Best practices in creating quality online experiences for museum users

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Abstract

The Canadian Heritage Information Network commissioned a research study on quality in online experiences in order to ensure that the Virtual Museum of Canada (VMC), launched in 2001 to provide a strong online presence for Canadian museums, retains some consistency through its content and interface. The research goals were to determine what factors define 'quality' in online museum projects and how to measure this quality through a thorough analysis of existing online museum products in the VMC portal. This article focuses on how development teams attempted to engage users of *eight* VMC products. The 2002 statistics for these products indicated higher user engagement. Interviews with project managers and multimedia developers explored successes and challenges in developing products, and potential best practices for producing quality in online experiences for VMC users. Five factors frame the discussion of findings. Expectations for user engagement, as well as objectives, outcomes, and success indicators were important factors at the outset of the project. Critical factors during and after Web site development included the needs of intended and other interested audiences, and opportunities for reflection and evaluation following the launch of the product. Finally, building an exhibit that meets partners' interests and changing needs contributes to a project's lasting impact.
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1. Introduction

The Canadian Heritage Information Network (CHIN) launched the Virtual Museum of Canada (VMC) in March 2001 to ensure a strong online presence for Canadian museums. VMC projects target skills development for the creation, management and presentation of digital content in order to build the heritage community's capacity (CHIN, 2002). CHIN also actively helps smaller museums get involved in the production process, and encourages all heritage institutions to work together 'while staying abreast of the latest technology developments and their implications for heritage and the Web' (p. 7).

CHIN staff is constantly striving for high-quality content in the creation and production of all VMC products. During 2002–2003, CHIN undertook a research project to help project managers determine how to maintain some consistency through the VMC's content and interface (Soren, 2004b). The intentions of the research were:

- to determine what factors define quality experiences for VMC users (see also Soren and Lemelin, 2004);
- to explore how to measure this 'quality' through a thorough analysis of existing online museum products in the VMC portal; and,
- to consider issues CHIN staff might explore in the future to ensure that VMC products offer users quality experiences.

2. Factors that contributed to quality online user experiences

The research highlighted some of the ways museum Web development teams can work towards quality user experiences, before, during and after the launch of an exhibit.

- At the outset of a project, museum partners need to make decisions about their expectations for user engagement and how engagement will be measured, as well as about things to consider when working on a large project with many partners.
- Multimedia developers need specifications from the team about objectives, outcomes, and success indicators for developing the exhibit.
- Partners have to consider if there will be potential conflict between intended and other interested audiences (e.g. youth tends to be the target audience for exhibits, but lifelong learners likely use them more). A youth-driven mandate requires curators to write information for this audience, which may alienate others.
- The development team needs to reflect and evaluate after the launch of the exhibit with follow-up conversations, gatherings, or surveys to see how museum partners used the experience of developing the exhibit. These follow-up opportunities can also be beneficial for assessing the impact of a virtual exhibit on the museum community, nationally and internationally.
- How to track users and build an exhibit that meets partners' interests and changing needs is critical to a project's lasting impact. Partners and multimedia developers should receive periodic summaries of feedback messages to help development teams better understand target users' prior knowledge and experience, personal

and professional interests, and motivations for visiting an exhibit. The relationship with the partners tends to drop off and the multimedia company ceases to track satisfaction, concerns, and successes with the product.

The impact of these five factors on the development and production of eight VMC products is the focus of this article.

3. The research plan

The research plan had three phases. The first phase involved a summary of relevant online and print literature to study current thinking about the experiences of online users visiting museum exhibits. The second phase examined a suggested approach for CHIN to analyze statistical data from the VMC portal. CHIN has collected statistics since the launch of the VMC site in March 2001. The statistical analysis focused on a relatively new statistic CHIN developed called the 'Engagement Factor,' which is used to communicate the VMC's performance as a whole, and to report on each of the VMC's products separately.[1] As an interpretive element, the Engagement Factor helps CHIN look at VMC statistics in a new way. Marketing campaigns, features, and search results (e.g. using Google) all affect a VMC virtual exhibit's or interactive game's Engagement Factor.

This article reports on findings from the third phase of the research. Semi-structured telephone and in-person conversational interviews (e.g. Diamond, 1999; Mason, 1996; Patton, 2002) with project managers at CHIN and multimedia developers provided a rich history of the development and production of eight VMC products. The products included seven virtual exhibits and one interactive game. They ranged from early virtual exhibits created and developed in 1997 and launched in 1998, to a virtual exhibit developed in 2003 and launched in 2004.

Five of the virtual exhibits were **executively produced** with CHIN project managers directly involved in creation, development, production and translation. Project managers worked closely with the multimedia developer and as many as 10–15 international partners on projects. As an introduction to the five executively produced virtual exhibits included in the research:

Haida Spirits of the Sea (http://www.virtualmuseum.ca/Exhibitions/Haida/index.html), launched in 1988, invites discovery of the Queen Charlotte Islands and the Haida Gwaii people's profound relationship with the sea.

Butterflies North and South (http://www.virtualmuseum.ca/Exhibitions/Butterflies/index.html), also launched in 1998, allows users to identify butterflies and moths, teaches

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[1] The formula used to calculate the Engagement Factor is the following:

$$\text{Engagement Factor} = \frac{\text{Number of visits}}{\text{Number of visitors}} \times \text{length of time a user spends on the site}$$

See the online or print publication of this research for a discussion of the factors that complicate the interpretation of visits, visitors, and the duration of time users spend on a Web site, as well as a comparison of statistical data for eleven VMC products collected in 2002.

how to watch and attract butterflies, how to protect their habitat, and offers links to more related information.

