

Collections without Borders: Sustaining Digital Content at Cultural Institutions

A Case Study of the Museum of Anthropology at the University of British Columbia

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While institutions continue to develop an array of digital content, and products, they often do so without giving enough consideration to the ongoing efforts and resources required to ensure their long-term viability. This case study explores how the Museum of Anthropology (MOA) at the University of British Columbia (UBC) successfully conceived and implemented a strategy to digitize its permanent collection and develop a durable database infrastructure. It offers a number of lessons for other institutions looking for ways to develop their own capacities and infrastructures, even if that development is more modest or takes place incrementally. The case study also features a useful Health Check Tool for Digital Content Creators in Cultural Heritage Institutions, developed in conjunction with the U.K.'s Joint Information Systems Committee (JISC) and the U.S.-based Ithaka S+R.

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Introduction

For nearly two decades, investment from private and public funders has helped to create a rich landscape of digital resources in cultural heritage institutions across the globe. These projects and initiatives, whether focused on digitization, born-digital content, or other tools for learning or research, are often complex, drawing on the skills and time of people in many departments. Once created and well after the initial investment has been spent, these resources often still require some ongoing management, technology development or editorial enhancement, and preservation if they are to be sustained. Yet it can be challenging for museums and other organizations to develop reliable models for long-term support of this work, especially for those projects that begin with grant funding.

The great promise of the digital environment as both a preservation solution and an outreach tool has encouraged many cultural heritage organizations to seek support from public and private funders to enable them to create digitized collections of their physical holdings. Doing so has helped them to protect the materials from physical wear from handling and to preserve them for future use. ¹ An additional benefit of digitization has been that sharing these materials online can help expand the audience for these institutions' rare and unique collections far beyond their physical buildings, potentially to anyone with an internet connection. As a result, many museums today use their websites not just to offer notices of opening times and ongoing exhibitions, but to share a substantial part of their collections, sometimes even more than what one might see when visiting their physical spaces. ²

Museums are also exploring various types of digital development, beyond creating digital surrogates of the objects in their collections. For example, amateur detectives can solve forensic mysteries on the Montréal Science Centre's online game "Autopsy of a Murder," and art historians can label or tag selections from the digital collection on the BBC's Your Paintings. ³ Budding curators can build their own collections on the Rijksmuseum's Rijksstudio site, and film producers can purchase videos for reuse from lightboxes they assemble on the Imperial War Museums' webpage. ⁴ The Old Port of Montréal also launched a mobile application called "Wintering" in 2013, which former Head of Heritage Carol Puzé hopes will shape the way the community understands the heritage site. Because the Old Port is a public park with no physical building, the application attempts to demonstrate the coherence of the institution by guiding users around the grounds and sharing its history. ⁵

Museums have come to realize just how important digital platforms can be both for preserving and sharing their collections and for engaging with patrons in new and multifaceted ways. As Bill Greenlaw, Executive Director for Archives, Museums and Libraries in the Department of Communities, Culture and Heritage in Nova Scotia, puts it, the museums he oversees "are viewed as a public good in [the province]," but their role in society is changing with the times; "there needs to be social relevance" to the work they are doing, and, more often than not, these

institutions' online presence will be the major factor in determining that relevance.

Canada is home to more than 2,500 museums that attract over 59 million visitors every year. For Canadian institutions that wish to create digital projects and software but require outside funding to do so, the only significant funder are provincial and federal governments. Unlike in the United States and Europe, where, in addition to federal agencies, private foundations and individual donors are key sources of support, there is little private money for the development of digital content in Canada.

This situation makes the question of sustainability all the more urgent: how can those who manage digital content best take advantage of the resources they do have? Given that so little is available for new digital initiatives, what can museums do to support the materials that are already available and ensure that they have the impact their creators desire?

With support from the Canadian Heritage Information Network (CHIN), a special operating agency within the federal Department of Canadian Heritage, Ithaka S+R has undertaken a study to examine the systems and practices in place to aid the creation and ongoing management of digital content at museums in Canada. Rather than a broad assessment of the complex landscape of Canadian cultural heritage institutions and the many and varied challenges they face, this project was conceived as a case study of one such institution, the Museum of Anthropology (MOA) at the University of British Columbia (UBC), as a way to understand in some detail how MOA is actively developing a strategy to address both the opportunities that digital media afford and the challenges that they can pose. [6](#)

While case studies are by definition explorations of very specific instances of a particular phenomenon, examining digital creation and sustainability strategies that appear to be working can offer useful models for others facing similar challenges. Although MOA is one of the few Canadian organizations that has undertaken the mass digitization of its permanent collection, it is far from the only institution currently grappling with how to sustain its digital assets in view of the current economic climate. It is our hope that this study will be useful for others at cultural heritage institutions who are creating digital resources and considering strategies for how best to support that content.

