Reinventing Museums in a Broadband Environment

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ABSTRACT
Over the last ten years, the Adler Planetarium and Astronomy Museum in Chicago has rebuilt its physical structure from the ground up. During this time it has also embarked on numerous parallel endeavors to fully exploit this rebuilding process electronically. These include the creation of an extremely capable electronic infrastructure, a very high-speed electronic connection to the outside world, and exploratory work in displaying gallery content electronically. In addition, Adler's education department was reorganized to emphasize the creation of electronic programs and content, while partnerships with NASA and the Department of Education were established to create a center for space science education where all these efforts merge.

Given the profound changes in the museum world that relatively low-speed Internet connectivity has fostered since its inception, the Adler has embraced the assumption that high-speed connectivity will be ubiquitous in upcoming years and that this level of connectivity will profoundly alter the museum's role in formal and informal education. In informal education it will make possible galleries with exhibit content changing over time, allowing for new discoveries to be addressed and a depth of content over the life of the gallery not possible with traditional museum approaches. Broadband connectivity will expand the role of museums in formal education, allow the rich content of museums to be delivered directly into the classroom, supporting and enriching classroom instruction.

As we work to begin to fill the space with meaningful content on an ongoing basis, we are finding that creating the gallery has been the easy part, and that large-scale electronic content creation for a gallery like this has profound and far-reaching implications for the staffing and operation of the entire museum.

KEYWORDS: Electronic, broadband, content-creation, bandwidth, visual display

INTRODUCTION
Computers and communication technology have had an immense and far-reaching impact on many aspects of museum operation. Given the tremendous impact that the Internet has already made at low connection speeds, what impact might the ubiquitous broad bandwidth connectivity environment of the near future have on museums?

The Adler Planetarium and Astronomy Museum in Chicago has spent the last decade assembling the resources that will allow us to begin to address that question soon. This extended effort is about to climax in a unique new gallery that may shed light on a museum's role

in a broadband future. In our so-far limited experience we feel that the combination of high-speed communications and vastly powerful computers will have profound role-changing implications in the ways in which museums function in the not-to-distant future.

BACKGROUND AND PREPARATION

The last ten years at Adler has seen a flurry of change unprecedented in the previous sixty of the museum's existence as the oldest Planetarium in the Western hemisphere.

Destruction and Construction

In 1991 Dr. Paul Knappenberger was named as the Adler Planetarium's president. Determined to modernize the institution, he worked with staff to create a long-range strategic plan that mandated the construction of a dramatic new all-glass exhibit wing wrapping 180 degrees around

the historic 12-sided original structure. Completed in late 1999 at a cost of over 40 million dollars, this work also included extensive demolition and renovations to the original building, essentially adding to and rebuilding the entire museum from the ground up. An exciting

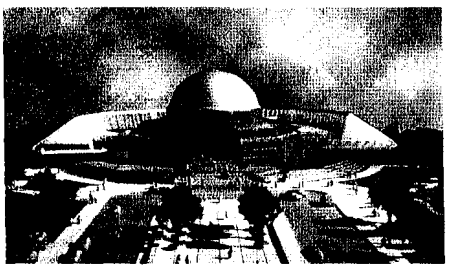


Fig1: Front Façade of the Adler Planetarium

opportunity for staff, this project set the stage for the next and more challenging phase of reconstruction well underway today: that of reinventing staff and programs via technology.

Internal Connectivity

This extensive reconstruction represented an unprecedented opportunity that Information Systems departments are rarely presented with. We were able to design and build an all-new information infrastructure from the ground up. Fiber and category 5 copper-based, it's a massively capable network designed to carry significant volumes of traffic, most specifically video.

External Connectivity

During roughly this same time period, Adler partnered with a multi-university consortia whose aim was to provide videoconferencing classroom instruction between member institutions regionally. To reach this goal the consortia built a private regional high-speed network for video and Internet traffic. Its initial capacity was OC-3 or 155.52 megabits per second, and this could be easily scaled up.

The state of Illinois is in the process of building its own high-speed network to provide connectivity to local governments, hospitals, libraries, not-for-profit institutions and 3,300+ schools. Adler's university consortia network connects to this statewide network at high speed. Consortia member institutions therefore have direct and high-speed access to these 3,300+ schools as well as unlimited Internet bandwidth.

