The MultiMedia Playground

Experiments in the Design of Multimedia Exhibitions

Robert J Semper
Executive Associate Director, Exploratorium
3601 Lyon Street San Francisco, CA 94123
415-561-0318 phone 415-561-0307 fax robs@exploratorium.edu

The seamless integration of interactive media into a museum setting is a major design concern for museum exhibition developers. Matching the scale and interactivity of multimedia exhibitry with physical objects on the one hand and visitor dynamics on the other is a difficult undertaking. This is especially true because the traditional design of multimedia presentations are optimized for single users in an office, home or school situation, situations which are considerable different from the dramatic, three dimensional, multi-user environment of a museum setting.

A previous paper discussed some of the general issues concerning the integration of multimedia into a museum environment by considering the relationship between the nature of interactivity and the connection of multimedia installations to the exhibit floor.[1] This paper will discuss some concrete design issues which arise when presenting multimedia in an exhibit context. The two recently held Exploratorium MultiMedia Playgrounds will provide a set of specific examples.

The MultiMedia Playground

In early spring 1994, the Exploratorium held its first MultiMedia Playground. Designed to be a four week public access software and hardware trade show for people who don't usually attend existing industry shows, the MultiMedia Playground became an instant hit. The audience ranged from senior business people who needed to get a quick overview of what their technical staff were talking about, to teachers were interested in exploring how to use this new medium in their classroom, to parents who wanted to learn what kind of software to buy for their children. The Playground included samples of multimedia titles, creative presentations by artists and designers, access to different hardware platforms and staff and volunteer resources to help visitors with their questions.

---

1 Proceedings of the 1991 ICHIM Conference

The success of the 1994 exhibition lead to the development of a follow on exhibition, MultiMedia Playground '95, held in the spring of 1995. This exhibition developed its design based on an analysis of the previous years experience and was more clearly focused on network interactivity, virtual environments and community use of the new media.

The MultiMedia Playground was developed by a design team headed by Susan Schwartzenberg, director of the Exploratorium's Media Department and including Max Cameron and Sarah Berg (for the first) and Ali Sant (for the first and second) with substantial support from the Exploratorium's Media, Library and Film Program staff including Ron Hipschman, Larry Shaw, Kurt Keppler, Jim Spadaccini, Zane Vella, Rose Falanga and Marina McDougall.

Both Multimedia Playgrounds were developed by the Exploratorium's Center for Media and Communication which was founded in 1991 to explore the use of media and different communication channels to reach an extended audience outside the museum as well as provide media-rich experiences on the exhibit floor. In addition to being a major temporary exhibition as part of the Exploratorium's public programming efforts, the MultiMedia Playground served as a testbed to prototype a variety of ways to use multimedia in the Exploratorium. These shows gave us the opportunity to test a number of ideas about the integration of multimedia into a public exhibit setting.

The First MultiMedia Playground

The initial MultiMedia Playground was a 3,000 sq ft exhibition which ran for 4 weeks in January and February, 1994. The exhibition was designed with five sections: CD-ROM Library, Tools of the Trade, Special Exhibits, Virtual Worlds, and the Internet. In addition to the exhibition, a series of software demonstrations by local multimedia developers were held in the exhibit area and in our 200 seat theater. A series of panel discussions on future trends in the industry and society issues surrounding new media were conducted on the weekends.

The CD-ROM Library presented over 50 multimedia titles in a repertory fashion at workstations which were designed to be used by small groups of 2-3 people. At the Tools of the Trade area, volunteer multimedia developers demonstrated how titles were produced using a complete multimedia production system. When presentations were not being made, visitors could use the system to explore multimedia development tools such as Macromedia Director, Adobe Photoshop and Adobe Premier, a QuickTime editor.

The Special Exhibits section demonstrated such projects as Todd Rundgren's interactive CD-ROM, flip-books based on the I-Ching with Tim Binkley's Books of Change and do it yourself animation with Spoonimation, an artist created automatic animation stand where visitors made their own animation using a small stage with characters. The Virtual Worlds section presented a virtual reality piece by Jenny Holtzer and CitySpace, an interactive program for kids, developed by Coco Conn and Zane Vella which

uses the concept of neighborhood as a way of introducing children to the Internet. The Internet section provided visitors high speed access to the Internet at five workstations with a volunteer staff to help people navigate.

