking with other museum professionals. The complex nature of these projects requires a collaborative effort—one for which the groundwork should be established in the early project planning stages. By involving stakeholders throughout the process and by establishing clear goals and objectives, the likelihood of success can be greatly increased. Success is also dependent upon the quality of the user interface, the availability of quality content, and the ability of the museum to convey the concept of the extended experience to its visitors. Finally, evaluation is critical to advancing each individual
implementation as well as the field as a whole – ultimately with the goal of fully realizing the potential of the extended museum experience.

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*Technology is the knack of so arranging the world that we don’t have to experience it.*

- Max Frisch

Are technology-based extensions of the museum experience a breakthrough in museum education and visitor experience or just the latest fad? Unfortunately, no one knows – yet. There are those who believe Frisch was right—that technology inhibits our experience of the world. There are others, myself included, who see technology—when used judiciously and appropriately—as a powerful tool that can open up whole new worlds. For the purposes of this project I have been limited to one kind of extension of the museum experience that can be accessed in only a few select museums. Yet people can—and do—sustain their museum visits all the time. Whether by purchasing an exhibition catalog at the museum store, or scribbling down an artist’s name on a ticket stub and doing an internet search after they return home, museum visits are being extended. Despite the lack of evaluation to prove the efficacy of the
technology-based extended visit, museums have an obvious opportunity to control, shape, or at least facilitate the extended experience. The question is not whether to offer opportunities to extend the museum experience – but how best to do it.


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Anonymous. Personal communication with the author, March 16, 2005.


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Petrof, John V. "Relationship Marketing: The Wheel Reinvented?" 


Prabhu, Vas (Deputy Director, Interpretation and Education, Peabody Essex Museum), interview with the author, by telephone, February 14, 2005.


Sorenson, Christy (Director of New Media, Peabody Essex Museum), interview with the author, by telephone, April 6, 2005.


"Technical Innovations at EMP: Museum Exhibit Guide (MEG) Device." The Experience Music Project,


____. Exhibit Developer, email communication to the author, March 10, 2005.
Interview Questions
For professionals involved in projects using technology to extend the museum experience

What is your role?
When was your project implemented?
How long was the development process - from inception to implementation?
What were the major reasons you decided to implement the project?
What were the goals and objectives for the project?
How important is the component of extending the museum experience?
What departments and/or people were most involved with the project?
Did you work with outside vendors?
   If so, who and for what?
In general, how has the project been received?
Has any formal evaluation been done on your project?
   If so, what kind? Would you be willing to share the results?
   If not, do you have anything planned? What?
Does your institution offer other means to extend the museum visit?
Can you recommend other people I should speak with?
Are you aware of other U.S. implementations of technology designed to extend the museum experience?
What would you hope to learn from a project such as the one I’m undertaking?
SESSION PROPOSAL APPLICATION FORM

I. SESSION TITLE (No more than seven to 10 words)

The Visitor Has Left the Building: Evaluating Extended Museum Experiences

II. SESSION OVERVIEW (100 words or less for each section)

A. AUDIENCE
The audience for The Visitor Has Left the Building: Evaluating Extended Museum Experiences will comprise museum professionals working in evaluation, technology, and education. It may also be of interest to those working in marketing and museum administration. The session will appeal equally to those employed in museums and external consultants and researchers.

B. FOCUS
This session will focus on the challenges inherent in evaluating technology-based museum experiences that take place outside the museum building and strategies and methodologies for performing such evaluation. This session examines the issues from both a technology and evaluation perspective and will include details of the efforts of three different museums.

C. OUTCOMES
Attendees will understand the challenges of evaluating extended museum experiences. Having learned about a variety of strategies and methodologies appropriate to reach different evaluation goals, they will be able to make recommendations for an evaluation strategy for a technology-based extended museum experience.

D. RELEVANCE
This topic is particularly relevant in this centennial year, when the AAM annual meeting focuses on Exploring Tomorrow’s Museums. Few would deny that technology will be a major force in the redefinition of museums, but the question remains—how and when is technology an effective tool
in the service of the mission of a museum? This session will focus on evaluating these projects so the museum field can better understand whether they are a worthwhile investment of the extensive resources they require.

III. SESSION SUMMARY

A. Description for the AAM Web site and final program (not to exceed three sentences):

Museum evaluation and technology professionals discuss the challenge of evaluating the extended museum experience. Hear a panel (representing both art and science museums), talk about some of the successful—and not so successful—strategies and methodologies they have employed. Ask questions about the relevant evaluation challenges your institution faces and get input from the experts.

B. Description for the AAM preliminary program (one sentence):

*The Visitor Has Left the Building: Evaluating Extended Museum Experiences* presents strategies and methodologies for evaluating technology-based museum experiences that take place after the visitor has left the museum building.

C. Confirmed SPC or affiliate organization endorsement if applicable

(see Endorsement section on Session Proposal Instructions):

Committee on Audience Research and Evaluation *(requested endorsement)*

IV. CHAIRPERSON

First Name: Lisa  
Last Name: Granger  
Title: Museum Studies Graduate Student  
Institution: JFK University  
Address: 4250 Wilshire Boulevard  
City/State/Zip: Oakland, CA 94602  
Telephone: (510) 530-5148  
Fax:  
E-mail: lisagranger@gmail.com
Qualifications (100 words or less):
My master’s thesis was a study of technology-based projects designed to extend the museum experience. Research comprised a literature review, case studies, and interviews showed a dearth of data supporting or controverting the efficacy of such projects and revealed a need for focused evaluation.

