Papers

Bringing Authentic Museum Experience to the Web

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Despite its lack of 3-D reality presence, the Web has some particular capabilities which make it of great interest to the museum world. It is both a temporal and a spatial medium. It provides the opportunity to meld imagery, text and interactivity. And it provides for both individual as well as group (albeit distributed) experience. These attributes are similar to those offered by the museum experience and this is what makes the marriage between museums and the Web such an intriguing opportunity. It is no accident that two of the earliest World Wide Web applications were museum-like projects: the Library of Congress exhibition of Vatican Art and the University of California at Berkeley's Museum of Paleontology exhibit.

Museum use of the World Wide Web has run the gamut from publicity and marketing opportunities to publishing resource to on-line exhibit presentation to real-time connectivity to the museum environment. While much of what museums are doing on the Web follows good Web design rules, museums have a unique role to play when they bring their own public space design sensibilities to their Web work. Along with many museums, the Exploratorium has been undertaking a number of projects which are designed to explore the intersection of traditional museum design and Web resource creation. Over time this work has included the creation of on-line exhibits, exhibitions and experiences. Along the way we have explored how to provide meaningful interactivity for our visitors. Each project has provided lessons about what works and what does not work for this medium.

Our goal has been to bring authentic museum experience to the Web and we have found it helpful to keep our museum exhibit designer hat firmly on our head as we explore the use of this new medium. By thinking of the Web resources in museum terms, i.e. exhibits, demonstrations, exhibitions, it is possible to bring the best of museum experience to an on-line audience. Museums have a unique perspective on interaction and involvement honed by many years of public visitation. It is this perspective that can lead museum Web designers as they work in this new medium.

This paper will present a brief history of some of our past work and then describe our most recent experiments which focus on real-time interaction be tween the exhibit floor and the Web.

ON LINE EXHIBITS

The on-line Cafe Wall Illusion exhibit is one of a series of on-line exhibits based on existing physical Exploratorium exhibits. These on-line exhibits are designed expressly to work directly on the screen. The Cafe Wall illusion at the museum demonstrates a visual effect which occurs when you look at a wall of alternating misaligned black and while tiles. Based on an effect first noticed by the British psychologist, Dr. Richard Gregory, on a cafe wall in Bristol, in the illusion the horizontal lines of a tile set to look to be slanted rather than straight when the black and white tiles are separated by gray mortar and misaligned vertically. This effect disappears if the mortar color is changed to match the tile color or if the tiles are aligned one above each other.

In the on-line version of this exhibit, created by Ron Hipschman, the user can change the color of the mortar or move the tiles to make the effect appear or disappear. Sliders under user control allow the on-line visitor to change what they are seeing. The exhibit works directly on the screen just as it does in the museum setting. The interactivity is direct and to the point and the user can experiment with various alternatives at their own pace. The design of this resource (just like that of the physical exhibit) places the effect front and center to encourage play and manipulation first rather than text and context.

ON-LINE DEMONSTRATIONS

The Cow's Eye Dissection was one of our first on-line resources and was developed by the Exploratorium for the Science Learning Network in 1995. SLN is a project of science museums to use on-line museum resources and telecomputing to support K-8 inquiry-based school science instruction sponsored by the National Science Foundation and Unisys Corporation. Created by Jim Spadaccini, the Cow's Eye Dissection is an on-line version of the popular Exploratorum demonstration of the same name. Designed to present many of the features of the physical demonstration and to encourage on-line visitors to do their own cow's eye dissection, it includes a step by step visual presentation of a dissection, tips from high school explainers, and information about where to get cow eyes.

Besides obtaining the content of this resource directly from the museum demonstration, we tried to add an exhibit-like atmosphere to the on-line experience. An important feature is the addition of audio commentary by the explainers which adds to the verisimilitude of the experience. The real stories of the explainers who do these demonstrations everyday gives the experience an authenticity which makes it more compelling to view. A museum demonstration is part object, part show, part audience interactivity ands this Web resource provides each of these elements for the on-line user.

ON-LINE EXHIBITIONS

The Turbulent Landscapes project was designed to create an on-line exhibition which was closely related to a physical exhibition. The Turbulent Landscapes exhibition at the museum contained over 20 artists works which related to aspects of nature which demonstrated the new field of complexity studies.

