6 THE EVOLUTION OF INTERACTIVE INTERPRETIVE MEDIA

A Report on Discovery and Progress at the Minneapolis Institute of Arts

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Integrating new information technologies into any traditionally conservative environment presents program planners, designers and developers with many complex logistical, technical, and political challenges. This type of integration is particularly challenging when content, installation and operation directly impact the traditional appearance of the institution.

Over the last three years, The Minneapolis Institute of Arts (MIA) took on such a challenge by initiating a plan to integrate interactive multimedia throughout the museum. Many obstacles were encountered and many lessons were learned. This paper examines the evolution of the process, creative team and technology during the development of the first five interactive multimedia programs.

History of the project

The plan to integrate interactive interpretive programs museum-wide was a component of a major capital campaign initiated in 1989. Posed as a method to increase visitor effectiveness via new forms of powerful educational technology, the proposed programs gained the support of the museum trustees as well as some primary funders.

In early 1990 the Institute received one million dollars from the General Mills Foundation for the development of fifteen computer-based "interactive video" programs. The content and installation of these programs were designed to cover the breadth of the museum's encyclopædic collection.

Tools for new audiences

An objective of the MIA's increased emphasis on interpretive materials, especially interactive technologies, was to reach non-traditional audiences as well as enhance the experiences of the traditional visitor. Non-traditional audiences were defined as general

visitors with a moderate to high interest in art , but with little or no formal background in art or art history (ICI, 1993).

Interactive multimedia: the MIA definition

The MIA defines interactive multimedia as a program which actively engages visitors in accessing audio and visual information (ICI, 1993). This is accomplished technically through the integration of a micro-computer, touchscreen monitor, speakers and when required, videodisc player.

Applications

To address the varying needs and interests of both the traditional and non-traditional visitor, three major types of interactive multimedia programs have been developed and installed within the museum. These include:

- Visitor Directory programs
- Gallery-specific Multimedia Programs
- 'New Beginnings' Capital Campaign program

Project Summaries and Analyses

Project 1: Visitor Directory , Spring, 1990

Project objective: The Visitor Directory program was designed as an extensive information resource available to visitors as they enter the museum.

Content: Within the directory program visitors can access text, video and graphic information on current exhibitions; daily and weekly events; gallery design and location; self-guided tours; programs for families and children; and museum services.

Project team: The Chair of the Education Division served as the project manager during the program development. An external consultant/software designer was contracted to assist in program design and equipment configuration. A Media Department Producer shot and edited the video for the videodisc.

Extensive use of the outside consultant during the production of the program presented a number of problems in both its design and maintenance. Unlike the internal staff, the consultant did not naturally embody the museums design aesthetic. Further, media staff were not trained in the technical aspects of the programs operation, and the museum depended upon the outside consultant to troubleshoot, update, and maintain the program once it was installed.

Hardware and software
Computers: Macintosh IIcx
Boards: NuVista
Monitors: Mitsubishi 19" multiscan
Touchscreens: Microtouch anti-reflection
Videodisc players Pioneer 4200
Authoring: Supercard

Installation: Three separate kiosks running the Directory program are installed in the museum's main lobby. Although the monolith-like kiosks are the same overall

dimensions, each monitor stands at a different height to serve standing adults, children and visitors in wheelchairs.

The kiosks diagonal placement (see Fig.1) at the entrance to the museum attracts most users before they begin exploring the collections. The "redundant" installation has proven appropriate, with all of the kiosks in use during high traffic periods, such as weekends and special exhibitions. A 1992 visitor study indicated that over 41% of the visitors used directory programs sometime during their visit (O'Leary, 1993).

Because the directories present most of the information in the form of text and images, high quality resolution of graphics is critical. Unfortunately, the types of touchscreens and video cards used in this installation compromise its overall visual quality. Anti-reflection touchscreens significantly softened the display's clarity. Similarly, the interlaced video card used caused displayed images and text to vibrate and limits the use of single pixel (thin) lines. The authoring system is complex and unforgiving. Even the smallest syntax error will allow a visitor to gain access to the computer's directory and possibly damage files. Even the slightest changes to the program must be carefully tested before installation.