Museum of Anthropology (MOA) digital strategy case study methodology

This study builds on the Ithaka S+R report *Sustaining Our Digital Future: Institutional Strategies for Digital Content*, published in January 2013 and funded by the Jisc-led Strategic Content Alliance, which examined the role of host institutions in supporting the creation and ongoing management of digital content created by project leaders at universities, libraries, and museums in the United Kingdom. [7](#) While that report focused primarily on scholar-produced materials on university campuses and included a detailed case study of University College London, it also delved into the cultural sector, examining how two major institutions, the National Library of Wales and the Imperial War Museums, are addressing a similar set of questions: How are digital resources created, and what motivates the decision to digitize? What technical and personnel structures are in place to support that activity? Because museums and libraries—unlike universities—tend to start with a collecting and preserving mission, how are their policies and workflows for managing digital content different from those at higher education institutions? Given the potential for increased interaction with the content that the internet provides, how are cultural institutions understanding and developing their online audiences?

In early 2012, CHIN contacted Ithaka S+R to explore the possibility of undertaking an additional case study from the Canadian cultural heritage sector, which could permit a deeper exploration of the strategies in place at museums. Together the Ithaka S+R research team and CHIN staff determined that it would be most valuable to study an institution that demonstrated a high degree of digital activity and evidence of a digital strategy already in place, as had been the case with both UK-based case studies of cultural institutions. Yet, while the UK cases offered many valuable examples, both the Imperial War Museums and the National Library of Wales are large organizations. The site recommended by CHIN—the Museum of Anthropology at UBC, which has a \$4 million (CAD) operating budget and around 38,000 ethnographic objects—is of a moderately large size and would likely be seen as a useful and accessible model for a wider range of organizations. It also has the added benefit of being embedded at a research university, which would potentially make MOA's story more interesting to similar organizations on campuses or with a research focus. Additionally, CHIN wanted to identify an institution that negotiates a complex web of relations with its stakeholders, which MOA does in its collaborations with First Nations communities and other cultural heritage organizations. An initial discussion with MOA Information Manager Ann Stevenson surfaced several encouraging avenues to explore, including the Museum's shift to a common database for all its digital assets and the many ways in which that core database of materials is being exploited for a wide range of uses.

Over the course of four months, the Ithaka S+R team conducted desk research to gain a sense of the dynamics at play in the Canadian cultural heritage funding landscape, the types of digital strategies evident at other cultural institutions, and the range of digital activities that are undertaken by curators, outreach coordinators, and others in these organizations. To deepen our knowledge of comparable institutions, the team worked with CHIN staff to identify leaders of six Canadian cultural organizations and conducted interviews in order to understand support for the creation and ongoing management of their digital projects and initiatives, the value that their museums see in the investments they are making, and the ways the museums measure their success. [8](#) We also spoke with CHIN staff to learn more about the support the agency provides museums for the development of digital projects. Interviews followed an interview guide developed by Ithaka S+R with input from staff at CHIN. [9](#) Most conversations were conducted by phone and lasted approximately 60 minutes, though in one case, a respondent chose to answer queries by email.

To develop a clear and deep understanding of the policies and practices in place at MOA, the Ithaka S+R research team spent two days onsite with Ann Stevenson and her colleagues in Vancouver, conducting individual and group interviews. During this time, we met with seventeen staff at the Museum, including the director, senior administrators and managers, curators, web developers, and an exhibit designer. Most meetings lasted about 60 minutes, though several ran longer, as needed. With the permission of the interviewees, interviews were recorded to permit the researchers to review them in more detail. In addition, a lunchtime roundtable invited all MOA staff to discuss sustainability issues in an informal setting, learn more about the

Ithaka S+R team's research agenda, and ask the researchers specific questions concerning the project.

