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Process Redesign and Technology Integration in Museum Exhibitions: Designing the Appalachian Experience exhibit at the Oak Ridge Children's Museum

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ABSTRACT

This text is an exploration into the exhibit design process at the Children's Museum of Oak Ridge in Oak Ridge, Tennessee. I have attempted to document the portion of the aforementioned process that falls between grant receipt and final exhibit design proposal. The focus of this paper lies in the challenges of working within both the restrictions of an exhibition committee structure and the culture of a not-for-profit non-municipal education and research center. In this case, that center is the Children's Museum. The second objective of this document is to recommend a means for improving the exhibition design process. Finally, using personal knowledge of the Museum and proven tools used in other high technology-into-low technology museum applications by previous researchers, I will recommend a final design for the exhibit in question.

INTRODUCTION

The Children's Museum of Oak Ridge

The Children's Museum of Oak Ridge (CMOR) was opened to the public on March 11, 1973, in the library of one of Oak Ridge's then-Junior High Schools, Jefferson Junior High. In January of 1974, the Museum was relocated to the former Highland View Elementary School, the building which it occupies today.

Figure 1. A taxidermed polar bear at the entrance of the Museum.

Selma Shapiro served as the Museum's director from its inception to 2005, and she still serves as an active member of the Board of Directors. The CMOR's exhibits cover topics such as the rainforest, trains, and world cultures, all with an interactive focus. Including the exhibitions listed above, the Museum has renovated six exhibitions in the last four years. The Museum is also home to one of the most thorough histories of the city of Oak Ridge's involvement in the Second World War.
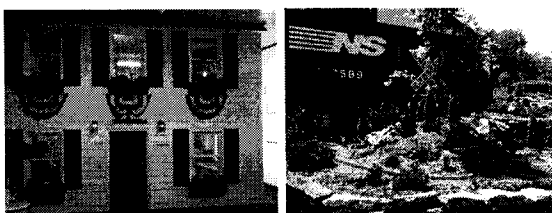
Figure 2. A "kid-sized" dollhouse and a model train setup that wraps around a real caboose.

One of the most important cultural assets in the Museum, as well as to this particular project, is the Regional Appalachian Center (RAC). The RAC was created thanks to a federal grant from the National Endowment for the Humanities in the 1970s. Along with the Museum of Appalachia in Norris, Tennessee, CMOR represents one of the two most valuable preservation and research centers on Appalachian culture and heritage in East Tennessee.

Figure 3. A crowded library that doubles as the Regional Appalachian Center.

Along with the multiple recently renovated exhibits, CMOR is home to a number of aging, but still historically relevant, exhibition rooms. One such exhibition is the Appalachian Experience room. In spite of the conspicuous absence of high technology content-delivery, the exhibit remains very popular among young and old patrons. Younger Museum patrons tend to gravitate towards the Appalachian-style schoolhouse setup and children's toys, and older patrons spend much of their time examining furniture and reading blurbs attached to the pictures and artifacts in the exhibition area[1].

Figure 4. The current Appalachian Experience exhibit.

Institute of Museum and Library Services

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[1] Based on personal observation, June – August, 2005.

The Institute of Museum and Library Services (IMLS) is a federal program whose mission is to "grow and sustain a 'Nation of Learners'[2]." IMLS disburses grant monies to museums and libraries across the United States for the purpose of:

> provid[ing] leadership and services to enhance learning in families and communities, sustain cultural heritage, build twenty-first-century skills, and increase civic participation.[3]

In July of 2005, the Children's Museum of Oak Ridge was awarded an $80,000 Museums for America grant by the Institute of Museum and Library Services. Portions of the grant application may be found in *Appendix A* and the full description of the Museums for America grant awarded to the Children's Museum may be found in *Appendix B*.