Staying in Tune (http://www.virtualmuseum.ca/Exhibitions/Instruments/index.html), launched in 1999, enables users to discover traditional Francophone musical instruments and that which connects them to the people who invented the instruments.

Panoramas: The North American Landscape in Art (http://www.virtualmuseum.ca/Exhibitions/Landscapes), launched in 2001, focuses on the North American landscape in art and has four themes (Evolving, Social, Mythic, and Personal Landscapes).

Perspectives: Women Artists in North America (http://www.virtualmuseum.ca/Exhibitions/Perspectives/index.html), launched in 2002, celebrates, from historical, modern, and contemporary art perspectives, and across cultures and periods, the important contributions to the arts of women from Canada, Mexico, and the United States.

In 2001, **CHIN-commissioned virtual exhibits** were developed with themes related to the humanities, history, ethnology, and the natural sciences. Museums that had already researched and developed ideas for an exhibition became partners on commissioned projects.[2] The Museums Advisor from the Government of Yukon Heritage Branch was the project manager for the two commissioned virtual exhibits included in the research sample.

Explore Herschel Island! (http://www.virtualmuseum.ca/Exhibitions/Herschel/English/menu.html) introduces users to an island off the Yukon North Slope in the Beaufort Sea. The island was home to ancestors of the Arctic people, and a landmark and sanctuary for those travelling and working in the Western Arctic.

Yukon Photographers (http://www.virtualmuseum.ca/Exhibitions/Goldrushphoto/02english/02intro.html) features historical photographs taken just before, during, and after the Gold Rush by people visiting the Yukon since the time US Army Lieutenant Schwatka travelled down the Yukon River in 1883.

The **interactive game** included in the research was *Safe Trax* (http://www.virtualmuseum.ca/Exhibitions/Rail/english/index.html), launched in January 2003 and marketed with a contest on the Sympatico portal. It aims to teach youth about train safety by engaging them in a Flash-based game that guides two imaginary youngsters through train-related territory. The multimedia developer tried to translate research and content into an experience that would be attractive for the targeted 13–15 year-old user.

An interview with one other multimedia developer helped to further define the role and responsibilities of a multimedia company in developing a VMC product. At the time of the interview, his multimedia company was working on the virtual exhibit, *Horizons: Canadian and Russian Landscape Painting (1860–1940)* (http://www.virtualmuseum.ca/Exhibitions/Horizons), launched in 2004. *Horizons* allows visitors to explore 250 paintings brought together for the first time from diverse regions of the world's two largest

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[2] The commissioned projects served as a transition into the VMC Investment Program, which enables museum staff to create a product that can be hosted on the CHIN site or the museum's own server. These projects began development in 2001 (http://www.chin.gc.ca/English/Members/Vmc_Investment_Program/index.html). Community Memories (http://www.virtualmuseum.ca/English/CommunityMemories/index.html) is CHIN's most recent program in which local history exhibits present the collections of small and large museums, and the treasures and reminiscences of individuals from those communities.

countries—Canada and Russia. Fourteen museums and art galleries in Canada and Russia created this exhibit, in association with CHIN.

Key questions that CHIN project managers and multimedia developers considered during the semi-structured conversational interviews included the following:

- models or frameworks for creating, developing, and producing VMC products;
- strategies for engaging online visitors;
- challenges or obstacles to developing a product;
- successes related to online user experiences;
- types of interaction users would have with the VMC product; and,
- best practices or considerations from the development and production processes of VMC products that successfully provide quality online experiences.

4. Developing and producing quality in online experience

Interviews provided insights to how project managers at CHIN, multimedia developers, and partner heritage organizations planned to engage users. The interviews also made it clear why there may be more traffic to some VMC products and why users might spend more time browsing some exhibits. Responses to the key questions illustrate how the five factors for creating products that offer quality online experiences emerged from the research.

4.1. Expectations for user engagement

Interviews highlighted specific strategies that teams used for engaging online users across the eight VMC products. In discussions of these strategies, a number of complex issues surfaced, such as market analysis, usability and accessibility, expectations of users from different age segments, user-driven content, human-computer interaction, interface design, and the use of narratives and stories.

Haida Spirits of the Sea has 12 versions—four different language versions (English, French, Spanish, and Portuguese) and three levels of technological access. The latter include a kiosk version, which is almost identical to the version presented at Expo'98; a Java version, which was brand new in 1997 and very controversial; and a non-Java version. The kiosk at Expo'98 was one of six multimedia dislays on a circular station and had a banner over the touch screen. A market analysis of Portugal (e.g. national norms, current world issues, and Canada's position within the global village) and the *Oceans: A Heritage for the Future* theme for Expo'98 resulted in an initial analysis and planning document.

In *Butterflies North and South*, the visual elements in the galleries (from Peru and several provinces across Canada) ensured that users would be able to quickly and easily identify butterflies and moths outdoors, find the information they need online, and then leave the exhibit. Moths were included because users are likely to see moths in their backyards and confuse them with butterflies. Developers organized images by butterfly habitat, family, and colour, and developed three language versions (English, French,

and Spanish). The two strongest sections were the 'Gallery' (which allowed people to visually connect with the butterflies and moths they were seeing) and the 'Teachers' Centre' (to provide educators with a resource they could rely on). The multimedia developer made images a good size so people could identify butterflies and moths quickly, and used several images on each screen.