Additionally this university consortium has been able to connect and/or apply to connect to regional and national high-speed experimental networks such as MREN and Abilene, and it's believed that this network could eventually serve as the regional NE Illinois next-generation Internet II backbone.

Previous Conceptual Gallery Work

Though we house one of the largest collection of historical astronomical artifacts in the world, as an astronomy museum our primary subject matter is current astronomical data rather than objects and artifacts. We need to be able to represent often abstract and obtuse concepts and data without the benefit of objects and artifacts, and in easily understandable form. We also suffer from a problem common to all museums: in the time it takes to design and build a permanent gallery, oftentimes at least some of the exhibit content is outdated by the opening and increasingly so throughout the life of the gallery. Scientific advances occur with increasingly dizzying speed. One robotic explorer launched by NASA can turn decades of scientific knowledge on its ear, wreaking havoc on the content of traditionally-built galleries.

Because of this rapid knowledge obsolescence we've explored at length the idea of representing gallery content electronically. Our original and simple concept was to pair a large graphics computer display with a smaller text computer display, both juxtaposed on a museum wall. We termed this combination of capabilities a Visualization Station, VisStation for short. The screens would be driven by networked, Internet-connected computers. The large screen would display graphic content and the small screen descriptive text regarding the graphics, exactly analogous to static illustrations and text boxes on museum walls everywhere. The advantage was that this content could be changed or reprogrammed "at a keystroke". Additionally, the graphics screen could be made to display numerous static graphics in a slide Show mode or even multimedia presentations if the computer were capable.

We tested this simple concept in a temporary exhibit that ran through late 1999 and into early 2000: the "Mars Exploration Station". It was a representation of what a Mars colony in 2030 might be like and it was part of the federal government's Mars Millennium initiative. We used 21-inch monitors for the graphic displays integrating any text information into this same display, eliminating the need for two computers and two monitors per station. We also used obsolete computers to drive the stations as a cost-cutting measure. We deployed seventeen of these stations throughout the roughly 2,500 square feet of this modest exhibit, sharing space with non-computerized exhibit components. All the VisStations were set to work in a slowly-cycling slide-show mode with interspersed explanatory text. Astronomers and educators were able to load and change content on the stations over the network. The end result was that even in this limited low-budget implementation they were startlingly effective as exhibit display elements, and the creation of exhibit content was streamlined. The exhibit lacked only more sophisticated computers and a higher density of stations which would have really allowed for a truly compelling visual display. We concluded that this relatively simple concept was one that we wanted to explore on a much larger scale.

Staffing Reorganization

After the completion of Adler's physical demolition, construction and renovation, staff reorganization was begun to better match the capabilities of the new Adler. A committee composed of representatives from the entire museum plus outside experts worked at length to complete an education master plan. This plan mandated the reorganization of

Adler's education department into three areas: formal education, informal education and technology-based education. Though the argument was made that technology was an increasingly important component of both formal and informal museum education, the final consensus was that it needed to be initially emphasized by segregation to jump-start the creation of technology-based programs. A year of transition that included many staff hires and an almost complete department turnover resulted in a very new capability at our museum: professional educators whose job it was to create and develop effective technology-based informal and distance learning programs.

Innovative Education Programs

Based on the changes and new capabilities that were underway, a group composed of educators, computer specialists and advancement staff met over a ten-month period to explore the potential of these new capabilities in a distance-learning context. The end result of this effort was a detailed distance-learning program that posited the use of broad bandwidth technology to enable a significant new proactive role for museums in the formal educational process in schools, as well as the possibility of creating a significant new revenue stream for museums. A pilot project based on this work will be described in detail later in this paper.

NASA and Department of Education Partnership

Recently, the Adler was awarded a nearly $3 million grant from NASA and one million from the US Department of Education to establish the Adler Center for Space Science Education (ACSSE). This center will provide NASA with a high-visibility public venue in the Midwest. It will draw upon Adler's extensive educational and technological resources to pilot new methods of informal education for visitors in our museum, as well as to reach worldwide audiences through distance-learning programs that utilize broad bandwidth technology. The establishment of this NASA partnership also makes available to us the content and expertise of an extensive research and educational community as well as the funding necessary to create the center.