Appalachian Heritage Digitization Project

The portion of the grant that concerns this project involves the digitization and preservation of a collection of analog audio and video on the topic of Appalachian Heritage in East Tennessee. The specific grant-awarding verbiage that describes the portion of the exhibit that is discussed in this paper is as follows:

> The purpose of the project is threefold: 1) Digitally preserve audiotapes and videotapes of Appalachian culture, as well as preserve the original tapes […] 3) Make museum resources more accessible to the public through the following activities: […] b) Revitalize the museum's

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[2] IMLS, About Us – Legislation & Budget.
[3] IMLS, About Us – Legislation & Budget.

Appalachian exhibit by incorporating the digitized recordings into interactive kiosks. [...] d) Incorporate digitized resources into the museum's Web site[4].

The in-building application of this portion of the grant was to be an interactive kiosk-style computer-based content delivery system for the digitized audio and visual materials. Two purposes secondary to the content delivery system include the relatively simple tasks of preserving the original audio and video tapes and rendering the digital files to be remotely accessible via the internet.

INITIAL PLAN

Statement of Purpose

At the outset of this project, the ultimate purpose of my work was to create a Museum visitor experience that would increase community awareness of both the Museum itself and the Museum's role in preserving the East Tennessee region's Appalachian heritage so that the Museum would be in a better position to apply for future grant monies and utilize them in a way that would continue the Museum's growth in membership and in its opportunities for advancing learning and research in both regional history and promotion and education of world cultures in the local community. In more tangible terms, I planned to do research on and determine the optimal physical layout, computer-human interface, and content availability for the exhibit described in the previous section.

Timeline

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[4] IMLS, Grant Recipients – Children's Museum of Oak Ridge – Oak Ridge, TN.

As mentioned earlier, the Museum was awarded the IMLS Museums for America grant in the summer of 2005, with the first round of disbursements to take place in September of the same year. At that time, I began the process of digitizing the Museum's vast collection of analog media. Listening to and watching the tapes made me realize that, although the subject matter—Appalachian history—was not much in the way of a "hot topic," it was still entertaining, informative, and most of all, important to anyone with ties to the region known as Appalachia. With that in mind, I set out to determine how these multimedia materials might be best conveyed to an audience like the one that the Children's Museum brings in. To do this, I created a four-page survey, included in *Appendix C*, that was to be mailed to the entire membership of the Museum—all 900 of the family, grandparent, and individual members. The survey went through three iterations before being completed and approved by the IMLS exhibit design committee at the Museum in November. Initially, the survey was to be included in the Museum's January newsletter and completed surveys were to be returned to me for compilation and analysis. With an anticipated 500 surveys returned by February, 2006, I planned to go before the Museum's 24-member Board of Directors to present my findings. Taking into account the reactions and recommendations of the Board at the March meeting, I planned to design a preliminary version of the user-interface that would guide visitors through the digitized multimedia, which would then be demoed to the Board in April, 2006.

Final Recommendation

The collection of survey responses and the two meetings with the Board were to culminate with a final recommendation on the new exhibit's design and the user-interface that would be developed to most effectively engage, entertain, and educate the greatest number of Museum

patrons. As mentioned earlier, the purpose of this through understanding of how to best reach Museum patrons was to help the Museum achieve higher levels of growth in both private donation levels and federal grant monies from organizations such as IMLS and the National Endowment for the Humanities. The only way that this would be possible was to deliver the digital content (and the rest of the content made possible by the IMLS grant) in a way that was relevant to as many Museum patrons as possible. The content itself was relevant; the challenge was to make sure the content delivery brought this point home to individual patrons. This was to be the aim of the final recommendation.

EXECUTION CHALLENGES

Committee Structure

The nature of the Museums for America grant mandated that the work on the new exhibit be overseen by a committee made up of Museum employees as well as community members with expertise in the fields relative to the operations that the grant would fund. This group includes digitization and technology consultants, exhibition design consultants, archiving and accessioning consultants, Appalachian historians, etc.

Because of the level of expertise and professional experience required by the grant's supporting literature, many of the committee members were committed to other obligations on a full-time basis. As such, anything that requires the full committee's approval could safely be considered frozen for at least a month while making its way through the gears of the committee structure.