During the interviews, several MOA staff who manage digital projects or initiatives were also asked to provide feedback on a "health check tool," originally developed as part of the Jisc study with the assistance of Lorna Hughes and her colleagues at the National Library of Wales. Feedback from Stevenson and her colleagues helped us to revise the tool to the institution's needs and to better reflect the ongoing support required for the different types of digital assets they manage: the Museum's digitized collection, online exhibitions, educational resources, and related software. Feedback from this group has been instrumental in developing the final form of the Health Check Tool, available in the section, "[Health Check Tool for digital content creators in cultural heritage institutions](#)" of this report and online and preceded by a guide for digital content creators in cultural heritage organizations. ¹⁰

We offer our sincere thanks to the many people who contributed to this case study, which was made possible by the support of the Canadian Heritage Information Network. We especially thank Paul Lima and Sheila Carey at CHIN for their guidance, assistance, and encouragement throughout this project.

Several members of the Canadian museum community generously shared with us in depth information about the inner workings of their institutions, helping us to better understand the digital landscape in Canada. Special thanks are due to Janet Carding and Mark Engstrom of the Royal Ontario Museum; Bill Greenlaw of the Nova Scotia Department of Communities, Culture and Heritage; Carol Pauzé of the Montréal Science Centre; Stephanie Poisson of the McCord Museum; and Caroline Riedel of the Maltwood Art Museum and Gallery. Invaluable feedback on early drafts of the paper was provided by Deanna Marcum, our colleague at Ithaka S+R, as well as several staff at CHIN and MOA.

Ann Stevenson of MOA served as the research team's main point of contact at the Museum throughout the project. She coordinated our site visit, scheduling interviews and guiding our growing understanding of the history and current structure of the organization, and we are deeply appreciative of her help. She and her colleagues at MOA, including Director Anthony Shelton, warmly welcomed us into their museum, patiently sharing with us rich detail about the transformative changes that have been underway in the organization since 2001, taking the time both to look back and speculate about the future. Although many individuals graciously shared their time to support our work, the responsibility for the contents herein remains with the authors.

Sustaining digital collections funding in Canada

For much of the cultural heritage sector in Canada, concerns about the sustainability of digital resources often focus on obtaining financing for this activity in the first place. Virtually all financial support for creating digital resources there has come from governmental agencies, which has not been the case in Europe and the United States, where this funding is disbursed by both public and private partners and donors. In Europe, the Comité des Sages—a panel of experts convened on behalf of the European Union to make recommendations concerning the future directions of digitization policy in the EU—has encouraged the involvement of private sector partners, such as Arcadia in the United Kingdom, in the digitization of public domain materials for the government-funded web portal Europeana. ¹¹ In the United States, federal agencies, such as the Institute for Museum and Library Services and the National Endowment for the Humanities, provide money for the production of digital content in museums, libraries, and archives, but so do individual philanthropists and organizations from The Andrew W. Mellon Foundation to the Gladys Krieble Delmas Foundation.

The first major investment in cultural heritage online by the Canadian government was made in 1997 with the creation of the Multimedia Investment Fund, which was distributed through the federal Department of Canadian Heritage. ¹² Over the following decade, the federal government created additional support streams for museums, libraries, and archives through several branches of and programs within the Canadian Heritage portfolio of organizations, such as the Canadian Culture Online Strategy and Library and Archives Canada. In the case of the latter, which itself is a memory institution that acquires and preserves the documentary heritage of the country, this job was accompanied by the additional responsibility of digitizing the materials in the LAC's own collection. In addition to Canadian Heritage, provincial governments, principally those of British Columbia, Ontario, and Quebec, helped to foster the growth of digital content in their local universities, libraries, and archives, and research-focused government-related agencies, such as Canada Foundation for Innovation and the Social Science and Humanities Research Council, also contributed to digital projects in cultural heritage institutions that engage in research. ¹³

In general, while support provided to libraries and archives targeted projects undertaking the mass digitization of documentary materials, funders of digital work in museums took an approach more reflective of the curatorial work of those institutions, backing the creation of interpretive, contextual, and sometimes even interactive digital resources. ¹⁴ CHIN, for instance, sought to "[enable] Canada's museums to engage audiences through the use of innovative technologies" through its Virtual Exhibits Investment Program (investments of up to \$250,000, about ten productions per year) and the Community Memories Investment Program (up to \$5,000, about 40 productions per year by institutions with five or fewer full time equivalent staff). ¹⁵ Together, these funds disbursed close to \$23.6 million between 2001 and 2012 for the creation of online exhibitions, interactive and educational resources, and virtual tours. ¹⁶