Hardware accessibility is also an issue since the equipment has to be accessed through a door at the back of the kiosks. The doors face a wall and restrict both light and the ability to safely lift the heavier pieces of equipment (e.g., the 70 lb. monitor). Working on the program demands stretching the keyboard to the front of the kiosk where there is no working surface.

Fig. 1   Visitor Directories

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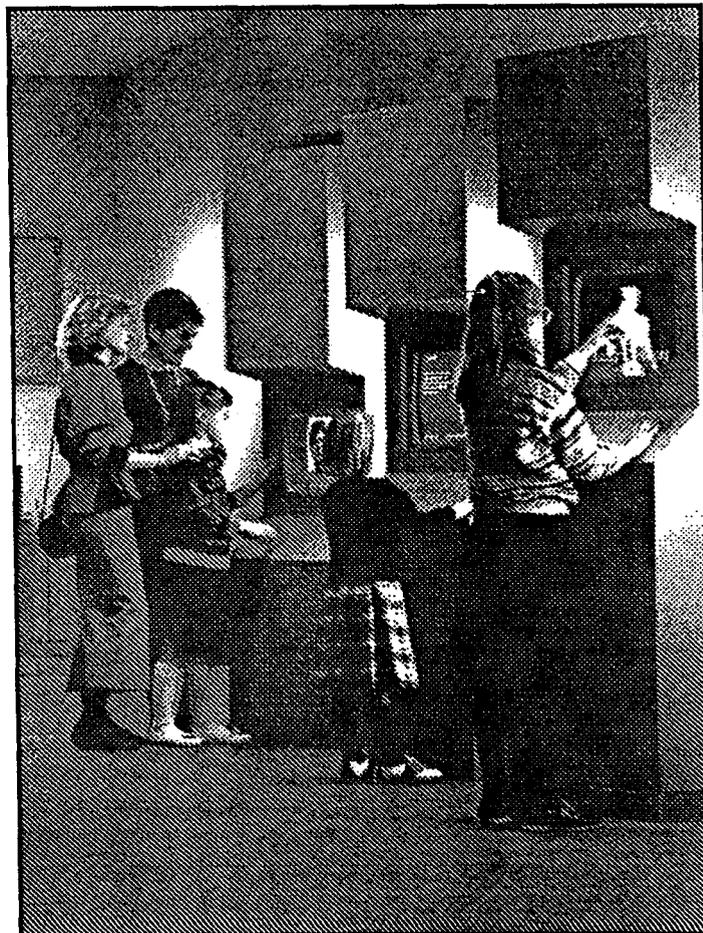
Finally, ventilation and filtration are critical. Although the kiosks contain a fan and filtered air intake, the doors and monitor openings are not properly sealed. High traffic on hard lobby floors make dust an extreme problem.

Conclusions: For the museum's first installation of interactive multimedia, the Visitor Directories were quite a success. Technical problems and the lack of properly trained in-house support proved to be the most troublesome factors.

Project 2: African Art, Fall 1990

Project objective: The African Art program is the MIA's first gallery-based multimedia installation, designed to provide cultural and historical information on selected objects in the gallery (ICI, 1993). Since most of the MIA's collections are not comprehensive, a decision was made to focus on the individual strengths of the objects in the museum's African collection rather than attempt to integrate them into a broader historical perspective.

Content: The African Art Program is divided into two major categories: Objects; and Themes. Eight 3-5 minute video documentaries were produced, two for the Theme category and six for the Object category. The finished program takes the form of a "video jukebox" by which a visitor selects any or all of the eight video segments.

African Art as a subject lends itself well to media programming. Since many of the objects within the gallery were created for ceremonial or everyday use, video images of objects in these contexts help demystify their static setting in the museum, and gives the viewer an enriched understanding of the object's purpose and cultural value.

Project team: Development of this project took place in three separate groups while overall project management passed between museum administrators. The content was developed and the scripts were written by the Curator of African Art, the Chair of Education, and a research assistant. Video editing and narration recording were performed by the media department. The external consultant/software designer developed the computer interface, screen design and specified the hardware configuration.

The use of independent work groups and the external software designer/ consultant compromised the programs aesthetics and maintenance. Like the Visitor Directory program, use of the outside software designer/consultant resulted in inappropriate mixing of design aesthetics and metaphors. Although most of the gallery and video footage is organic and earthy in tone, the interface design incorporates many contemporary metaphors (e.g., 3D metallic buttons). The contrast grossly impacts the consistency of the program's design.