Timeline Readjustments

Even in the face of the challenges and potential slow-downs the committee structure presented, my first timeline readjustment was a compression. Realizing that the cost of mailing the surveys to 900 addresses and including a return-mailer with the survey would be too costly both in monetary and temporal terms, the committee decided that the survey would be most effective in an online format. To this end, I transcribed the survey into a digital format and loaded it onto a web-based survey-hosting service. In doing this, I anticipated cutting the time between publishing the survey and compiling a statistically significant number of results in half.

Tentatively, I moved my entire timeline one month ahead of the original schedule. Unfortunately, changing the format of the survey was grounds for the committee to reevaluate the content of the survey. The survey was not integrated into the Museum website until March, 2006, three months behind schedule. This schedule adjustment, in conjunction with a lack of advertising in outlets outside of the Museum website, contributed to the overwhelming failure of the survey. Of 900 registered Museum members and a target of 500 responses, the survey was only completed by six unique users as of April 22, 2006. Because that number amounted to less than 1% of the Museum's membership, and several of the respondents are currently a part of the Museum's administration as well as the exhibition design committee, I would not consider the survey results valid in supporting a recommended exhibit design.

Without the benefit of statistically significant survey results, the final recommendation proposed in this paper will be based on personal experience and observation in the Museum, previously

conducted research on the topic of museum exhibit design, and input from the Museum's Board

of Directors.

Communication with Membership

The lackluster response to the marketing survey by the Museum's membership brought to light a

deeper administrative problem faced by the Museum: communication with membership. These

900+ members represent the set of Museum patrons most likely to provide the necessary visitor

counts to provide a basis for an increase in both private donations and public grant awards.

Currently, the Museum communicates with members through two primary means: in-building

announcements and promotions and a bi-monthly newsletter. An example of the in-building

communication is illustrated in fig. 5.

Figure 5. Flags of the World display, promoting upcoming International Festival.

As mentioned earlier, the survey was originally intended to be an addendum to the January

membership newsletter, but the added costs associated with printing, a larger mailing, and return

postage proved to be prohibitive. The exhibition design committee anticipated that moving the

survey to an online format would increase the likelihood that Museum members who knew about

the survey would actually take and submit the survey. This may have been the case, but the

900+ Museum members were not notified of the survey's existence.

PROCESS IMPROVEMENT

Enhancement of Board Ownership

As with any other business entity, the culture of CMOR starts with those at the top. In the

Museum's case, that "top" is a 24-member Board of Directors. Board members are elected by

the general Museum membership to serve three-year terms on the Board. Terms of service are

cyclical such that one-third of the Board seats are up for election each year.

For the most part, Board members take their involvement in the Museum very personally. Proof

of this phenomenon can be seen in the substantial number of volunteer hours given up by Board

members during new exhibit construction[5], donations of both time and items for the Museum's

annual "Neighborhood Garage Sale" benefit[6], and the sentiment expressed in multiple interviews

conducted as a part of this research.

Bowman and Kakabadse suggested the existence of an "ownership of the strategy"[7] matrix,

describing the sentiments of parties involved in the strategy creation process. The matrix's

design takes into account an individual or group's level of internalization of strategy and success

and levels of perceived inclusion in the strategy creation process. This matrix is displayed in fig.

6. From the observations described above, it can safely be assumed that Board members are

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[5] Personal observation, construction of the Ed Westcott exhibit, June – July, 2005.
[6] Personal observation, May, 2005.
[7] Bowman & Kakabadse, 1997.

high-level internalizers of strategy creation and of the eventual success or failure of Museum
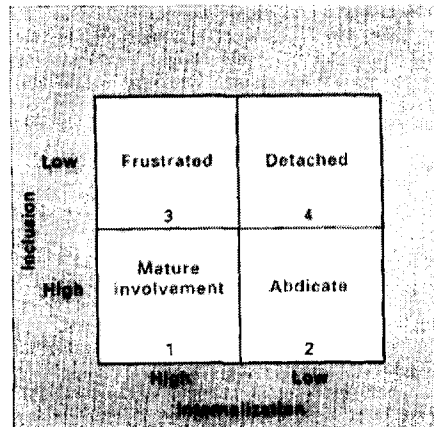
initiatives.