Recap: the Big Picture

To recap, the last ten years has seen the physical facility of the Adler Planetarium expanded and rebuilt including the addition of a massively capable electronic infrastructure. Partnerships were formed that connected Adler with very "wide data pipes" to the rest of the world. Previous work on displaying Astronomy content electronically in exhibits resulted in a simple but profound prototype exhibit display concept. Our education department staff was reorganized based on a master plan which provided for one third of the department to be responsible for creating and developing technology-based distance learning programs. And a partnership with NASA and the department of Education enabled Adler to fund the creation of a Center for Space Science Education, within which all of the above will come together.

THE ADLER CENTER FOR SPACE SCIENCE EDUCATION

ACSSE will provide infrastructure and links between the research community and education - a place where science researchers can become effectively involved in education and public outreach. The central component of ACSSE is a new gallery, entirely

electronic, composed of an interactive video production studio, a computer-based classroom, and programmable public exhibit space. It will act as a nexus from which Adler will disseminate the whole of its rich science content through broadband distance learning applications. Programs that emanate from the video studio will draw upon the resources resulting from the Adler/NASA/Department of Education partnership utilizing Adler's unique high-speed connectivity to the outside world to improve science and technology literacy for our targeted audiences. The center will establish a framework to improve students' ability to make informed decisions regarding science, math, and technology, issues they will encounter throughout their lives. Teachers will be provided with a mechanism to support their classroom instruction, advance their professional development, and network with their colleagues. Through ACSSE, the Adler aims to engage members of school communities in active, contextual learning, providing them with a strong foundation in science and technology and with the ability to enhance that foundation as lifelong learners. In doing so Adler will be piloting a new role for museums in the formal educational community.

CYBERSPACE, THE "PROGRAMMABLE" GALLERY

The major portion of ACSSE is CyberSpace, a radical departure from typical museum galleries. It will fuse all the unique new potential that technology enables into one spectacularly capable museum space. A logical extension of all of our earlier efforts, all of its exhibit components are computer-based.

Imagine an entirely computer-based museum facility, filled with dazzling display technology, compelling educational computer-based interactive exhibits, uncannily realistic virtual reality experiences of the universe, computer and video classrooms that are fed information through extremely broad bandwidth networks from the rest of the world and that can host events that can be sent electronically anywhere, classrooms that can be reconfigured into exhibit space, lecture rooms, videoconferencing centers, virtual reality arenas.

An almost infinitely malleable electronic space, it will be driven by its broad bandwidth connectivity. Adler hosts the world, the world experiences the rich science content of Adler, in real time at high quality: this is the concept behind CyberSpace, the Programmable Gallery.

Constrained by surrounding exhibits, this irregularly-shaped space is a modest 2,600 square feet. It is divided roughly into three areas: a video studio, a computer-based classroom and exhibit space. They are designed so that they can be closed off into discrete classroom areas or opened up into additional gallery space, their electronic components used for exhibitry when no formal program uses are scheduled.

As you've seen, there have been so many technical aspects to Cyberspace and it had taken so long to make them all happen, that initially our entire focus was on them. We assumed that when the gallery was built that we would be able to craft content for it on an ongoing basis as well as distance learning programs that take advantage of its connectivity. While I now have a good feeling that we have a handle on content and program creation for the space, I'm of the opinion that these issues will turn out to have been the most difficult ones and will have the most profound and lasting effects on our institution.