As with the Visitor Directories, the museum again depended upon the outside consultant to maintain and troubleshoot the program.

Hardware and software:
Computer: Macintosh IIcx
Board: NuVista Plus
Monitor: Mitsubishi 19"
Touchscreen: Microtouch Clear
Videodisc player: Pioneer 8000
Speakers: 5" enclosed
Authoring: Macromind Director

Installation: Because this was the first interactive media program permanently installed in a gallery, decisions regarding furniture choice, lighting and sound control were critical to the success of this program and those to follow.

The first installation of interactive media within a gallery was a politically sensitive and logistically complex task. It required many compromises by every division, department and individual involved,

Unlike the Visitor Directories, the African program is installed in a custom-made desk-like table (see Fig.2). Two matching benches, covered with traditional African textiles, are provided.

An external design firm was contracted to design the installation furniture. Unfortunately, the proposed laminate covered table was aesthetically inappropriate for the earthy gallery. A later decision had a table constructed entirely of oak (see Fig.2). Even with this change, the unshrouded monitor stands in sharp contrast to the surrounding gallery. The backless benches, though aesthetically pleasing, drew criticism from older visitors who found them uncomfortable over time. Because the African Art program was first interactive project to incorporate audio, speaker placement and sound control were not fully considered until after the cabinet design and installation. Even at low volume, the narrator's voices reflected off the hardwood floors and filtered into the gallery. Headphones were considered, but they posed additional maintenance problems and restricted onlookers. Careful equalization and volume adjustments reduced the audio reflection to an acceptable level.

The program was originally installed in a corner of the gallery against a large picture window. The light from the window significantly reduced the image quality and caused the surrounding gallery to be reflected in the monitor. Vertical blinds were eventually installed to control the light.

Fig. 2   African Art

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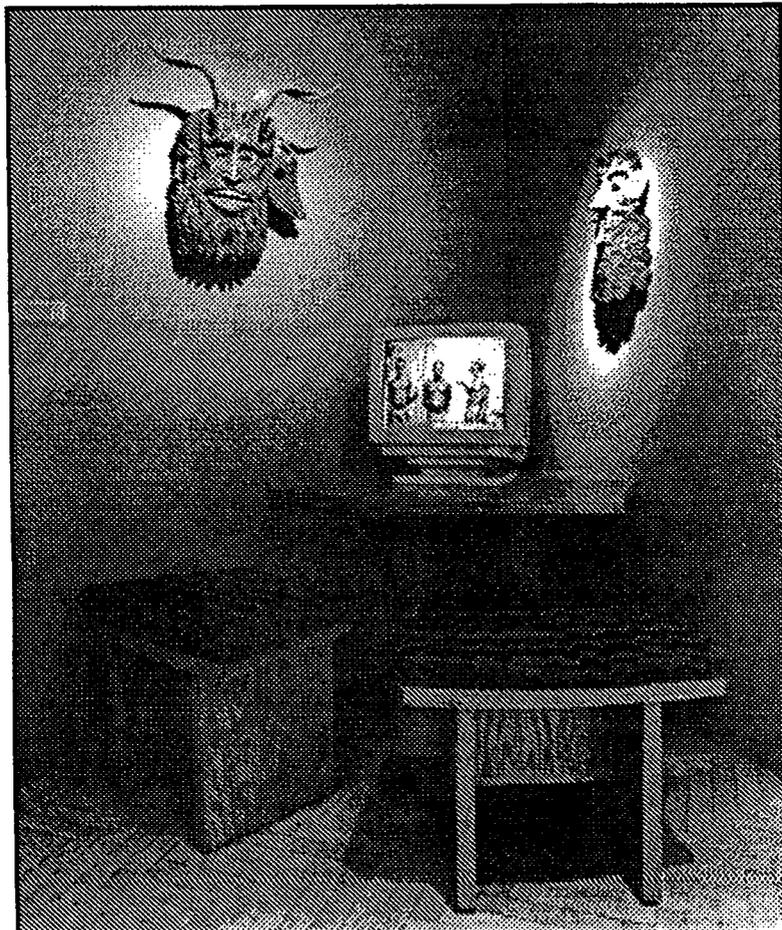
To its credit, the simplicity of the African Art program's "jukebox" design along with stable hardware and software makes the program very dependable. Despite the limitations of the backless benches, the desk type installation with benches serves a number of different users. Adults with small children can hold them in their laps, while others may stand behind them as passive onlookers. The height of the desk also provides wheelchair accessibility.