Figure 6. Bowman and Kakabadse's "ownership of strategy" matrix.

The second and final determination to be made to pinpoint the location of the Board in Bowman

and Kakabadse's matrix is how included Board members feel in formulation of strategy—or

more specifically in this case, the planning in the Museum's largest current initiative, the

updating of the Appalachian Experience exhibition. When asked to describe the current process

of exhibit design and how it might be improved upon, one Board member responded that he

simply was "not familiar enough to comment [on the design process]"[8]. Other respondents had

similar sentiments regarding the exhibit design process. This suggests a trend that would push

Board members into the low inclusion, high internalization quadrant of Bowman and

Kakebadse's matrix: "Frustrated." The challenge therefore belongs to the exhibition design

committee to include the group that determines the sentiment of the entire Museum family in

developing and designing the new exhibit.

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[8] Burkholter, 2006.

Enhancement of Membership Ownership

In many cases, Museum patrons have been visiting CMOR for an excess of twenty years[9]. Those who live in neighborhood that is home to the Museum, one of the poorest in Oak Ridge, are given free family memberships as a community service. As a former staff member, I can recall countless occasions during which grateful parents expressed deep thanks for giving their children a place to be on summer days and in the afternoons during the school year. Both of these occurrences suggest that the Museum membership, for the most part are also high-level internalizers of the success and failure of the direction taken by the Museum. The purpose of the design survey was to catapult the group into the first quadrant of Bowman and Kakabadse's matrix: "Mature involvement." In reality, the membership was left in, and remains in, a variation of the third quadrant that I will call Ignorant/Frustrated.

The benefits of involving the Museum's membership in higher level strategic decisions could be as simple as improving membership morale and attendance numbers, to something as substantial as increasing high level member involvement in the grant proposal process and higher private donation levels.

Grant Execution & Exhibit Design

The new exhibit design process more closely resembles a hodge-podge of insular tasks than a collective effort to create a new exhibit. The focus of the exhibit design committee's leadership is on the completion of the individual tasks outlined in the grant award statement rather than the final deliverable: a new exhibit.

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[9] Personal observation, 2004-5.

The design of an actual exhibit and content delivery method is an issue that has not been approached seven months into the grant execution process, as evidenced by the lack of involvement of the exhibit design professional to this point in the grant execution process[10].

It can be argued that the only portion of the grant execution of real consequence is the customer experience provided by the exhibit. In this case, the customer is represented by both the patrons of the Museum and the representatives from the IMLS selection committee.

With this in mind, it seems clear that it is the absolute responsibility of the exhibit design committee to focus all grant execution-related work on the final deliverable of the grant: the exhibition design and the content-delivery method for the newly archived and digitized information.

DESIGN RECOMMENDATION

As previously mentioned, my original intention with this paper was to propose a design for the content delivery system to be used in conjunction with the updated Appalachian Experience exhibition. My anticipated primary means of identifying and proposing an effective design was collecting and analyzing the data that would have been the aggregation of the membership surveys that went largely uncompleted.

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[10] Damos, 2006.

I will still be making a proposal for the design of the exhibit with this paper, but rather than use research conducted specifically on the CMOR target audience, I am basing my recommendation on research done in similar applications, personal observation, and a focus on creating a repeatable Museum patron experience in the hopes of generating future revenues for the Museum.

Scientific Basis

One of the keys in designing the exhibit is that the visitor take away a thematic understanding of Appalachian history and its relation to the present day and to the local region. It is Falk's contention that it is not necessary to continuously re-explain the overall theme to the museum visitor, but that displaying clustered examples of one theme will suffice in conveying a thematic message[11].

Ciolfi and Bannon make a particularly interesting point in their proposal that is extremely relevant to the CMOR case, as their project revolved around adding a high-technology component to an otherwise low-tech and hands-on exhibition area[12]. In keeping with the Hunt Museum's convention of hands-on and fully interactive exhibition areas, the pair determined that a computer kiosk-based content delivery system would be inappropriate due to the limiting nature of such a system. Instead, they proposed an RFID application using dolls and other objects as triggers for different media presentations.