While libraries, archives, and museums in Europe and the United States can continue to apply for European Commission and federal money to fund mass digitization, cultural heritage organizations in Canada interested in that work must primarily pull together support from their institutions' own resources. As a result, some innovative new models for funding digitization have begun to emerge, including the development of partnerships that can reduce the financial burden on individual institutions by distributing associated costs across several institutions. ¹⁷

Facing this funding landscape while still holding on to the big hopes expressed for digital resources just a decade or so ago, many museum, library, and archive professionals and their supporters are concerned about the future of the documentary and cultural heritage of Canada. Even leaders of the Museum of Anthropology in Vancouver—an institution with the staff and robust technological infrastructure to support this activity, all backed by a carefully thought out digital strategy—recognize that they will face challenges ahead when the major funding that helped to build their digital collection runs out.

Museum of Anthropology (MOA) is a leader in digital strategy

Nestled behind indigenous plants and grasses and looking onto the Strait of Georgia, the Museum of Anthropology (MOA) rests on Musqueam First Nations territory on the University of British Columbia (UBC) campus in Vancouver. Like its physical location, the scope of the Museum is both firmly rooted in MOA's local environment and positioned to serve as an opening to the wider world. An institution with a mission to “inspire understanding of and respect for world arts and cultures,” MOA has welcomed the digital transition taking place in the cultural heritage sector, viewing it as an opportunity to extend its influence and more broadly serve its research and teaching mission. ¹⁸ In the words of Director Anthony Shelton, the digital environment enables the Museum to “concretize [its] values of access and democratization,” both sharing and soliciting knowledge via the web.

To this end, the Museum has developed a digital strategy that relies heavily on the technological infrastructure it has created in order to support the three online platforms through which it shares its digitized collection with the public. In building the central, back-end databases that house all its master files and consistent, detailed metadata, MOA has a laid solid foundation that allows the Museum to share that core content on- and offsite in a variety of ways with various audiences ranging from students and teachers to academic researchers.

Collection digitization process and tools will support your strategy

MOA is nearly unique among Canadian museums in that it has digitized 90% of its ethnographic collection, which comprises more than 40,000 objects, including textiles, ceramics, tools, and toys from every continent except Antarctica. ¹⁹ That it was able to do this is due in no small part to its status as a research organization, as a part of the University of British Columbia, and timely encouragement from a board member of the Canada Foundation for Innovation (CFI), an independent, non-governmental organization created by the Canadian government in 1997. Prior to 2000, CFI's grantmaking had been limited largely to the sciences, but the board member saw an opportunity and suggested MOA apply for funds to improve its research support infrastructure.

Making the case for securing research funding for the Museum did not require a huge conceptual leap. After all, as a department of UBC, the Museum of Anthropology is a true teaching museum with two of the curatorial staff and the Director holding appointments both in the Museum and in the Department of Anthropology. In addition, the Conservator teaches courses in conservation, both the Head of the Curatorial Department and the Associate Director for Research have offered university courses in museum studies, and the Curator of Education and Public Programs teaches in the Faculty of Education. Many other staff members contribute to instruction by giving lectures, demonstrating collections tasks in labs, and holding workshops.

Ruth Phillips, the MOA Director at the time they began to consider applying for CFI funding, was also a researcher and had already expressed an interest in enhancing the Museum's facilities to accommodate further research activity. In addition, current conditions at the museum suggested that the time for an upgrade had come. Staff had noticed that the system visitors to the museum used to search for objects was woefully out of date, requiring people to consult printouts stored in at least a dozen sets of large binders housing MOA's collection records. Mindful that the binders were not a sustainable solution, the Museum decided that its next phase of collection record development would help make this information more accessible.