The MultiMedia Playground was designed to be an informal environment with computers set on desks in an open fashion. The various areas were delineated by signage and furniture arrangement. The entire space was populated with Exploratorium staff and volunteers to provide assistance to visitors and to answer computer questions.

MultiMedia Playground '95

Having gained significant experience with the concept of a multimedia exhibit, MultiMedia Playground '95 was developed from the start to be a more integrated exhibit environment. Designed to mirror the rapid expansion of the use of multimedia over the intervening year and, more particularly, the accelerated use of computer based networks to support the communities, MMP '95 was an 8 week 4,000 sq.ft. exhibition. The five main components of the 1995 exhibition were the Introduction /Orientation area, the Digital Snackbar, Virtual Environments, the Internet Roundtable and the Media Workshop.

The Introduction/Orientation area was added based on the previous years observation that many of the visitors were not well acquainted with using computers. It included a staffed beginners area, a computer dissection table with dissections performed on a working computer every hour, a CD-ROM based introduction to computers, an exploded computer and an exhibit on hard disk drives. The Digital Snackbar provided a digital sampler of Interactive Multimedia with 50 commercial titles chosen by a review board for educational value, and a demonstration area for non-commercial projects developed by local schools and organizations.

The Virtual Environments section presented experimental installations including an expanded version of CitySpace by Coco Conn and Zane Vella with a live connection to a similar installation at the Ontario Science Center in Toronto; SMDK, an architectural sound environment created by Christian Huebler and Knowbotic Research composed of digital sounds supplied by people the world over through the Internet; and Intersection, a blue screen, interactive video piece created by Kurt Keppeler and Ali Sant which mixed recorded street scenes with live visitor images from two locations.

The Internet Roundtable provided 8 workstations with high speed access to the World Wide Web, an interactive connection to a robot system investigating a volcano in Hawaii as well as video conferencing via CUSeeMe to people from all over the world. The Media Workshop provided groups of 8-15 people with the chance to explore interactive media development in a 45 minute program.

Each weekend, presentations were scheduled in the exhibition space and a number of lecture series were held in the museum's 200 seat theater including Tools of the Trade where local multimedia producers demonstrated the tools they used, the History of the Future which explored past visions of the future, Rewiring Community which examined using networked technology to build and sustain communities and Introduction to the Internet which provided an overview of Internet connectivity.

The exhibition space for MMP '95 was designed to create a sense of community and environment and to counteract the isolationism which often is the effect of the multimedia experience. While there were many individual workstations (the exhibit included over 40 Unisys and Hewlett Packard (HP) pc's and Apple Macintoshes as well as 4 Silicon Graphics (SGI) UNIX workstations, an HP UNIX workstation and an SGI Onyx minicomputer), the visitor experiences were clustered in such a way that the social environment was highly developed. Each area had its own design sensibility and the visitor could journey from one section to another. Since the exhibition was about multimedia software and hardware, the computers were places out in the open with no attempt to hide the cables or encase the machines. The design was deliberately not high tech but rather presented a clean, almost homelike space with table lamps and wood furniture to encourage a sense of approachability.

The space was developed with large semi-enclosed structures. CitySpace was contained in a three wall space and SMDK was situated in a large black box. The Media Workshop was presented under a tent with open walls. Four large projection screens which showed activities from various exhibit activities were used to create larger scale environments for group interactions.

A key feature in the exhibition operation was the staffing. The exhibit used both staff and volunteers and needed at least six people to provide smooth operation. A full time technician was required to keep the hardware running. The Virtual Environments exhibits and the Media Workshop required a facilitator for them to operate. Other staff provided general visitor support by answering questions concerning connectivity, software and hardware and program navigation which could not be answered easily in a sign or brochure. The staff also provided security for the hardware. An exhibition brochure was produced to answer frequently asked questions and to provide a schedule of activities.

Museum Multimedia Design Lessons from the MultiMedia Playground

The MultiMedia Playground experience at the Exploratorium provided us with number of opportunities to test multimedia design issues in a real museum setting. Three general themes which we have found useful to study are the social and group dynamics of using multimedia exhibits, the appropriate scale of multimedia applications in public spaces and the dynamics of managing group activity, especially those which take some length of time, in exhibition spaces.

Museum Multimedia and Visitor Social Dynamics

One of the key questions which has to be addressed when introducing media into a museum setting is how to maintain the social environment of the exhibit environment. Too often the introduction of multimedia elements in an exhibit space becomes a single user event in what is otherwise generally designed to be a public group space. Designers have addressed this in the past with the addition of slave monitors to systems for added viewers and by providing multiple workstations with the same program.