The development team wanted *Staying in Tune* to engage youth and remain as educational as possible for target users, 15–20 year-olds. Partners chose four themes for the exhibit—Aerophones, Chordophones, Idiophones, and Membranophones. Educational activities include a quiz, crossword puzzle, multiple-choice game, scrambled letters game, making a musical instrument, and musical composition (users can access the musical composition activity through the exhibit or the VMC *Teachers' Centre*). Partners used a constructivist approach (e.g. Hooper-Greenhill, 2000; Jeffery-Clay, 1998; Soren, 2004a) to ensure that this exhibit would be the expression of youth. Constructivism is a theory about learning as an active, learner-centred process. It holds that people learn by building up, or constructing, new ideas and concepts based on their prior knowledge and experience. Constructivism also refers to providing a sort of scaffolding for individuals in the form of specific learning activities or instructional strategies.[3] The multimedia developer was experimenting with new ways of developing projects with students for CD-ROMs she was creating. She had not seen many exhibits that used a constructivist approach at the time (1998–99).

The development team for *Panoramas: The North American Landscape in Art* knew that few users would stay long enough during one visit to enjoy all 300 artworks in the exhibit. However, partners felt that the sheer volume of so many works from various countries and the ability to see the artworks *côte à côte* would entice individuals and offer an opportunity that would probably never exist in a physical museum exhibit. Users can listen to a curator's audio tour (which requires downloading QuickTime) about one of the artworks in the 'Media' section and explore the 'Educational Centre' for each of the four themes of the exhibit. These more interactive elements provide users with different ways of approaching the art beyond just enjoying looking at the works and reading curatorial information. The multimedia developer for both *Panoramas* and *Perspectives: Women Artists in North America* tried to offer content in a variety of ways, providing search filters by theme, developing three language versions (English, French, and Spanish), and producing international image galleries for each theme. A database with the capability of filtered search enables users to look at a certain era, type of art, or theme, which creates different choices of how to organize search results. The multimedia developer commented

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[3] In social constructivist thinking, learners are active and adapt to the world by forming and reforming categories and structures that work to explain the phenomenal world and allow the learner to interact with it effectively (O'Connor, 1998). They build up or scaffold, piece by piece, an internal mental structure that is made up of pieces that pre-existed. Individuals rely on this structure in reorganizing their activity on the basis of further experience. Hein (1998) describes constructivist exhibitions as opportunities for learners 'to use both their hands and minds, to interact with the world, to manipulate it, to reach conclusions, experiment, and increase their understanding or ability to make generalizations about the phenomena with which they engage' (p. 34). Conclusions reached by museum visitors as learners are validated by whether the conclusions 'make sense' within the constructed reality of the learner.

that different staying times are based on different motivations. How long users stay engaged in an exhibit differs based on why they are visiting it (e.g. users stay a little longer if they are doing research for a project or paper).

An interactive multimedia application called *Explore Herschel Island!* had already been created for the Old Log Church Museum through the University of Victoria. The original exhibit for *Explore Herschel Island*! only required a redesign and translation of the English content into French and German. The development team lightened the background framework by changing the font to the simpler, modern-looking 'Arial' and using a light grey background. The end product was crisper, cleaner, and less distracting. There is also a simple trivia quiz and components to try and engage different users with different ideas and suggestions. A layered approach provides basic entry information, but also more scientific information if users want to explore further. A Yukon group had also done considerable research for a travelling exhibit on photographers of the Gold Rush. *Yukon Photographers* is about photographers who documented the Gold Rush and what life was like going over the mountain passes. The project manager thought that the Klondike has its own allure that draws people. Users are likely looking for information on the 'Yukon Gold Rush' and interested in how photographers made a living from selling views of Klondike Gold Rush events. The development team for *Explore Herschel Island!* and *Yukon Photographers*, both launched in 2001, felt that a combination of rich content and images is engaging and different from users' regular experiences reading books or visiting museums. Users can read through the online material in one of three language versions (English, French, and German), do research, look at the images in their area of interest, and print out material.

For *Safe Trax*, the multimedia team created a narrative experience for a less linear exhibit. They decided to give users opportunities to make bad choices so that the user could experience what not to do in a particular environment (i.e. a counter-intuitive strategy). The multimedia developer knew that one of the first questions teenagers and some adults ask is, 'What's in it for me?' Rules and regulations around train safety would likely not be a very interesting topic. The development team tried to make the exhibit a little bit more engaging in a technical sense by having more things happening at once, and more possibilities always working, as opposed to a character-based story. For example, in one scene users calculate how many seconds they have until the train is going to hit them in a movie-style matrix with a freeze frame, an approach that teenagers are used to seeing.

The multimedia developer for *Horizons: Canadian and Russian Landscape Painting (1860–1940)* was attempting to create a constructivist experience for the user by building an exhibit in which information is available in bits, but adds up to something more meaningful. Users could identify their own path to learning. They could build a unique experience for themselves driven by their curiosity and with online tools (e.g. zooming-in on sections of an artwork; changing the surrounding background colour to see how it alters an image; and accessing content in one of three language versions—English, French, and Russian) (Soren, 2004a). The multimedia developer was very aware that targeted users for the exhibit, 13–29 year-olds, were likely to have little interest in Russian art from between 1860 and 1940, and that this youth-driven mandate could alienate other interested audiences. Consequently, he was attempting to provide rich experiences for both novice

and 'power' users, cater to users' wants and needs, and make sure that fun is part of the learning experience.