Conclusions:

Even with the large number of design problems encountered during the development and installation of the African program, the result was an overall success. The extensive lessons learned during this production significantly changed future production strategies and set the stage for future gallery installations.

Formation of the Interactive Media Group

Prior to the production of the third interactive program, a major restructuring took place within the museum's media area. The restructured media department, incorporating the two existing Media Producers and the Technician, left the Education Division to become an independent department. A manager with multimedia experience was hired and formed the Interactive Media Group (IMG) in the Spring of 1991.

Along with these organisational changes came a technical upgrade of the media facility itself. Macintosh computers and a wide variety of input, output and storage devices were installed. Staff was retrained, through both in-house workshops and external courses. A part-time Electronic Graphic Designer and a Production Assistant were hired. In 3 months, production had begun on two new interactive programs, this time to be produced completely in-house.

Project 3: Photography: From Silver to Silica, Fall 1991

Project objective: The MIA's photography collection consists of over 8,000 images ranging from the mid 1800s to contemporary works. Unfortunately, restrictions on viewing space and light exposure limit the number of photographs on view to less than a hundred. This program was created to allow the public access to a greater number of images as well as to provide additional information about their history and creators.

Content: The Curator of Photography became interested in the program's design after developing a simple prototype outside of the museum. Once in-house, the program took on the form of an audio/visual database. Viewers can access digital "slide" shows, photographers portfolios and biographical information, as well as technical simulations of darkroom and camera operation.

The Photography program's database nature is controversial concerning its educational effectiveness for the general visitor who requires some form of guidance and structure. Most users of the Photography Program tend to focus on highly popular images, and photographers with wide name recognition and tended not to explore lesser-known artists (Nebenzahl, 1993). This raises many questions about the program's ability to assist viewers in structuring their learning.

Project team: The primary project team consisted of the Curator of Photography, Director of Education, and the IMG all working together. The curator worked with the IMG to identify key photographers and photographs to be covered and the text for the biographic and bibliographic sections. An outside script writer worked with the curator on the development of the script for a history section. The Chair of Education served as the script

editor. The IMG designed interfaces and program structures, tested prototypes, created graphics and animations, authored the programming and worked with the MIA's in-house reinstallation designer to develop the program's unique baffle installation described below.

The editorial compromises and philosophical differences between the education and curatorial participants were taxing on all parties during the development of the Photography Program. Particularly the curator who underestimated the extensive demands of script writing.

However, all project team members worked together throughout the program's production. Since the key members of the team work within the museum, communication greatly improved, as did the overall quality and consistency of the finished program. The cooperative production environment also resulted in a wider feeling of ownership and long-term acceptance of the program.

Hardware and software:
Computer: Macintosh IIci
Display board: RasterOps 264
Monitor: Sony 1936
Touchscreen: Microtouch clear
Speakers: Roland CS-10
Automation: Powerkey
Authoring: Authorware

Installation: Instead of creating a piece of special furniture for the program enclosure, a gallery baffle was modified to support the computer, monitor and counter (see Fig. 3). The monitor is installed at an upward angle, allowing for both standing and seated viewing. Two light, movable chairs provide seating, but can be easily moved for wheelchair access.