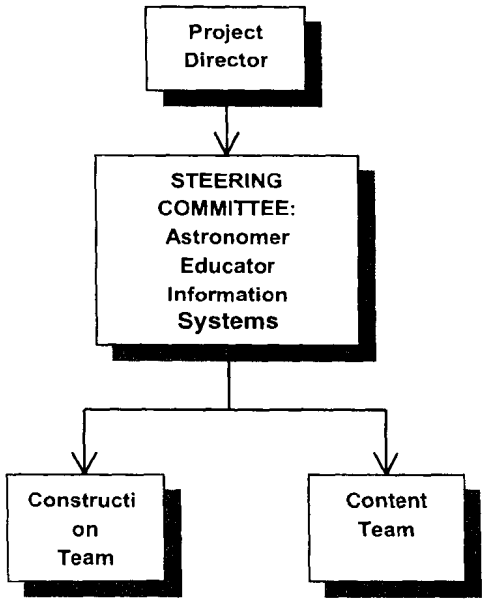
Skewing the Process

Adler, like many institutions, works in teams. A typical team charged with the creation of a gallery would include an astronomer or historian, an educator, a project manager, a production person (at Adler our production department houses much of our artistic and computer-based art staff) and others drawn in as needed on an ad hoc basis. The astronomer or historian served as the project director.

The subject matter of the gallery would have been decided on an institutional basis previously, to fit the institutional themes that are planned for two or more years in advance. Given that subject, the astronomer (or historian if it was to be an historical gallery) would write a content resource document, more or less the reference work for the gallery, a concise overview of the latest scientific knowledge regarding that topic. Their peers would review this document before being approved for the gallery team. Using that document, the team would develop the goals and objectives of the exhibit and the education staff would begin crafting the programs to be created based on the gallery.

Cyberspace was entirely different. Because the whole point of the space was that its content was completely electronically generated and would have multiple themes and focuses over its lifetime, it was the first gallery space at Adler that was created without specific content in mind. Given the computer and communications basis of the space, the project director was myself, Adler's information system manager. Something not usually done in Adler gallery teams was the creation of a steering committee composed of a representative of the three departments that would be most impacted by the gallery: Astronomy, Education and Information Systems.

A typical gallery team at Adler would be responsible for the construction of the gallery and the gallery's content, as in a typical gallery these are intimately intertwined. Since they are completely separate in Cyberspace we realized that we would need two distinct teams: a construction team and a content team. The construction team would exist for the time it would take to build the gallery; the content team would be ongoing throughout the life of the gallery (estimated to be three years). The organization looks like this:



The construction team met weekly from mid July 2000 through early March 2001, finalizing the design and working with the fabrication company and electronics consultant. Construction started mid-May 2001, with physical completion of the space scheduled for mid-August 2001.

Generating Content

When complete, the gallery will have seventeen sophisticated versions of the earlier "Visualization Station" concept. In this iteration we've gone back to the original idea of a large graphics and small text screens. The large displays are flat plasma displays, the small screens are LCD screens. Each dual display/text screen is also equipped with a trackpad which can be used or not (covered when not used) and the entire assembly has a directional strip speaker below should sound be required. This entire functional unit is driven by a very capable rack-mounted computer located in a rear equipment room with all the rest of the exhibit computers.

The gallery will also contain four virtual reality stations, in this case Elumens Corporation VisionStation

(www.elumens.com), in which computer video output is projected onto a side mounted 1.5-meter dome. It's a single-person immersion virtual reality experience.

The front multipurpose room can contain up to 16 columnar desks sunk into the floor in numerous orientations. These desks will contain a flip-up 18" LCD screen, keyboard and trackpad, again driven by very capable rack-mounted computers located in a rear equipment room with all the rest of the exhibit computers. Three ceiling-mounted projectors will be able to project a contiguous video strip across the front of the room. This room will be videoconferencing capable, both H.320 (ISDN-based) and H.323 (internet-based).

The rear distance-learning studio will house the same ceiling-mounted projection arrangement as well as the same videoconferencing capability. If computers are necessary they won't be floor-mounted ones but rather laptops connected wirelessly to the network. This room will have the advanced

capability of serving as an access grid node, an advanced experiment in using bandwidth to support human interaction via a network. (*http://www-fp.mcs.anl.gov/fl/accessgrid/).*

Each combination plasma display/LCD display could serve as a passive exhibit display device or, using the trackpad, an interactive exhibit element. Each unit could use sound or not. Every display device in the gallery could take input not only from the individual internet-connected computer it was attached to but from numerous other input devices that range from NASA TV from a satellite feed to a live feed from our own observatory telescope to incoming videoconferencing feeds. Therefore the choices that the content group faced regarding what content to display were fairly wide.