4.2. Objectives, outcomes, and success indicators

Several models or frameworks guided the development, production, and project management of individual VMC products. A more traditional model provided users with information in layers in contrast to a more constructivist approach, which helped targeted users build meaningful experiences for themselves. Developing a theme, project plan, calendar, and the various objectives to be reached was critical. On larger international projects, partners from heritage organizations brought a wealth of input and content to the project, and were often selected because they had already completed research related to the topic or theme for the VMC product. For each project, multimedia developers thought about outcomes and success indicators for users. For instance, they considered how best to interest users in the design of the exhibit and create new and novel experiences for users through the exhibit architecture and content structure. The harmony of working together to produce unique and powerful online products with different contents seemed to be a learning experience for partner heritage organizations. The experience of working on online products can also help curators in the development of exhibitions for visitors to their physical museum.

The two curators responsible for content development for *Haida Spirits of the Sea* were from the Haida community. The team used a traditional museum model of developing materials for multiple audiences, adopting 'an onion skin approach,' which provides information in layers to give people access to as much or as little as they choose. Partners worked with a multimedia company that was creative and artistic, and good at presenting visually appealing content in a functional exhibit.

A consortium of museums created and produced *Butterflies North and South*, and made an effort to use the strength of each partner. *Birds*, a virtual exhibit launched earlier in 1998, proved to be a popular one, and the Nova Scotia Museum of Natural History and the Provincial Museum of Alberta believed that a virtual exhibit on *Butterflies* should be equally popular. However, the models for developing the two exhibits were quite different. *Birds* was like a book with each museum partner responsible for one of the chapters. *Butterflies* was more partner-driven with each partner contributing to every section. For example, Museo La Salle in Peru had more colourful butterflies in its collection than Canadian partners, and access to images through butterfly photographs, which added to the visual appeal. The development team wanted to help users easily and quickly identify butterflies and moths through images from the galleries in the exhibit, as well as specific and detailed information about the large number of species presented. The team also developed a 'Teachers and Games' section, which can be accessed through the VMC *Teachers' Centre*. International interns associated with the project had the opportunity to go to Peru, perform research, and help develop the project with the Peruvian partner.

Staying in Tune involved 11 museums from nine Francophone countries in Canada, Eastern Europe, and Africa. Several 15–20 year-olds were selected and invited to work as 'curators' on the project. Each chose an instrument and wrote a poetic or personal text, sharing an experience, memory, or emotion related to the musical instrument.

Partners each had affiliations with a music school (e.g. the School of Music in Burkina Faso; the Chefchaouen Music Conservatory in Morocco; the University of Music in Romania; the Research Laboratory on World Music of the Université de Montréal) or had musical instruments in their collections (e.g. Canadian Museum of Civilization's Africa and Ethnomusicology Programme was developing a project to build instruments in the museum). College and university graduates hired as interns through Young Canada Works Experience grants worked alongside the curators and educators on exhibit design, programming, and content, and some were able to travel to partner museums.

Both *Panoramas* and *Perspectives* used tools that had been developed for *Christmas Traditions in France and in Canada* (CHIN's first virtual exhibit launched in 1995) and then *Haida Spirits of the Sea*. The development teams made decisions about a theme, project plan, calendar, and the various objectives to be reached. Top art historians in Canada and Mexico worked with CHIN on both *Panoramas* and *Perspectives*. Education staff from the American Art Museum at the Smithsonian Institution in Washington, DC, had time to work on *Panoramas* because their museum was closed for renovations. Partners for *Perspectives* included the Louisiana State Museum, where curators had researched Black slave artists in preparation for *Through Clementine's Eyes: Rural Life on the Cane River* (January–April 2003), an exhibition about a Black artist who had suffered as a slave but was always an optimistic philosopher of life. The McMichael Canadian Art Collection had also researched female artists for the exhibition, *Carr, O'Keeffe, Kahlo: Places of Their Own* (June–September 2001). The Winnipeg Art Gallery had done research for *The Group of Seven in Western Canada* (February–May 2003), and the Canadian Museum of Civilization had a related collection of paintings. The multimedia developer for both virtual exhibits offered options and provided technical expertise. She listened to what curators contributed, the types of works they wanted to present and levels of interactivity for users. She then presented a model in which creative works, rather than technology, could lead content. Since text needed to be translated into three languages, a database model in which images and text could be stored only once seemed most suitable.

Herschel Island served as an American commercial whaling colony in the 1890s, with a dozen whaling structures that still stand as archaeological and palaeontological sites managed according to the Inuvialuit Final Agreement. Using Yukon youth and local expertise rather than an outside multimedia company enabled the local community to build flexibility into their design and capacity for Web development. Two related virtual exhibits are *Fort Selkirk Virtual Museum* and *The Bishop Who Ate His Boots*, funded by the VMC Investment Program, and launched in 2002.