Fig. 3   Photography: from silver to silica

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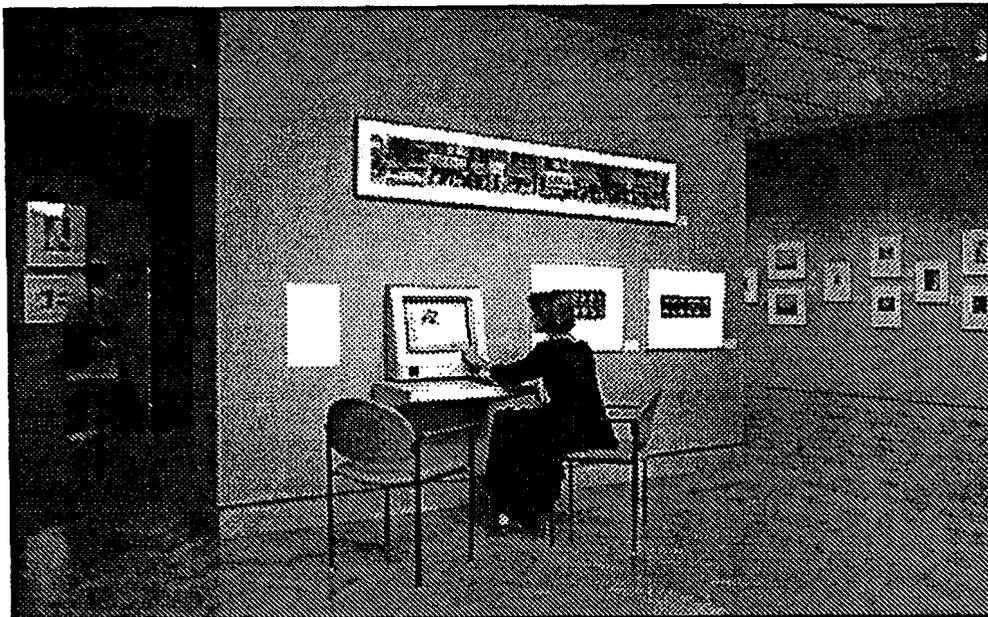
The integrated baffle installation proved to be a unintrusive form of gallery installation. Related photographic works are hung on the baffle right next to the program. High frequency speakers were mounted in the monitor surround, and the woofer was mounted in the counter top, resulting in a clean and easily controlled audio. The only drawback is the tight internal design of the baffle enclosure which restricts easy access to the equipment when there is a problem.

The program has run reliably seven days a week from the day of its installation. Although there were some programming bugs in early versions of the software, the program still ran dependably.

Producing and delivering this program in-house and entirely on the computer significantly reduced the overall production costs and time required. The cost of producing this program was less than half of the two previous projects, and the project was produced and installed in six months. In addition, the curator's personal interest, motivation and the early prototype helped expedite the entire process.

The Photography program is currently the most popular of all the gallery-installed programs. A 1992 survey found that it was used by over 28 percent of the museum's visitors (O'Leary, 1993).

Conclusions: The in-house production of the Photography program was a tremendous challenge for everyone involved. Many of the technical and aesthetic problems of past projects were permanently resolved. However, a new set of even more complex content, process and design issues were exposed, to be dealt with in future programs.

Project 4: The Arts of Japan, Fall 1992

Project objective: Traditional Japanese culture is foreign to most MIA visitors. The Arts of Japan program is intended to introduce visitors to religious and cultural issues which led to the creation of some of the objects in the Japanese collection. Rather than focus on the objects individual attributes, a broader cultural context is described.

Content: Because of the nature of the content, the curator felt strongly that structured, linear video segments would be the best method for addressing the material. After a number of prototypes were developed, three major segments were identified: Buddhism, Scrolls and Screens, and Ukiyo. Each segment ranges from 5-7 minutes in length.

While the basic program followed a video "jukebox" design similar to the African program, this design differed by allowing users to interrupt a chosen segment at any time to access an on-screen video controller (pause, fast forward and review functions), an interactive glossary, references, credits and a demo-help section.

One of the most popular sections of the program is a 4 minute computer simulated walk-through of a fictional Japanese home. Digital representations of objects from the Japanese galleries are placed throughout the home to illustrate their use in a traditional context. The entire design and rendering of the simulated home was performed on Macintosh computers before being transferred to videodisc.

Although overall visual quality of the Arts of Japan project was superior to any of the previous projects, the summative evaluation and user tracking identified problems with design of the interface and length of program segments.

An analysis of the computer generated user tracking data showed that on the average, only 30% of users completed an entire video segment. The average time before pausing or exiting any of the segments was 55 seconds. This indicates that information needs to be

presented in shorter chunks and possibly at a faster rate to keep the viewer's attention. (Pezalla-Granland, 1993).

Project Team: The Assistant Curator of Asian Art wrote all of the narrative scripts which were reviewed and edited by the IMG and Chair of Education. The IMG, with the addition of a freelance CAD expert, designed the interface, graphics, animation and programming and worked with the MIA's Reinstallation Designer to design the gallery enclosure.