Because each individual plasma display/LCD could host anything from a complex computerized interactive program to a video clip to a simple graphics slideshow, each functional unit would be required to have something like a team working on its content. Yet there were seventeen of these units alone, not to mention the VR stations, projection possibilities, computer-based desks in the front multifunction room and so on. The Adler is not a large museum and the thought of full content teams working on all the various electronic possibilities of the gallery seemed impractical. The more we considered it the more overwhelming the task of creating content for this space appeared.

After numerous meetings, it was determined that the choke point for gallery content creation would be the lack of staff with sufficient computer graphics and programming skills. While Adler does have a department of people with these skills, they are all engaged in creating show content for the two Planetarium theaters that Adler has and very little of their time could be used for a large scale undertaking such as Cyberspace.

This was addressed in two ways. First, in order to organize the gallery content, the gallery was divided into four areas:

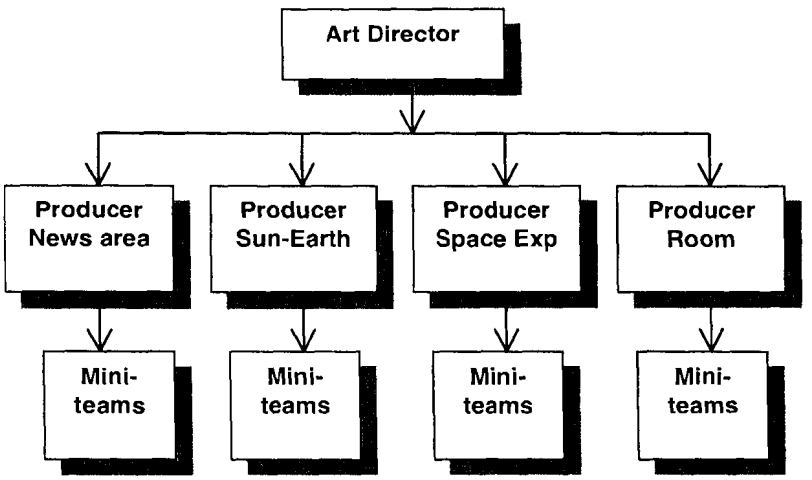
1. The News Center
2. Manned Space Exploration
3. The Sun-Earth Realm
4. Classroom Computer Activities

The steering committee along with the Astronomy department decided the general nature of content for each of the individual exhibit components for the first exhibit iteration (i.e. plasma display number seven would be something called "the night sky" giving visitors information on the celestial objects in the current night sky).

Each of the four areas was assigned a certain number of the plasma displays, virtual reality exhibits and projectors. Staff from the Astronomy and Education department were assigned to individual plasma displays or other exhibit elements so that each of the four areas had numerous "mini-teams" whose job it was to decide the nature of the experience of the public at that station. Each mini-team would develop objectives for their exhibit component, determine roughly how they wanted to present the information visually and storyboard it if possible. People would be assigned to more than one mini-team.

Each of the four areas was assigned a "producer", someone with previous production experience whose job it was to coordinate the areas content. Finally all four producers reported to an art director whose job it was to advise

everyone on art and design details and to coordinate a consistency of look throughout the gallery.



CyberSpace Content Team Organization

Existing computer graphics expertise was spread throughout the teams as evenly as possible. We also looked at creative ways of getting the content off the ground for the first pass. These range from contracting out parts of the project to looking to volunteer/internship help to hiring additional staff to make up the shortfall. Obviously each of these choices has long-term economic implications.

Also, it was agreed that the first attempt at gallery content would be at a fairly simplistic level and would grow in complexity and sophistication as we went along. For instance, we agreed that our ultimate aim was to standardize computer-based content to be developed with the Macromedia platform of software. However, because we don't currently have enough people on staff to do this, much of our initial content will probably be web-based sine we have a fair amount of in-house expertise here. We hope to eventually grow to be able to develop all content within Macromedia. Another agreement from early on was to try to use electronic content that we had previously developed. In the course of developing years of planetarium shows and previous exhibits there was a great deal of electronic content already available. Because the virtual reality components that we chose could show VR content from numerous different formats, we had the luxury of being able to pick and choose the first round of VR content. Our production department was able to explore the complexity of moving VR content from our shows to the gallery VR stations. What this told us that the creation and development of VR

content would not be a trivial undertaking.