MOA's bid for CFI funding outlined a pledge to develop “a new infrastructure for collaborative research,” bringing together the MOA staff with the various communities it works with and creating better physical and virtual environments for academic study and collaboration. ²⁰ The award, which at the time was at least three times bigger than the next-largest CFI grant to a social science department, was viewed as a major achievement for an academic department in a Faculty of Arts. The CFI funds were then matched by the British Columbia Knowledge Department Fund, and an additional 20% was supplemented from UBC. All together, the full award came to more than \$40 million (CAD) dedicated to a major “renewal project” that would improve not only the Museum's building but also the accessibility of its holdings—jewelry, drawings, ceramics, masks, sculptures, clothing, and more from around the globe. Included in this undertaking were the digitization of the collection and the overhaul of the collection and information management systems, aimed at facilitating both internal processes and external access to the collection.

Given the large investment MOA was about to make, Information Manager Ann Stevenson, IT Manager Mawuena Glymin, and their colleagues devoted considerable time to designing and building an infrastructure that could serve as the home of all the Museum's digital assets. Of primary importance at this stage was the storage of the images and data being produced from the digitization of MOA's permanent collection. Ensuring the integrity of those digital files and sustaining the work involved in producing them required the staff involved in their production to develop a strict workflow that is still followed today. Image surrogates are created and ingested into the Museum's back-end databases—MediaBank, its digital asset management system (DAMS), and Mimsy, the collections management software (CMS) that contains all the records of its holdings—along with robust and consistent metadata ensuring those assets can be searched and sorted for simple discovery and use. In creating this workflow, Stevenson and her colleagues aimed to establish a clear and smooth process for digitization that could be sustained as MOA's collection expands.

Digitization of the collection, which took place between 2007 and 2010 during the CFI grant period, was part of a larger initiative called the Collections Research Enhancement Project (CREP). Staffing for CREP included five permanent MOA employees, and the Museum also hired at least seven temporary, onsite staff to handle the objects, take pictures, and then ingest the

images. A major benefit of doing this work within the Museum's own walls was that it could build capacity among the permanent staff for the methodologies and workflow still in place.

Today, MOA has a standing policy that all new materials brought into its permanent collection, whether through purchase or donation, are digitized after acquisition. Collections Manager Nancy Bruegeman and an assistant manage the first step of the process, ensuring that the part-time photographer makes a digital surrogate and transfers the images and metadata to the CMS. But Bruegeman has other responsibilities at the Museum as well, such as taking care of the physical collection, and the organization has limited funds for digitization. With current staffing, they can dedicate one day per week to this work, which covers approximately 1,000 items per year; when objects are acquired at a higher rate than the current digitization schedule can accommodate, a backlog develops and Bruegeman must prioritize the digitization of objects. The ones that are photographed first are typically those requiring images for appraisal for insurance or tax purposes, or those that are part of upcoming exhibitions.

Once the digital image records and associated metadata are created, Bruegeman manages rights clearances and publishing flags, and the information about the digital assets she creates are incorporated into the DAMS by Stevenson. From that point, Bruegeman and Stevenson feed these data into the three public versions of the Museum's catalogue: the MOA CAT, the Collection Online, and the Research Reciprocal Network (see Figure 1 below). [21](#)

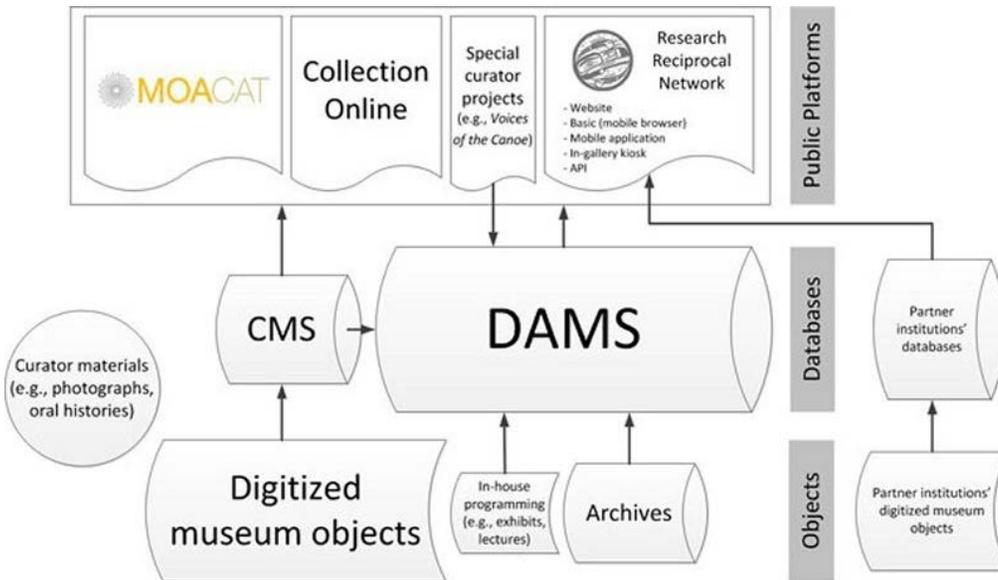


Figure 1: MOA Database Structure.