Like all MIA curators, the Curator had multiple priorities imposed on him by the museum throughout program production. His limited availability to write scripts, and review prototypes often slowed the production process. The Assistant Curator of Asian Art specialises in academic writing and research. Because of this, the special demands of narrative script writing made it a difficult, time consuming process.

Hardware and software:
Computer: Macintosh IIci
Display board: RasterOps 24STV
Monitor: Sony 1936
Touchscreen: Microtouch clear
Videodisc player: Pioneer 8000
Speakers: Roland CS-10
Automation: Powerkey
Authoring : Authorware

Installation: The Asian galleries are darkly lit with angled cherry cabinetry. A matching cherry enclosure was designed to blend into the existing cabinetry. The enclosure walls were angled so they appeared to extend out of the permanent cabinet behind it (see Fig.4). One side of the enclosure is hinged for equipment access and the monitor is installed at an upward angle within a recessed "cut-out" providing a small writing shelf and wheelchair accessibility.

Fig. 4   Arts of Japan
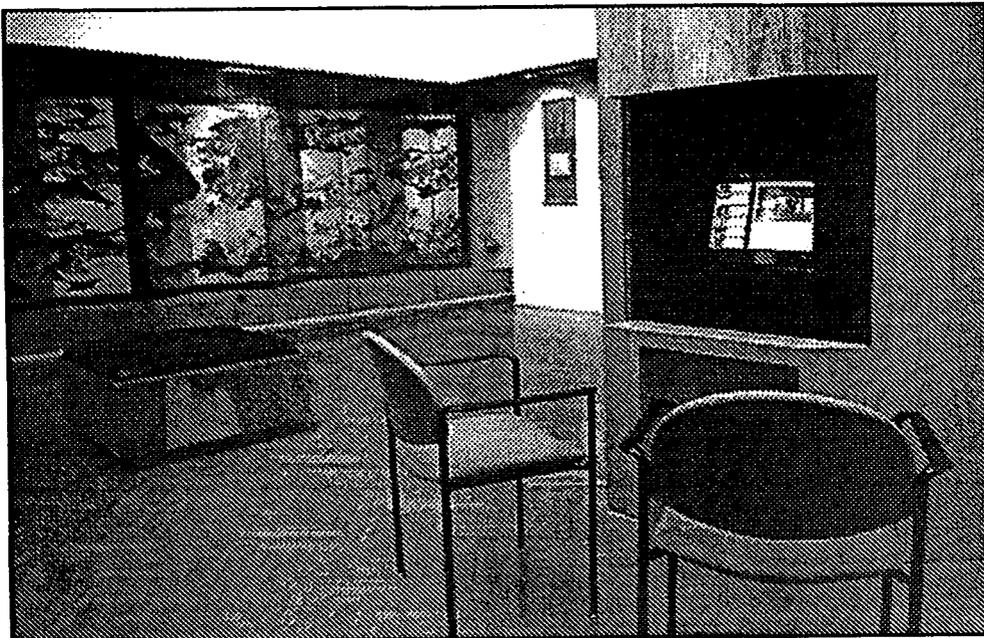
The overall aesthetic and functional quality of the Japanese installation is vastly superior to that of other MIA programs. This drastic improvement was the result of the lessons learned from previous installations as well as the strong visual characteristics of the existing gallery.

Most visitors find the program's graphics and overall visual quality to be outstanding. The inexpensive video board used in this installation produces a higher resolution, non-interlaced video image of greater quality than previous installations.

Conclusions: This project demonstrated a new degree of control over the look, feel, and technical sophistication of interactive programs. Developed simultaneously with the Photography program, the Arts of Japan further illustrated the need for more work on educational program structure and the content development process.

Project 5: New Beginnings: The Capital Campaign, Fall 1992

Project objective: Unlike the previously described projects, the New Beginnings project is focused on marketing, fund raising and donor recognition. It was created solely to introduce visitors to the scope and objectives of the capital campaign and to encourage them to become active contributors to the museum.

Content: The program was developed from existing Capital Campaign literature and publications. The content of these sections ranges from an introductory video to short digital slide shows and interactive lists of donors. The design and interface are elegant and simple, reflecting the aesthetic of the print materials (see Fig. 5).