4.3. Needs of intended and other interested audiences

CHIN project managers and multimedia developers talked about the multiple, unique ways that development teams expected users to interact with their VMC products. Unexpectedly, they also discussed ways in which partners interacted and learned during the development process. Out of these discussions emerged different types of exhibits that partners could consider in their early decision-making. An internal CHIN document produced in 2002, *VMC—Architecture and Feedback Analysis at CHIN*, was a starting point for this typology of VMC products.

4.3.1. Share/obtain information

This type of exhibit gives users the feeling that the information is accurate, authoritative, reliable, and comprehensive. For instance, *Haida Spirits of the Sea* helps to raise consciousness about the Haida as a living culture. *Butterflies North and South* identifies butterflies and moths found in visitors' backyards. *Staying in Tune* provides information about musical instruments around the world. *Safe Trax* gives information about railway safety.

4.3.2. Learn/experience

With this type of exhibit, users have the feeling that the experience is interesting and story-like. Browsing invites responses of 'Wow!' and promotes interaction and feelings of serendipity (i.e. the user feels fortunate to have found the exhibit) when visitors discover new things. For example, *Butterflies North and South* invites users to explore information-based games. Both *Panoramas* and *Perspectives* offer content based on the user's interests, providing an element of surprise, giving options, and dynamically presenting works based on a user's choices.

4.3.3. Communicate

Enabling online social communication, chat groups, and discussions with a 'many to many' connection typify exhibits intended to communicate. During the development process, young curators shared their impressions from working with the musical instruments for *Staying in Tune*, and curators communicated themes and sub-themes for *Panoramas* and *Perspectives*.

4.3.4. Experiment

Through experimentation users can find things that are surprising, complex and challenging, and that promote action. *Staying in Tune* enables users to experiment through hearing the instruments and playing the games in the exhibit. *Panoramas* and *Perspectives* provide opportunities for users to explore new ideas and perspectives in a 'Curator's Choice' section in which a user can hear a curator speak about the artwork. Production teams continually experimented while developing *Explore Herschel Island* and *Yukon Photographer*s to see what did and did not work (e.g. colours, a prologue, music and sound to evoke feeling, and improved navigation).

4.3.5. Explore a database

A database offers access to collection information through digital images, textual descriptions, catalogues, archives, audio and video clips. *Panoramas, Perspectives,* and *Horizons* provide database collections that enable users to learn about their unique interests as they move through each exhibit.

4.3.6. Exchange ideas

An exhibit for exchanging ideas allows users to establish and create a network or a forum among users, or between museum experts and users. It allows them to discuss and share, and to build a virtual community or a means of creating links between communities. Email listservs with groups of people who have common interests allow the sharing of

information on *Explore Herschel Island!* and *Yukon Photographer*s. Also, *Panoramas* and *Perspectives* provided opportunities for partners in Canada, the US and Mexico to exchange ideas during the creation and development process. Partners could see what about them was different, what was common, and learn about themselves through their contact with others. Curators exchanged ideas, thereby creating new ones. Users could appreciate the environment around them and see the landscape with different eyes.

4.3.7. Experience-rich resources

An exhibit can provide users with resources that are rich in content, images, and variety. Both *Panoramas* and *Perspectives* integrate multimedia in resource-rich exhibits and enable users to enjoy all the elements of the exhibit using non-invasive plug-ins. *Explore Herschel Island!* and *Yukon Photographer*s offer rich content, images, and variety to engage users on different levels.

4.3.8. Critical response and creative process

Another type of product suggested by a multimedia developer was an exhibit that invites critical response and creativity. This type of exhibit provides users with opportunities to critically respond to online content and participate in a creative process. For example, by putting the responses of critics, art celebrities, or others on the Web and inviting the user to also become a critic gives individuals the opportunity to publish and have a democratic voice (i.e. the user's voice is equal to the critic's). Providing creative, conceptual tools that let users create and post products facilitates the creative process and inspires users.

Exhibits that provide users with opportunities to chat or dialogue with other users or museum experts require more resources than heritage organizations and museums across Canada tend to have. To date there have not been sufficient resources for museums developing VMC products to maintain interactive exhibits that include online spaces for exchange and conversation (Brochu et al., 1999). However, some CHIN project managers and multimedia developers who were interviewed discussed exchanges among users on listservs, and exchanges among partners developing and producing VMC products. In these ways, VMC products are creating forums and opportunities for development teams to share ideas and experiences.

4.4. Reflection and evaluation

Interviews enabled project managers and multimedia developers to reflect on and evaluate both successes of their Web sites for online users and challenges they encountered during the development and production process.

4.4.1. Successes related to online user experiences

Interviewees identified specific successes for each of the eight VMC products. For project managers and multimedia developers, successful Web sites were sensitive to the needs of its users and works from the user's perspective. They promote good relationships with multimedia companies who work with leading edge technologies as well as students and interns, and involve good working relationships with high quality museum

and heritage organization partners, nationally and internationally. Other successes interviewees discussed were excellent quality of content and images, different language versions, marketing of regions across Canada and the promotion of tourism to these areas, and the building of technical capacity in Canadian museums and heritage organizations.

Extreme sensitivity to the needs of the community was critical in the development of *Haida Spirits of the Sea*, as was enabling curators to select what they wanted from the Royal British Columbia Museum and Museum of Anthropology, while feeling that they had full support. CHIN had never used sound in an online exhibit before and needed to make available a special server to accommodate this requirement. Horizontal scrolling (as opposed to top to bottom scrolling) in the canoe section enabled users to 'paddle' their way through the interpretive text.