The physical environment can have a lot to do with the social dynamics at a media exhibit. The CD-ROM Library/Digital Snackbar area in the MMP is an interesting example of this. In the original MMP the CD-ROM workstations were clumped in four groups of three in a cluster with low walls and extended desks. Low movable stools were used for visitors. This setup encouraged small group interaction and significant engagement with the title in one area but less browsing among the stations. In MMP '95, the design of the equivalent Digital Snackbar area placed the 12 workstations on a curving table with the visitors sitting on tall stools on the inside of the curve. This design emphasized the individual nature of each workstation. This configuration seemed to encourage more browsing among titles with shorter stays at each system and also seemed to favor more solo use, but seemed to discourage small group use.

The Internet area also evolved from the first exhibition to the second. In the original MMP, 5 networked workstations were placed on desks against the wall in a corner to form an L shaped area. The space in front of the corner was often filled with people asking questions of the exhibit staff which made the workstations themselves seem inaccessible. In MMP '95, 8 Internet workstations were placed on a round table so that users could see other users, but would also have a space for their own work. This roundtable worked out well not only for users but also for visitors who were vicariously participating by watching over the shoulders of the users. The table because a focal point for discussions about the net and because the table was round, there was space for many of these discussions. The individual nature of the network interaction was transformed by the space into a group setting.

The Scale of the Multimedia Experience

Too often museum multimedia is presented in the same scale as desktop multimedia. While this may be appropriate for offices and homes, it does not support the dynamic public space environment. Museums offer multimedia the opportunity to break out of the box.

The MultiMedia Playground offered the chance to introduce elements which were designed to change the scale of interaction. The original exhibition was primarily designed to a single uniform scale dictated by the size of individual workstations. To create a more integrated and rich environment, the design of MMP '95 developed a close coordination between the function, the equipment and the exhibit environment. Large semi-containing structures were created to figuratively enclose areas. A number of

large screen projections were used to transform individual experiences into group events. The exhibition itself was moved from the original ground floor location to the open central mezzanine. While this was initially done because the original space was not available for the second show, the move proved felicitous because it allowed the creation of a dramatic environment visible from both the mezzanine and the main exhibit floor.

As part of the Internet Roundtable, a CUSeeMe video conferencing system was installed. CUSeeMe is an Internet-based desktop video conferencing system which uses 1/8 size screen images and push to talk audio to establish video communication paths between computer users. Multiple connections are possible by connecting to a reflector so that you can view up to 8 people at once. To get away from having everything in the MMP '95 displayed on monitors, the project team created a conversation space for this exhibit where the interaction was through the projected large screen image, a small stalk camera/microphone and a mouse for navigation. Visitors could talk to people from all over the world who had signed onto the reflector. The size and openness of this installation provided a transparent communication which was not possible using the standard monitor setup. We also found that visitors easily developed a facility in using the system without a great deal of instruction,

SMDK was housed in a large black 12' X 24' room which was lined with loud speakers. A virtual sound space with dynamically changing sound bites was mapped onto the physical space in a computer. Visitors would individually walk through the space with an ultrasonic sensor which would trigger the sound clusters to play as they bumped into them. A tiny single eye monitor attached to a headband would give the user a visual indication of the sound space. Outside the exhibit, a map of the computerized virtual sound space was projected with the user's real-time position indicated. The sounds were loud enough to be heard outside the box. This allowed other visitors to experience what was happening inside the box. Here again the scale of the interaction was key to adding drama and excitement.

The Intersection installation used two large 8' X 10' blue screen walls and multiple monitors to create a virtual playground. One of these screens was mounted on the main exhibit floor and one on the mezzanine directly about the first. Visitors would see themselves in a monitor with an added background of San Francisco scenes and with other visitors blended from the other blue screen site. This exhibit not only provided a group scale physical activity to the show, but it also served to integrate the space into a whole. Visitors to the ground floor exhibition space were drawn into the exhibition upstairs.

Each of these exhibits used the space of the museum to great advantage by enlarging the experience. The medium itself became a 3-D architectural device.