Major points to be covered (100 words or less):
I will introduce the panel members and provide an introduction to the topic. I will facilitate the open discussion and question and answer segments of the session.

V. PRESENTERS All presenters must be confirmed, and all information complete. Please photocopy this page if you have additional presenters.

Total number of presenters, excluding chairperson(s):

_______3_______

First Name: Sherry  o Confirmed
Last Name: Hsi
Title: Director, Center for Learning and Teaching
Institution: Exploratorium
Address: 3601 Lyon Street
City/State/Zip: San Francisco, CA 94123
Telephone: (415) 563-7337  Fax:
E-mail: sherryh@exploratorium.edu

Qualifications (100 words or less):
Dr. Hsi holds a Ph.D. in Science and Mathematics Education from the University of California at Berkeley and was a postdoctoral scholar with the Center for Innovative Learning Technologies. In addition to serving as CEO of Metacourse, Inc, a company she founded, she currently directs the Center for Learning and Teaching at the Exploratorium. At the Exploratorium, Hsi is responsible for all aspects of exSpot—the museums latest technology-based project to extend the museum experience. Hsi has published extensively and presented at conferences worldwide.

Major points to be covered (100 words or less):
Dr. Hsi will present some of the lessons learned over the Exploratorium’s six years of pilot projects designed to extend the museum experience. She will talk about what worked and what did not work—and why. Finally,
Dr. Hsi will talk about some of the strategies that theoretically hold promise for evaluating these types of projects—but that, to date, have been too resource intensive to undertake.

First Name: Catherine o Confirmed
Last Name: Eberbach
Title: Ph. D. Candidate and Graduate Student Researcher
Institution: University of Pittsburgh
Address: LRDC 713
City/State/Zip: Pittsburgh, PA 15260
Telephone: (412) 624-7471 Fax: (412) 624-7439
E-mail: cle4@pitt.edu

Qualifications (100 words or less):
Former director of programs at the Bay Area Discovery Museum, Ms. Eberbach is currently a Ph. D. candidate at the University of Pittsburgh and a graduate student researcher with the University of Pittsburgh Center for Learning in Out of School Environments (UPCLOSE). She has worked with the Tech Museum of Innovation of San Jose, California, to design and execute the evaluation of its TechTags program, a radio-frequency identification-based extended museum experience.

Major points to be covered (100 words or less):
Ms. Eberbach will discuss the evaluation strategy she designed for the TechTag project at the Tech Museum of Innovation. She will explain how certain methodologies were selected to gather data for the evaluation of specific goals and objectives of the TechTag project. Eberbach will also discuss some of the challenges inherent in evaluating extended museum experiences and how they were addressed in the design of the UPCLOSE evaluation of TechTags.

First Name: Joanna o Confirmed
Last Name: Champagne
Title: Head of New Media Initiatives
Institution: Smithsonian Institution
Address: MRC 970. PO Box 37012
City/State/Zip: Washington DC 20013-7012
Telephone: (202) 275-1618 Fax:
E-mail: champagnej@saam.si.edu

Qualifications (100 words or less):
After developing web and multimedia projects for seven years at the Smithsonian Center for Education and Museum Studies, Ms. Champagne accepted the role as Head of New Media Initiatives at the Smithsonian American Art Museum (SAAM). At SAAM, Ms. Champagne is responsible for the museum’s Web presence including its main Web site and virtual exhibitions. In addition, she is responsible for the SIGuide project at the American Art Museum that will be implemented in July 2006. SIGuide will provide museum visitors with PDAs to establish the foundation for them to extend their visit by re-engaging through the Web site.

Major points to be covered (100 words or less):
Ms. Champagne will talk about the evaluation strategy for the SIGuide at the Smithsonian American Art Museum. For the purpose of this session, her primary focus will be on Web analytics applications – what kind of information they can provide and how that information can contribute to project evaluation. She will also discuss what to look for when shopping for a Web analytics software package.

VI. CONTENT
(Check only one in each category)

A. LENGTH
X Single Session (75 min.)
□ Double Session (150 min.)

B. FORMAT
□ Ask the Specialist(s)
□ Case Study
□ Forum
□ Interactive
X Panel Discussion
□ Point/Counterpoint

C. TYPE
□ Best Practice
□ CEO/Director
X Discourse/Dialogue
□ New Ideas
□ Nuts & Bolts
□ Research
D. LOGISTICAL SET-UP
X Theater-style
□ Other (Please describe alternate room set-up and convincingly articulate a need for it.)

E. SUBJECT (Check only one)
□ Administration
□ Collections Stewardship
□ Communications
□ Diversity
□ Ethics/Legal
X Evaluation
□ Globalization
□ Governance
□ Interpretation
□ Leadership
□ Planning
□ Technology

X (Please check) By submitting a session proposal, I agree to fulfill the expectations in the Session Chairperson Agreement. Failure to fulfill these expectations will jeopardize your acceptance as a session chairperson or presenter at future AAM annual meetings.