Fig. 5   New beginnings: captial campaign
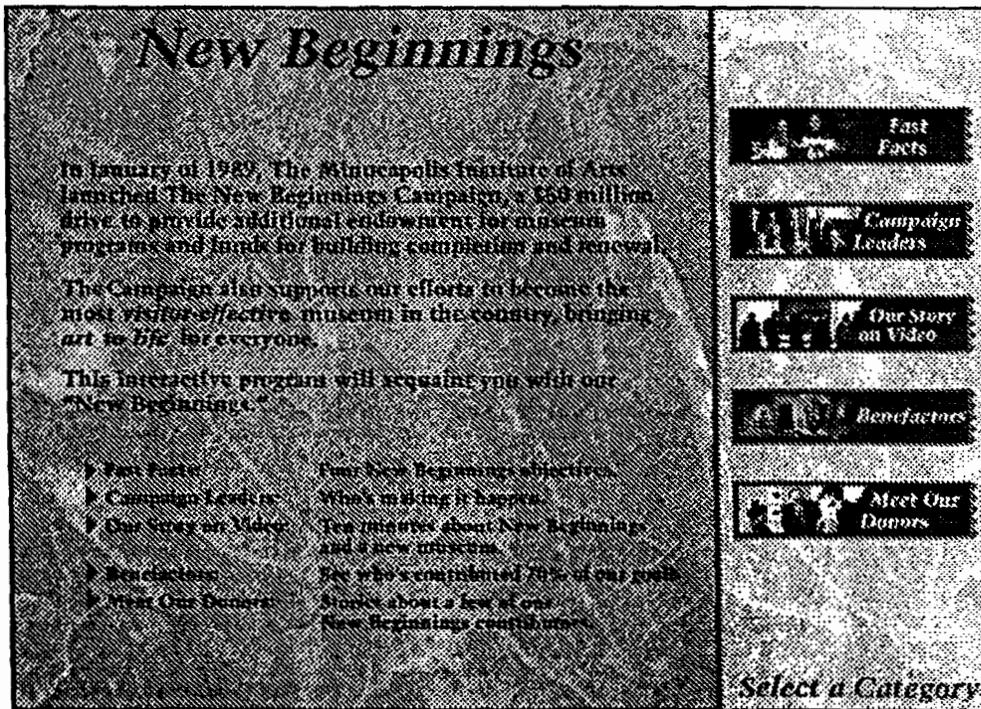
Project team: The Electronic Graphic Designer and Multimedia Producer worked with three members of the MIA's Capital Campaign office to create this program. Together this group collected existing images and identified a broadcast quality video program which was repurposed on videodisc. The IMG members developed the entire program in between their work on the other interactive projects.

Hardware and software:

Computer: Macintosh Quadra 700
Display board: Videologic
Monitor: Sony 1936
Touchscreen: Microtouch clear
Videodisc player: Pioneer 4400
Speakers: Roland CS-10
Authoring: Authorware

Installation: Because the program was completed prior to determining its permanent location, a temporary enclosure was created. Unfortunately, this enclosure did not meet the ventilation, filtration and access specifications of the permanent installations.

Conclusions: The efficient production of the New Beginnings program stands in clear contrast to the process of producing the gallery-based, interactive programming. By removing the complexities of interdivisional content negotiation and rigid constraints of the "gallery aesthetic," the remaining production process was greatly simplified.

The pre-defined content and design parameters significantly reduced the time spent in the design process. Since the project involved only one department within the museum, very little time was spent negotiating compromises. In the end, the entire project was completed and installed in less than three months.

Use of pre-existing images, text and video also drastically reduced the production time. The computer hardware and videodisc pressing made up the majority of the programs cost. The overall costs of the project (under $20,000) was less than half of the interpretive programs.

Overall Summary

The ever expanding capabilities of interactive media make it easy to become overly concerned with its technical aspects. However, the MIA's experiences demonstrate that the development of appropriate, effective content is still the most difficult part of the process.

With the right creative personnel, tools, and standards, the technical aspects of production and installation take a back seat to the real problem of how to effectively communicate with the visitor. The problem is not an easy one, particularly when you are trying to meet the needs of a educationally and culturally diverse audience.

In current and future projects, the IMG will turn its efforts toward studying and refining the many aspects of the content development process. By gaining a greater understanding of our visitors and our own work process we will continue to improve our ability to communicate through these technologies rather than with them.