A WALK THROUGH CYBERSPACE

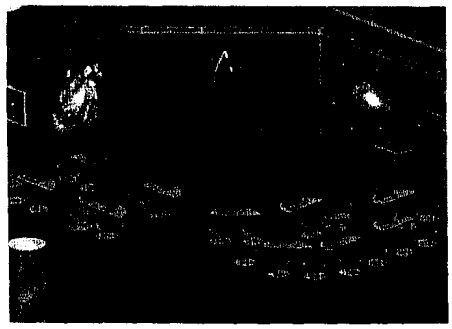
A visitor walks into the gallery and immediately on their right sees a curved wall lined with seven 37" plasma display screens as described previously. Above the plasma screens, LCD projectors will display multiple images side- by-side in a contiguous strip at least forty feet long that can project individual video streams or one contiguous one. At the rear of this space will be one of the Elumens virtual reality stations. This area will become something currently called the "News Center". Breaking space or Astronomical news items will be featured here as well as VR elements relating to news stories. As an example, as the International Space Station is assembled and featured in our news space displays, you'll be able to navigate through it in the VR Vision Station interactive. The plasma screens will operate in both passive informational mode as well as interactive mode.

The central exhibit area will contain three of the plasma/text screen stations as well as a virtual reality station. This area will concentrate on content relating to a Sun-Earth theme, our current institutional emphasis. Continuing to the left as one enters will take you to a space between the distance learning studio and the multifunction room. Because of the glass walls and doors this space, though small, will not seem as enclosed as it is. At the end of the space will be two computer stations and one of the plasma/text stations. These units will house more in-depth information from the News Center area.

The entire time that you've been walking into the gallery you will have been aware of a room with glass walls to your left. This would be the multifunction room. This room will house sixteen desks with the flip-up 18" LCD displays and keyboard cabled remotely to rack-mounted computers. As described previously these desks are actually lightweight trays mounted on a pedestal sunk into the floor that can be removed and reconfigured as necessary, the electronics plugging into floor outlets. Three huge projection screens drop from the ceiling in front of the glass walls. Three ceiling-mounted projectors in the center of the room project content from any source at the facilitators discretion controlled through an electronic podium. Tracking and still cameras allow this room to double as a video studio. A VisionStation VR unit sits in one corner of the classroom. Glass doors close the room off into a contained, discrete and functional classroom. With the doors fully opened the room becomes an extension of exhibit space, with visitors able to either work at the computer stations on various computer-based interactives and web sites, or the room can serve as a lecture center, with the projection system serving as a multimedia source for the lecturer. The rear exhibit portion

of the gallery contains five plasma/text station as well as a virtual reality station. This area will concentrate initially on content regarding manned space exploration.

All gallery signage is electronic. Throughout the space are LCD text screens of varying size explaining what's happening and showing a schedule of events, so that visitors are always informed about what they are seeing and when they can expect to see certain events. The video studio is really the heart of the gallery. It's almost identical in capability to Cyberspace in that it can house multiple students in a distance-learning videoconferencing mode. The front of the room is equipped with the large projection walls upon which three centrally-located ceiling-mounted LCD projectors project. Projection content is controlled through the control podium. When not in use this room also can be opened up to be an extension of the gallery space and when used as a classroom. Large tempered glass doors enclose the room from visitors in the exhibit portion of the gallery. During programs visitors will be able to watch the class in progress.



The Distance-Learning Studio

Behind the video studio is a small control room packed with monitors and equipment allowing the controller to control programs originating in either or both of the two rooms. Additionally, there are numerous equipment racks, as all the exhibit displays are driven by rack-mounted computers located here.

Also located here are other input devices for the displays, from DVD players to VHS players. Switching audio and video equipment is rack-mounted as is a network switch that underlies the connection capability of the entire space. Finally a feed from our 20" telescope observatory ends up here as a potential video source into the gallery.

A massive switching matrix will allow for any content-generating device (computer, DVD, telescope, video feed etc.) to be switched to any display in the exhibit. This is one of the most crucial technical feature of the gallery.