For *Butterflies North and South*, the development team actively worked from the user's perspective, trying to be very specific about what people who are looking for information about butterflies or moths need and how best to help them find it. The development team thought about what users might be doing or trying to do with the exhibit, and what information they might want. The Spanish version, which was added because of the Peruvian partner in the project, receives a lot of traffic.

In the early development of *Staying in Tune*, the team realized that users had to know how the musical instruments sounded. Although the process was challenging, they decided that they had to record the sounds of musical instruments for the virtual exhibit. Recording sounds of the instruments the students were researching was particularly stimulating for the students working on the project. It was the element that made a difference in motivating the students to 'jump into' the project. They recorded themselves if they knew how to play the instrument, or explored museum archives to find some extracts of music in which the instrument was being played. Five students selected by the World Music Research Laboratory of the Université de Montréal travelled to Tunisia and helped Tunisian students write their text on the instruments they had chosen. Ultimately, the students were really proud of the project and when they were all together (including two young people from Tunisia) at the launch in Moncton, New Brunswick, they had an opportunity to share their viewpoints on the experience of collaborating on the virtual exhibit.

Panoramas: The North American Landscape in Art was CHIN's first virtual exhibit project in which it was invited by the governments of the three partner nations (i.e. the Department of Canadian Heritage, the US Secretary of State, and Mexico's Secretaría de Relaciones Exteriores) to produce the VMC product. CHIN and the project were therefore sanctioned by the public authorities involved. As a result, the partners were of very high quality and became friends after the exhibit was completed. *Panoramas* was one of the most accessed exhibits after its launch. University students have used this virtual exhibit for post-graduate degree research because of the quality of the information. CHIN invited the multimedia company to work on a second VMC product, *Perspectives*, because of *Panoramas*' success.

Since an exhibit already existed for *Explore Herschel Island!*, it was a very small investment to revamp it and create a very good, trilingual product (English, French, and German) that was stronger in design, and able to interest a wider audience. The Yukon group continually looks at ways to bring more visitors to the Yukon as a whole, and peak

people's interest in visiting Herschel Island, one of the territory's major heritage sites and parks. The Government of Yukon Heritage Branch had been focusing on German tourists, but found that French users in Canada and in Europe responded well to the exhibit. Since people tend to start thinking about visiting the Yukon a year or two before they actually do so, the VMC Yukon products offer visitors the opportunity to take a look online and learn as much as possible about the Yukon before visiting. For example, an outfitter who flies plane tours into Herschel Island from Inuvik has linked to *Explore Herschel Island!* from his commercial Web site because he finds it the easiest way to show people what the island is like. With *Yukon Photographers*, the exhibit's primary mode of navigation allows users to discover works by artists, and a first-person narrative helps users get to know the artists and their biographies. Unique stories and tales cover a long time range and are cross-cultural.

The multimedia developer for *Safe Trax* felt that the quality of the content was excellent and well within the scope of the project, but that the interactive game could have been more educational and engaging. The multimedia developer for *Horizons: Canadian and Russian Landscape Painting (1860–1940)* commented that VMC products are successful when curators and multimedia developers share knowledge and strategic content, and increase technological and design know-how. Clear objectives and values help curators take ownership of a project, and feel responsible for whether it succeeds or fails.

4.4.2. Challenges or obstacles to developing and producing VMC products

Interviewees also talked about the challenges and obstacles encountered in the development and production processes for the sample of VMC products. Some of the biggest challenges included developing and producing a quality site within a limited timeframe, communication infrastructure, consensus-building, writing for the Web rather than a physical exhibition, and incorporating the newest technologies with different Canadian, as opposed to international, accessibility standards.

Since online exhibits were very new in 1997, the development team for *Haida Spirits of the Sea* had few models upon which to base their development process. The whole project was developed via teleconferences and with the unforgiving deadline of the launch of the exhibit at the World Expo's Canada Pavilion in Portugal in early May 1998.

Every partner working on *Butterflies North and South* wanted to provide content, which resulted in extra content being added during the development process (e.g. a section on conservation to provide users with an appreciation for the environment and conservation issues, and a section on butterfly gardening because of the popularity of gardening) and unanticipated translation costs for the three language versions of the exhibit.

Challenges with communication were paramount in planning and developing *Staying in Tune* since the development team included four Canadian partners, institutions from six African and two Eastern European countries. The production team chose to use Flash, which was simpler and easier for the Web user than QuickTime, but it was a challenge to build the exhibit in Flash at that time. An intern who worked on the content of the exhibit had no previous Web experience and the designer had limited experience, having just graduated from a Web design program.

Trying to build consensus on every decision (e.g. trying to find a common title, the theme, and what to name the different sections) was one of the biggest challenges in

developing *Panoramas: The North American Landscape in Art* and *Perspectives: Women Artists in North America*. With the number of different curators and representatives of three different governments, the CHIN project manager attempted to lead the group to a consensus that was logical for the project. She tried to make sure that everyone's voice was heard, and help partners understand that they needed to make decisions in order to proceed since the time frame was very limited. The partners met in person to advance the project. They came to Ottawa at the beginning for a brainstorming session, and met one more time two months later in Washington, D.C., to choose the photographs, pictures, themes, and conclude the different chapters. Generally, communication across the different languages was a challenge, as was getting a clear line for conference calls.