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[11] Falk, 1997.
[12] Ciolfi & Bannon, 2002.

In further studies on the topic, they furthered this idea by saying that individual objects, and not computer-based kiosks, ought to be the "interfaces through which visitors can make sense of the object, of their history and their multiple relationships and features"[13]. This suggestion would effectively cut out the middle-man in the museum learning environment.

Patten, Ishii, Hines, and Pangaro did extensive research on the technical side of this issue. Unlike Ciolfi and Bannon, Patten, et al, have executed a hands-on, interactive system to completion. Their system involved the use of electromagnetic "sensetables." In the context of the Museum, these sensetables may have far greater practical application because they are able to track objects more quickly in changing lighting conditions and maintain real-time position calculations[14]

Moving more towards the overall philosophy behind exhibition and exhibit design, Falk also contends that, contrary to conventional wisdom, every exhibit ought not fully contend for a visitor's attention. He maintains that:

> [w]hen every exhibit is competing for the visitor's attention, the result is often an exhibition working at cross-purposes. The visitor's attention goes ricocheting around the exhibition hall like a pinball[15].

These topics will be applied to the CMOR case in the *Final Recommendation* heading.

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[13] Ciolfi & Bannon, 2003.
[14] Patten, et al, 2001.
[15] Falk & Dierking, 1992.

Observation

Working as a summer camp instructor in 2004 and as a museum assistant in the summer of 2005, I had the opportunity to observe both how the children learned in the Museum setting and how a variety of Museum patrons acted within the context of individual exhibitions. Static exhibits, particularly those with artifacts and objects contained in glass cases, rarely hold a patron's attention for more than two to three minutes. This is the case for the children who visit the Museum because there are so many opportunities for interactive play in other exhibition areas. For parents and grandparents, this is the case simply because they are trying to keep up with the children. When children are in interactive exhibition areas, the roles are reversed: children tend to leave the exhibition area only when they are beckoned to do so by the adults with whom they came to the Museum[16]. For more on this topic and its application in the new exhibit's design, see the *Final Recommendation* heading.

Key Considerations

A key focus in the design of any service experience that has not yet been discussed is a focus on a service's intended audience. Being that it is the nature of the Museum to cater to children, the exhibit must be able to deliver content in such a way that it is both understandable and simple enough to have meaning for children who visit the exhibit, and to be capable of enough detail to satiate those who visit the Museum because it is the home of the RAC.

The exhibit must also be progressive and easily enough adaptable to future updates so that the exhibition area remains relevant and attractive in the future. This is necessary because the

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[16] Personal observation, 2004-5.

current budgetary restrictions of the Museum allow for only one three- to six-month renovation project at a time[17].

Final Recommendation

I must finally recommend that the style of content delivery for digital media exhibit in the Appalachian Experience exhibition area facilitate the viewing and listening to a variety of selections on similar themes in a relatively short amount of time. Where possible, this content should be integrated directly with the non-restrictive hands-on portions of the exhibition area, in accordance with Ciolfi and Bannon's suggestion. This may be accomplished by designing a custom application using either RFID tags or electromagnetic tags on objects either already in the exhibition area or objects that would fit in the exhibition area thematically and stylistically. These tags would be used as triggers for selected portions of the digitized media to be added to the exhibit. The full body of the digitized material would be available for self-guided access in the Museum's library. Finally, the digitized material must be the focus of the redesigned exhibition area. This may be accomplished by integrating many of the objects already in the exhibition area into this exhibit.

CONCLUSION

The mission of the Children's Museum is a valiant one, and makes this research both important and rewarding. The ultimate purpose of this work was to help create an exhibit that would help the Museum grow financially via private donations and public grants and in the educational opportunities it presents to area children and to the regional community as a whole. As the

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[17] Personal observation, 2004-5.

exhibit design process moves into the future, I look forward to seeing the Museum continue to fulfill its mission and to enrich the lives of those who visit it.

ACKNOWLEDGEMENTS

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