Distance Learning Programs

Much like other museums and cultural institutions with videoconferencing links, Adler has been exploring video programs into the classroom. We believe that this capability will soon be fairly ubiquitous and available via broadband Internet connections. Given that we envision a very comprehensive use of live and canned video programming throughout the museum.

While the primary function of the distance learning studio will be originating these types of programs, we made sure that we could use our existing network infrastructure to shuttle video around the entire museum. We want to use the distance-learning studio as a nexus from within which the entire museum is made available to the world. This not only includes all of our exhibit galleries, but our collection (which like

most collections is mostly unavailable to the public) and our staff.

Our emphasis is here because we believe that this video capability will soon present museums and cultural institutions with a new role directly in formal education, that of augmenting the teacher.

Throughout Illinois (and beyond) there's a critical shortage of qualified science teachers. This is occurring at a time when the state is raising its science requirements for students. The Adler and other science museums are centers of rich world-class science content, yet isolated from directly impacting science education.

Adler's pilot distance learning program will create two to three-week slices of science curricula instruction, using an astronomy-related theme to teach basic science (as an example, telescopes to convey information about light and optics). Drawing upon the rich science resources of the museum including our PhD astronomers, we'll use videoconferencing originating any and everywhere in the museum, using the equipment and facilities in the studio as a nexus to send this programming into the classroom. Extensive evaluation would determine if this instruction is effective and whether it enhances students test scores. If the results bear out the hypothesis, then the road would be open to assemble consortia of museums and cultural institutions, each contributing discrete portions into an year-long curriculum that could be sold to schools and school districts on a sliding fee scale. This revenue stream would be nothing that we would look to get rich on but rather a steady source of income to offset the cost of technology and museum educators necessary to execute this program. We would have to be careful not to lock out schools without extensive financial resources. We envision a base level of curriculum that any school could access, perhaps text-based lessons, some graphics, some canned video and an interactive session. Those that were able to pay would get more interactivity with content experts, up to full real-time interactive classroom instruction. Schools and school districts that we've discussed this idea with feel that the program as described would be of immense value and indicated a willingness to pay for such a program. This includes upper-level officials of the Chicago Public School system. Clearly such a functioning program is a long way off. However, the technology and ubiquitous bandwidth necessary to make it happen is not, and given developments in the Internet, inevitable. Programs such as this would create an entirely new and vital role for museums to directly and strongly impact formal education. There are 3,300+ potential schools to work with in Illinois alone. Should this direction prove fruitful, one could envision several of the type of video classrooms we've previously described working full-time. And once Internet II takes off, instruction wouldn't necessarily be limited to one state. One could envision particular museums developing national and international reputations of excellence in classroom education.

NEW PROGRAMMATIC USES OF THE SPACE

Our first iteration of an exhibit in the space is a modest one, constrained by the learning curve and the resources that we're able to bring to bear on content creation. However over the life of the gallery impressive new programs will be possible:

Remote Observing

Something that we have a history of doing is called remote observing. Here an astronomer or graduate student literally controls a distant research telescope explaining it for visitors. We have an arrangement with the Apache Point Observatory in New Mexico to do this and have done so at length in the past. Cyberspace should allow us to do so on a scale not before seen. We are building relationships with other observatories such as Yerkes Observatory in Wisconsin and Misado Observatory in Japan and we hope eventually to be able to show a live astronomical telescope feed from the night side of our planet during the day while the museum is open.

Live Events

With our high bandwidth connectivity it will be possible to host live events at Adler that happen remotely. One such example is that we're working with NASA to make happen is live NASA events such as launches. We should be able to project these events on virtually all exhibit displays, creating a "virtual NASA" at Adler in Chicago. You'll be able to see everything from NASA launches to international space station activities to Mars landings, all at Adler as it happens.

Additionally, we're exploring using satellite transmissions to bring remote astronomical happenings back to Adler live. The prototype for this is a total eclipse of the sun in June of 2001 in Africa. Adler is co-hosting a cruise to totality in the Mozambique channel, and will be carrying satellite equipment to videocast the eclipse live back to the museum. This is a prototype for the future when Cyberspace is complete. Not only will we be able to host such events at Adler, but we'll be able to make them available over the internet and via video technology to our various partners.