This diagram shows the interconnected relationship between the objects, databases and public platforms that compose the Museum of Anthropology database structure. Museum of Anthropology's Digital Asset Management System, or DAMS, is at the centre of this structure. Objects related to the museum's archives and in-house programming, such as exhibits and lectures, are ingested into the DAMS. Digitized museum objects are also ingested into the Digital Asset Management System through Museum of Anthropology's Collections Management System, or CMS. Both the Collections Management System and the Digital Asset Management System subsequently feed MOA's public platforms, which include the MOA CAT, Collection Online, special curator projects and the Reciprocal Research Network, or RNN. Reciprocal Research Network content can be accessed via various platforms, including a website, a mobile browser, a mobile application, an in-gallery kiosk and an application programming interface, or API. The Reciprocal Research Network is also directly fed digital records of museum objects contained within the databases of the partner institutions. Of the aforementioned public platforms, it is worth noting that the special curator projects, such as Voices of the Canoe, can also feed the Digital Asset Management System.

The Museum of Anthropology has built a system to manage its digitized collection and offer a variety of customized public platforms to different types of users. This diagram is intended to illustrate how the "back-end" DAMS and CMS together feed a variety of public sites, from the general museum catalogue (MOA CAT; Collection Online) to a specialized resource for anthropology researchers (the Reciprocal Research Network), which itself includes content from partner institutions and offers a variety of points of access. Note that, despite this highly coordinated infrastructure, there are still some categories of content—such as the assets curators collect that do not officially become part of the museum collection—that still remain outside the bounds of this system.

With the collection digitized and cataloged, there are several different ways it is used, in order to maximize its value to the research community and to MOA's wider audience. The sections below outline the public-facing uses of the Museum's digitized collection.

MOA CAT and Collection Online

Prior to the renovation of the physical galleries at MOA, an onsite visitor looking for information about objects on display in the Museum's Visible Storage—the glass cabinets that stored

around 15,000 objects from the permanent collection—would have had to comb through at least a dozen unwieldy binders containing printouts of collection records in order to learn more about them (date and place of origin, materials used). Clearly, this system was flawed: the format was cumbersome to manipulate, any changes to the records required physically pulling and replacing pages from the binders, and the content consisted of written explanations, a challenge for the non-English speakers who are a significant part of MOA's audience. While the physical renovation of the Museum was underway, the collections management and exhibit design teams took the opportunity to imagine ways a new computer-based database, which would be the first public digital interface for the collection, could enhance visitor interaction with MOA's collection.

The redesign of the Museum's facilities addressed the research aims of the renewal project by making part of the permanent collection visible in new, large, customized glass cases and chests of drawers in what was the Visible Storage and is now the Multiversity Galleries. These are a series of openly connected rooms, each with several U-shaped alcoves outlined by the glass display cabinets, and every section of the Multiversity is dedicated to a different geographical region or community (Sri Lanka, Southwest, Haida, Kwakwaka'wakw). The greatest change in redeveloping this space was the incorporation of computer kiosks either at the centers of these sections or nearby.

The computer kiosks offer visitors to the gallery access to an online catalogue—the MOA CAT—of the Museum's permanent collection. But the team tasked with developing the kiosks went a step further. The most innovative feature of the program is its "You Are Here" function, which offers a 3D rendering of the exhibition cases and floor plan, showing outlines of each case section and drawer in the Galleries. A visitor standing at the kiosk can simply select the case section or drawer he wants to explore by touching its outline on the screen and thereby reveal the objects in that location; then he can tap an object to see its catalogue record. This approach allows patrons to use the MOA CAT to learn more about the objects immediately around them without having to search for them by name.