Managing Individual and Group Activity in an Exhibit Space

A third area of multimedia integration concerns the operation of activities in the public space environment which have a different time and space dynamic from the general exhibit floor activity. The

general mode of visit for visitors to the public space environment is browsing. Visitors spend a short period of time (i.e. seconds) at a lot of exhibits and a longer period of time (i.e. minutes) at a few exhibits. The open nature of the exhibits and the exhibit floor can accommodate a large number of visitors exhibiting this behavior. For example at the Exploratorium we have over 600 interactive exhibits on our floor and this number can handle peak crowds of 2500. But when activities are created which support longer usage (i.e. 1/2 hour to 1 hour) it is usually located in classrooms, theaters or other facility away from the exhibit floor.

In both of the MMP's there were exhibits which contained areas open to the exhibit floor where visitors could spend a long time working on a project. These spaces rapidly were filled and experienced low turnover. Our goal was to see if we could integrate this kind of activity into the main exhibit floor in a manner which would not cause frustration and one which would let many visitors observe what others were doing.

The CitySpace installation was designed to support a small group of students creating building models on Macintoshs which were then integrated into a fly through city rendered on a high end SGI Onyx graphics system. The city itself was projected on a large screen at the back of the space so that visitors as well as users could see the final product. There was one workstation which provided navigation control of the model. The students would work for a day or for a series of afternoons creating their images. This space was effectively a design studio for the participants with CitySpace staff supporting the work of the participants. Since this design work was individualized and takes considerable time, the 8 workstations in the CitySpace installation were usually occupied during the week by groups making it inaccessible to visitors. On the weekend, members of the visiting public could use the space to design their own buildings. Users would spend a long time at the exhibit. For the visitors who were not able to use the system, the large projection screen served to provide a visual experience to the observers. And CitySpace staff served as hosts to discuss the project with onlookers.

The Media Workshop was designed to hold short term (45 min.) classes in multimedia development lead by a multimedia instructor for groups of between 8 and 16 with 8 workstations and a projection screen at the back of the space. Production projects were designed to introduce the public to the use of production tools such as Adobe Photoshop, QuickTime editors, morphing and image capture with a scanner, video camera and digital cameras. The space was available in a first come first serve sign up fashion and could also be reserved by groups in advance. To integrate the Media Workshop into the museum, the production projects were based on Exploratorium-exhibited phenomena such as 3-D imaging, morphing faces and colors. This was the beginning of the creation of multimedia curricular material which is tied to the content of the museum.

The Media Workshop was usually filled to capacity which meant that many visitors were disappointed in not being able to access the space. To help visitors understand what was being developed inside the space, a workstation with an assemblage of past class projects was placed in front of the space. Visitors could also watch the instruction and see the results projected on the large screen. Based

on our experience with the Media Workshop, it appears that this kind of layering of experience from simple browsing to peripheral participation by looking over a shoulder to active engagement can be successfully built into a museum exhibit setting. A key element is good orientation signage to let visitors know what is going on.

Conclusion

The Exploratorium is currently extending the work of the MultiMedia Playground by developing a new learning environment, called a Learning Studio, within the museum. Designed for intensive and repeated use by the visiting public, members, teachers, and students, this media-rich studio will use interactive media to support the in-depth learning that is difficult to accomplish with exhibits alone.

In a manner similar to that of an artist's studio, the Learning Studio will have available all of the tools necessary to create an in-depth learning experience on a variety of topics. Located adjacent to the exhibit floor with easy access to exhibits, the 1000 sq. ft. space will be designed in an informal manner with an on-site facilitator to support its operation and a library of print and media resources. Although it can be used by individuals, a prime feature of the studio will be its focus on fostering small-group interaction and intergenerational learning.

A main component of the Learning Studio will be the use of interactive media workstations designed for use by up to four people. An important feature is the potential for teachers, students, and visitors, with little or no training, to be able to create videotapes, color prints, slides, and computer discs based on their museum experience which they can take back to their homes or classrooms. The Learning Studio will also be the production center for the development of Exploratorium multimedia material for the Internet.

The Learning Studio project will be an attempt to fully integrate interactive media into the museum setting. It will make use of all of the lessons we have learned from our past two MultiMedia Playgrounds. And it will serve as an ongoing laboratory for the study of using interactive media in museums.

Acknowledgments The MultiMedia Playground could not have been developed without the creative help and hard work of many Exploratorium staff members and volunteers. Generous support for MMP'95 was provided by Hewlett Packard, Unisys Corporation, Quantum and Silicon Graphics.