The Website, designed by Zane Vella, used existing exhibit images, the exhibit audio tour and the exhibition spatial layout to present an on-line exhibition. To help exhibit visitors develop a deeper understanding of the physical exhibition, the Website was designed to be presented on the exhibit floor near the exhibit as well as to be viewed on-line by remote users. A complexity timeline and a complexicon was added to provide background information. This on-line resource took advantage of the material collected for thecreation of a physical exhibit to create an on-line in-depth experience. It also explored the spatial dimension of the Webspace as a way of organizing information about the site. The on-line experience was designed to be rich and multifaceted in the manner of the physical exhibit.

ON-LINE CONVERSATIONS ABOUT AN EXHIBITION

Remembering Nagasaki was developed three years ago as a memorial for the 50th anniversary of the dropping of the atomic bomb on the city of Nagasaki in Japan. Created by Exploratorium staff Ali Sant, Marina McDougall and Susan Schwartzenberg, this Website exhibition was based on the photographs of Yosuke Yamahata, a young army sergeant in the Japanese army, who was sent to Nagasaki to photograph the aftermath of the atomic bombings. The Website exhibition appeared on the exhibit floor of the Exploratorium as well as in cyberspace on the Exploratorium server and was designed to provide visitors a chance to explore the relationship between memory and historical events.

The Website contained four primary areas. The first was a "Gallery" presentation of the photographs of Kosuke Yamahata. These were be displayed full-screen, and were presented in a way that gave the images the full power that they deserved. The navigation was designed to be very simple and straight forward, and the experience invoked to some degree what it would be like to tour around a gallery of these images on bare painted white walls. The second area was "Atomic Memories" where comments made by visitors about their experience of the Nagasaki bombing were accepted by e-mail and posted on the site. These comments were formatted into a threaded discussion by curator by Ali Sant. The "Commentary" part of the Website invited the public to comment on whole experience of living in the atomic age. The "Commemorations" section of this exhibition was about memorials, in this case a discussion of what it meant to memorialize something such as this event, with links to the memorials that were created for this particular anniversary. This

part made use of the real strong connectivity aspect of the web in its presentation of connections to many sites, including the home page of the city of Nagasaki

Taken as a whole this web site was an encapsulated museum exhibit visitation. Physically, the Website could be visited at the Exploratorium or from someone's home. Cyberly, the exhibition provided an opportunity to discuss the ideas as if one might with a friend at the gallery. The same principles of image manipulation, or evocative questioning, of allowing interaction between people which work on the museum floor worked on the cyber exhibit floor as well. The extraordinary discussion that developed during the months that this exhibit was on-line far exceeded any of our expectations of community dialog and lead us to the conviction that this new tool of the Web provided museums with a new way of interacting with its public.

ON-LINE EXPERIENCE WITH EXPLORATION

Recently, the Exploratorium has extended its work of connecting the museum to the cyberworld by creating a program of real-time networked exhibition experiences. The Live @ the Exploratorium project being developed by Zane Vella is designed to connect a remote field experience of scientific discovery in real time with an audience on the exhibit floor of the Exploratorium and then to use this interaction as the basis for a program that is Webcast on the Internet. In Live @, the remote field experience appears as an exhibition on the exhibit floor, and the audience interaction with the remote field experience appears as an interactive program for viewers in homes and schools anywhere in the world.

For the initial test of this idea, Hubble Servicing Mission: Looking Beyond Boundaries the Hubble Space Telescope servicing mission by the space shuttle in February 1997 was used as a foundation for a series of 14 real time Webcast programs. These programs presented the science of the servicing mission, background on the Hubble telescope as an instrument of observing the world, and discussions with the scientists and the technicians who are involved in the support of the telescope's functions. The audience at the Exploratorium could ask their questions of Hubble Space Telescope scientists and discuss space science with Exploratorium staff. This program was Webcast on the museum's Website and net visitors could e-mail or call in their questions to the experts. A prototype Webcast studio to host this event was built on the exhibit floor. The success of this program demonstrated the potential viability of on the floor Webcasting and remote audience engagement. We had almost 1000 visitors on site over 10 days and over 20,000 on-line users.

In the spring of 1997 a second test Webcast project called Eyeing the Storm was created for schools which presented the art and science of severe storm

visualization. A series of on site and remote interviews were presented on the Web and in person at the museum along with imagery of storm visualization and real storm footage. Each production was offered to a specific classroom. A series of five programs were produced from a small on-floor production center.

Most recently, as part of the total solar eclipse of February 26, 1998 the Exploratorium presented its third Live @ the Exploratorium production titled Eclipse: Stories from the Path of Totality. For the February eclipse totality was only visible in parts of the Galapagos, South America and the Caribbean. This project provided the excitement of attending a total solar eclipse to a live audience at the Exploratorium and to a world wide Internet and television audience. The goal of this program was to provide the experience of being at the eclipse as well as provide context for the event by with science experts, exhibits, visual material and Web material that would present the background of the eclipse for the audience at the museum and on-line.