The multimedia developer for *Panoramas* and for *Perspectives* found that the curators tended to be very attached to their information. Writing for the Web has to be very short and dynamic, something quite different from writing a catalogue for a physical exhibition.[4] When curators wrote text and credits, they often wanted to keep making changes, and the project developer had to stress that information could not be put into the database until all text was finalized (including managing any added time required, extra costs, and additional time for translation). Partners decided that CHIN would host the virtual exhibit and the other Web sites would have a link to it. The Smithsonian group had the most technological experience of the partners. Challenges for the multimedia developer were finding out specifications, working with different Canadian and American accessibility rules, and building the virtual exhibit on a server that the multimedia company could not control. She had to test the technology extensively and fix problems during development that seemed to be caused by the CHIN server (rather than plug-ins, Web traffic issues, or the connection between a user and the server). She also had to establish relationships with CHIN staff who were building the exhibit on the server (e.g. the multimedia group would load material online, but when reinstalled, their work would be overwritten). Communicating more effectively to remedy problems and improve the product became essential. Although the multimedia developer wanted to produce an exhibit that would have fast and exciting multimedia and be interactive to engage younger age groups, she felt constrained by needing to meet accessibility standards.

Technical challenges in creating the HTML page code for *Explore Herschel Island!* resulted in its development team collaborating with CHIN's Web developer. Also, the Yukon development team initially underestimated how much time it would take to pull everything together. The project manager found that trying to bring people together on the team, and providing supervision and direction, were time consuming.

In developing *Safe Trax*, the biggest challenges for the multimedia developer were not having a clear definition of the content and specific learning objectives, and making decisions by committee with several people attending meetings by conference call. Since his company was a more mature media company with 20 years of project management

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[4] Morkes and Nielsen (1997) report that people rarely read Web pages word by word. They have found that 79% of test users always scanned any new page they came across picking out individual words and sentences, while only 16% read word-by-word. In a study of five different writing styles a sample Web site scored 58% higher in measured usability when it was written concisely, 47% higher when the text was scannable, and 27% higher when it was written in an objective style.

experience, the multimedia developer of *Safe Trax* found it difficult not having control over the timeline, project plan, and resources. The multimedia developer for *Horizons* explained that although partners drive the conceptual and developmental processes with CHIN project managers facilitating, it is up to the multimedia developer to ensure that the products meet the VMC guidelines.

4.5. Partners' interests and changing needs

Insights into potential best practices for developing and producing VMC products emerged from the question: When VMC products are successful in providing quality online experiences, what should be the main considerations in the development process? CHIN project managers and multimedia developers elaborated on the following as best practices for developing VMC products with quality online experiences for users.

4.5.1. Common vision, clear goals and objectives
The development team clearly defines a common vision, and makes decisions about a framework and learning objectives very early on in the project. Partners identify a theme, organize information, and create a schema. The development team takes nothing for granted, does what it takes to get the job done, and makes sure that there is consistency and a solid structure in place.

4.5.2. Topics with clear and simple, yet emotional and powerful stories
Clear, simple, and compelling stories and themes are very important. They give users an opportunity to relate to the exhibit content, and lend the exhibit a feeling of credibility and authenticity.

4.5.3. Adequate time and budget
A comfortable budget and plenty of time to develop and produce a VMC product allow for a longer development cycle and production window, as well as time and budget to prototype and perform focus group and usability testing, especially in large projects where more partners are involved.

4.5.4. Dedicated individuals and collaborative partnerships
When people working on a VMC product are passionate about it and dedicated, they want to go beyond a sense of duty. Partnerships and teams with international as well as national partners are keys to success. A collaborative approach works best when there is a lot of discussion early on in the creative process and the team meets together, preferably in person, to work things out, develop learning objectives (i.e. specific things to get across to users), and develop products that are not purely for entertainment.

4.5.5. Thinking in the virtual medium
Curators need to learn how to create a museum experience for visitors in a virtual, online medium rather than in a physical exhibition, and push the boundaries of traditional curatorial practice by experimenting with things that no one has done before.

Best practices for museum Web sites exploit the medium's unique characteristics and enable users to actively interact with subject matter, look for patterns, and construct personal meaning based on prior knowledge and experience (Soren, 2004a).

For example, an award-winning virtual exhibit, *Cloth and Clay: Communicating Culture* (http://www.textilemuseum.ca/cloth_clay/home.html), is a VMC Investment Program product developed by the Textile Museum of Canada and the Gardiner Museum of Ceramic Art. Dalrymple, Shaughnessy, Soren, and Wolfe (2004) describe how careful information architecture and good-quality design combined to produce strong online storytelling:

> The design team worked under the premise that casual Web users tend not to read in detail Web pages that feature many hundreds or thousands of words of text. It was key that each level of text presented be brief and succinct (but with links to more information). To bolster the succinct texts, it was important to utilize other forms of communication. *Cloth and Clay* relies heavily on the adage that one picture is worth a thousand words. Information about geography, ecology and culture is communicated through images throughout the site. Technical information about objects is also conveyed through high quality images.