Adler Courses

The Adler Planetarium, because of our long-standing relationship with the University of Chicago and Northwestern University has long been a home to adult evening courses taught by world-famous experts in various areas of Astronomy and cosmology, including Steven Hawking twice previously. We're kicking off a program that expands the accessibility of this program to universities and community colleges via video. One could come to the Adler to attend a course, or one could attend a course virtually (but no less interactively) at a university or community college close to you. In this way we hope to be able to reach an audience that normally wouldn't consider driving downtown to Adler and thus vastly extend the program's reach. We also hope to record these courses and begin archiving this crucial content which can be used later in the more structured formal classroom program into the schools: lectures into schools from world class (and world-famous) lecturers!

CHALLENGES AND CONCLUSIONS

Many challenges and questions remain in the ongoing operation of Cyberspace. While the steering committee is controlling and assigning the opening content of the gallery, how will this be controlled on an ongoing basis? Will the various content teams that are assembled to pull the gallery together remain static, or will these teams change over time? How will ideas and thoughts regarding new ways to use and configure the gallery be handled? How often will the content be changed? What has priority, standard gallery content or live events?

Will we rent this space out for private event usage? How will we deal with rapid computer obsolescence over time? Will we have enough staff to continually create content over the life of the gallery?

These are just some of the questions facing Adler now. What's certain is that four major departments of the museum have been impacted heavily and in a fundamental sense that many well increase over time.

Further, I view Cyberspace as a pilot for what our entire museum could become: a highly interactive and changeable environment that would always host the latest up-to-date information and would never be the same each time you came through. While not advocating making the entire museum electronic, I feel that each gallery could be augmented by a certain proportion of electronic displays which would allow the display of a depth of content over the life of the gallery not possible with our current static galleries. Should Adler adopt something like this however, we're much more aware now of the staffing resources that would be needed to make this work. This could also be one view for other museums in the future.

In any case, what we'll have when the gallery opens to the public in autumn 2001 will be an exhibit that never goes out of date. Visitors can be assured of receiving the most up-to-date information possible. Since the content can and will change over time they can be assured that in repeated visits no two walks through the gallery will be the same. Because of this capability over the life of the space a huge array of content can be represented to the visitor in far greater depth and breadth, much more than one could ever do in a standard non-changeable exhibit.

Add to that the broadband connectivity of our connection to the outside world and now you've got a space that can host live interactive events. We can act as the Midwest hub of disseminating NASA information by hosting a live launch and other events. The next best thing to be in Florida for a launch might well be our gallery. My own personal goal given our NASA relationship is to work toward hosting an interactive video question and answer session between kids in local schools and space station personnel via Adler's gallery.

If there is a downside to all this it's twofold: the space will be initially expensive (this will be Adler's most expensive gallery to date). More importantly, as we've seen the space will be extremely staff-intensive over the life of the gallery. We will have an ongoing content committee tasked to coordinate and deliver content throughout the life of the gallery. Numerous skills will be necessary to operate the space, from graphics artists to computer programmers & support technicians to educators to astronomers to more than the standard number of guards. Currently 3.5 full-time jobs will be devoted to this space through the gallery's life and this is so crucial to its successful operation that it's key in our funding strategy. It is our feeling however that and the broadband and virtual-reality-enhanced visitor experience far overshadows anything else we'd be able to do in that same space. We feel that not only will we be able to pilot a new kind of gallery space for the informal learning of our through-the-door visitors but will also be able to pioneer a method of positively enhancing formal education while providing a constant revenue stream to

keep the process alive. This is an admittedly ambitious goal but one that we've invested a great deal of work in so far.

ABOUT THE AUTHOR

Kenneth Kobus has worked at the Adler since 1993 as the Information Systems manager, overseeing all aspects of Adler's computer environment. He has participated in numerous gallery project teams, worked on distance learning programs, and has been part of a number of Adler long range planning groups. Prior to the Planetarium, he worked at a Northwestern University. Mr. Kobus has a Masters degree in Cultural Anthropology from Northwestern University.
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