The eclipse program was produced for a live audience in our new 1500 sq. ft. Webcast studio built on the exhibit floor of the museum. It involved the development of a comprehensive Website on the Exploratorium server along with live two-way production from with an Exploratorium crew which originated from a viewing site on the island of Aruba. Zane Vella and served as coordinating producer for the project and with the help of Noel Wanner produced the Webcast program from the Webcast theater. The Exploratorium sent a field expedition team including Marina McDougall, Kurt Keppler and Ron Hipschman to Aruba to provide coverage of the total eclipse. They were joined by a reporter for Discovery On-line, Hannah Holmes. The eclipse Website was produced by Jim Spadaccini with stories developed by Exploratorium staff.

Our idea was to use the activity of the total solar eclipse, which is highly interesting to a broad public, as a vehicle to present aspects of current research on the Sun-Earth interaction. We also wanted to provide a background of past history and the social and cultural aspects of eclipse viewing to help support a discussion of the long-standing interest of people in viewing eclipses wherever the occur around the world. This project was a collaboration between the Exploratorium, NASA's Sun Earth Connection Education Forum which is designed to educate the public about the scientific research activities surrounding the sun and it's relationship to the earth and Discovery Channel On-line, which presents to its on-line audience coverage of scientific events happening around the world. We were fortunate to be able to connect with the Science Museum of Minnesota's travel program which provided a trip for its members to the Aruba viewing site.

The new Webcast studio on the exhibit floor of the museum was the key locus of activity, serving as the production as well as educational nexus for this networked event. The production studio is open to the exhibit floor and can

hold up to 100 people seated and many hundreds more standing in different locations around the outsides of the studio space. It is designed to be operated by a host who interacts with guest scientists and staff on site at the Exploratorium and with remote scientists and guests from locations around the world. The interaction between the audience and the scientists both at the Exploratorium and at remote locations serves as the content material which was produced and streamed through the Internet from the Exploratorium. The Webcast was visible within the eclipse Website which included background material on the eclipse, the various stories of past eclipse events, as well as a Webchat, e-mail dialog, and archive of images. The studio is designed so that the public can replay past events from an archive as well as view new events.

Because of the difficulty of providing two-way IP communication to the island of Aruba, NASA provided a high-bandwidth datalink between the island of Aruba and the Internet using the TDRSS Communication Satellite system. This allowed for sufficient bandwidth to provide both two-way communication to the island of Aruba, as well as Webcast video streaming from Aruba. For the period of the eclipse itself, we also provided a standard one way television satellite video feed from Aruba which was used by large group viewing at schools and museums. In the Webcast studio, three large monitors -- two video and one data -- provided images of the eclipse and information from the Internet. Distributed monitors on the floor of the museum provided additional viewing sites for the public.

A preview event Webcast was held the night before the eclipse. Guests at the preview program included solar science researchers, Exploratorium scientific staff, as well as visitors in Aruba that were awaiting the next day's eclipse, and stories from archeoastronomer who talked about past eclipse events. The Webcast of the eclipse itself occurred during a two hour Webcast Thursday morning and was a mixture of video feeds from the floor of the Exploratorium as well as from the Aruba event. The backup video feed was also carried by news services in the United States and around the world including real time coverage by CNN. The eclipse project recorded over 500,000 users of the Website, over 10,000 viewers to the Webcast itself, and millions of people received the images and interacted with the event through the television broadcast component of the project.

Live @ the Exploratorium places the museum squarely in the center of the design and development of public experiences of exploratory discovery in the world. Future proposed projects include a series of programs on earthquakes, an examination of the underground aspects of a city and the presentation of the research on the discovery of the complete genome of species to name a few. This project demonstrates the potential for opening a museum transparently to the world at large through the use of telecommunication and network while maintaining the museum's central role as an interpreter of objects and events, and as creator of social experience of discovery.

CONCLUSION

As these examples have hopefully shown, museum design and Web design can have a strong interrelationship. Museum sensibilities such as thinking of 3-D exhibits not 2-D books and providing experience not just information mean that museum Web sites can be fundamentally different and more inviting than many designs today. As museum professionals we should not leave our museum design sensibilities on the doorstep as we step into the Web design world. Our spatial, informational and experiential proclivities can serve as in good stead as we look how to use this new medium to fulfill our mission as museums in the future.

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