4.5.6. Products that are user-focused, useful, and used

The Web development team establishes user requirements at the beginning of a project with a clear idea of who they are trying to reach, what they are trying to give targeted users, and what users might be trying to get from the online product. They incorporate the user's viewpoint, and provide a product that is more user- than object-oriented, enabling individual users to choose experiences based on their interests. If the VMC product offers users intellectually satisfying online challenges, individuals will take time to work on them, and if they invest time, they will want to learn something. Consulting target users throughout the development process with front-end and formative user testing helps the development team find out what users want and need.

4.5.7. Leading-edge technology sympathetic to content

Multimedia developers use leading-edge technology that is sympathetic to the messages that partners are trying to convey, while being available to as vast an audience as possible. The Web team develops a technical plan to manage the content and apply the technologies, and assesses technological capabilities and resources required of partner heritage organizations.

4.5.8. Navigation and access with clear organization of information and images

Users need clear, easy to understand, and logical navigation as they browse an exhibit. Users are less overwhelmed when information and text are presented in smaller fragments, particularly in an exhibit with large amounts of images and content.

4.5.9. Post-launch follow-up

Evaluation of the process, team, user statistics, and feedback messages helps give project partners a feeling that they have accomplished something on many fronts—they

got the story out, promoted the museum community, and showcased the partners' collections. Feedback messages help development teams see where gaps are and what people are asking for.[5] Flexibility in design gives the Web development team the ability to quickly make revisions based on feedback from partners and users. Although the content is accurate at the time the exhibit is launched, it is open for different interpretations, ongoing debate, and information sharing. User feedback may require correcting content when users report inaccuracies. Also, if partner heritage organizations share lessons learned with the community and recommend what to avoid in future online projects, future collaborative projects can build on the knowledge gained in these experiences.

One area this research did not explore is how or if exhibit developers see the online medium as supporting the other forms of communication museums practice. Virtual exhibits are a new and potentially effective tool for museums to use in presenting information to its publics, but not the only technique that museums use to present their information. Best practices could include how this form of media is integrated with other techniques used for presenting a museum's messages.

5. Some final thoughts…

The research into quality in online museum user experiences indicated that each of the eight VMC products has unique characteristics. However, practices used to develop the eight exhibits in the research sample could help to inform the development of other museum exhibits and Web sites. With all of the time and investment made in VMC products, development teams could be updating content, building different generations of exhibits, or offering different levels of design to ensure that users keep coming back to older exhibits that are well established in search engines (e.g. new species of and facts about butterflies are always being discovered that could be added to the *Butterflies* exhibit, which was launched in 1998). The technology also changes rapidly. Museum Web sites need to keep pace with users who are becoming increasingly sophisticated and expect that Web developers are using and exploiting the latest technologies. Successful VMC products could be 'living, breathing repositories,' as one multimedia developer interviewed for this research commented, because they evolve, changing in content and interpretation over time, giving users a reason to revisit and continue to learn from the exhibit.

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[5] An analysis of feedback messages for the virtual exhibits in the Quality in Online Experiences interview sample provided information about what particularly interested individual users in response to specific VMC products during 2002.

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A print copy of the report can also be ordered from http://www.chin.gc.ca/English/Publications/research_quality.html.

References

Brochu, D., Davallon, J., Camirand, C., Gottesdiener, H., Le Marec, J., Lemieux, et al. (1999). *Les musées face à l'édition multimedia*. Dijon: ICOM.

Canadian Heritage Information Network. (2002). Producing online heritage projects. Hull, Québec: CHIN. Also, retrieved from http://www.chin.gc.ca/English/Digital_Content/index.html.

Dalrymple, J., Shaughnessy, R., Soren, B.J., Wolfe, D. (2004). Developing Meaningful Online Exhibitions— Cloth and Clay: Communicating Culture. Museums and the Web 2004. Retrieved April 3, 2004, from http://www.archimuse.com/mw2004/papers/dalrymple/dalrymple.html.

Diamond, J. (1999). *Practical evaluation guide: Tools for museums and other informal educational settings*, Walnut Creek, CA: AltaMira Press.

Hein, G. E. (1998). *Learning in the museum London*. London: Routledge.

Hooper-Greenhill, E. (2000). *Museums and the interpretation of visual culture*. London: Routledge.

Jeffery-Clay, K. R. (1998). Constructivism in museums: How museums create meaningful learning environments. *Journal of Museum Education*, *23*(1), 3–7.

Mason, J. (1996). *Qualitative researching*. London: Sage Publications.

Morkes, J., Nielsen, J. (1997). Concise, SCANNABLE, and Objective: How to Write for the Web. Retrieved March 5, 2005, from http://www.useit.com/papers/webwriting/writing.html.

O'Connor, M. C. (1998). Can we trace the 'efficacy of social constructivism'? In P. D. Pearson, & A. Iran-Nejad, *Review of Research in Education* (23), 25–71.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Soren, B.J. (2004a). Constructing meaning and online museum user experience. Retrieved June 4, 2004, from http://www.chin.gc.ca/English/Digital_Content/Tip_Sheets/constructivism.html.

Soren, B.J. (2004b). Research on 'quality' in online experiences for museum users. Hull, QC: Canadian Heritage Information Network. Also, retrieved from http://www.chin.gc.ca/English/Digital_Content/Research_Quality/index.html.

Soren, B.J., Lemelin, N. (2004). Cyberpals/Les cybercopains: A look at online museum visitor experiences. *Curator: The Museum Journal*, 47(1): 55–83. (Re-printed August 30, 2004, at http://www.museum-ed.org/research/index.shtml).

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