The data available through MOA CAT is also quite rich and provides visitors with images and detailed collection metadata including object type; culture, place, and date of origin; object number; and if applicable, gallery location. Exhibit Designer Skooker Broome, who was one of the six staff members on the MOA CAT team, believes this information to be especially helpful for visitors to the Multiversity Galleries, as the objects displayed are minimally labeled, and, for preservation purposes, some must be rotated in and out of the cases on a regular basis. ²² An additional benefit of the kiosks is that the Museum can provide other contextual information, such as identifying the geographical point of origin of the objects using a Google Earth application and sharing videos of artisans explaining their work.

Launched when the Multiversity Galleries opened in January 2010, the MOA CAT made it easier both for collections staff to replicate in the catalogue changes to displays and object records and for visitors to conduct in-house research by using touch screens to search and browse. Because it reflects the positions of the objects within the Multiversity Galleries, the storage case and drawer search functionality built into the MOA CAT program is not useful for those viewing the digitized collection from outside of the Museum; yet the development team also wanted to make the records accessible to researchers off site. In 2010, with assistance on rights clearances from the UBC Office of the University Counsel, the in-gallery MOA CAT was put on the Museum's website in a more stripped down form as the Collection Online, MOA's second public, digital collection interface. ²³ Although intellectual property issues prohibited certain images from being shared on the internet, all the object records are the same as those in the MOA CAT. Consequently, the online catalogue serves the same basic function as the kiosk, namely, to provide researchers with information about the Museum's holdings.

It has been just over three years since the MOA CAT was made public, and Broome is beginning to think about what should come next. He would like to update the interface but is unsure about whether the institution would be able to support such an undertaking either financially or through the reevaluation of staff priorities. So far, the only major update to the MOA CAT has been the addition of a keyboard-based search so that visitors can type in queries rather than solely rely on either category-based or non-linguistic searches. Currently, the major ongoing activities dedicated to these online catalogues are carried out by Bruegeman and one assistant, who make adjustments in the CMS in order to publish new object records and reflect when items are moved in and out of the Multiversity Galleries, which then updates the MOA CAT and the Collection Online. Additionally, image and media updates are supported by the back-end DAMS, and Glymin provides general technical support and follows the basic analytics of, for example, how many people use the catalogues.

Reciprocal Research Network

The third and final public interface that draws much of its content from the same core databases is the Research Reciprocal Network (RRN). It is an online platform that aggregates data from nineteen partner organizations and groups, including museums in the United States and aboriginal communities, so that they can share digitized versions of their collections from their own databases and thereby "facilitate reciprocal and collaborative research" across distant locations. ²⁴ The first Project Charter governing the partnership was signed in 2006, and today the RRN is led by MOA Curator Sue Rowley. The site currently presents over 430,000 items and close to 250,000 images so that users—primarily researchers, staff at the partner museums, and members of groups whose heritage is represented in the collections—can "build their own projects, collaborate on shared projects, upload files, hold discussions, research museum projects, and create social networks." ²⁵

To use the RRN, individuals interested in becoming members simply request a research account on the website and wait for approval from an administrator. Once they have access to the Network, users can retrieve images and data on the objects shared on the platform, offer corrections or additions to the object metadata, ask curators and other members for help or advice on their own research, and develop projects with the support of these individuals. As of the end of March 2013, there are over 1,400 individual members in the Network and 692 discussions and 1,057 projects online. According to the site's developers, since March 2010, the RRN has hosted over 14,000 visitors who spend an average of twenty-two minutes there. The Museum's RRN team closely follows these user numbers as well as the feedback they receive from their partners and researchers, which has lead Rowley to ask the developers to experiment with new ways of altering and, she hopes, improving the site.

The RRN platform was created with the intention of being flexible enough to respond easily to partner and user needs. Web developers Nicholas Jakobsen and Ryan Wallace were hired at MOA in 2006 directly out of their undergraduate program at UBC to design the site and technological architecture. They decided to make it “lightweight” knowing that they would want to iterate on it often in order to accommodate new functionality as well as the diverse requirements of the Network’s organizations and needs of its users. In the end, the platform was launched in 2007, just a month after Jakobsen and Wallace had started to build it, and they continue to exercise their creativity in trying out new features and functionality, such as offering users “writeboards” where they can collaborate on documents with other members of a given project. According to Rowley, this feature was added after several researchers asked for a way to write and edit each other’s work on the RRN site.

Rowley and her team acknowledge that managing the partnership of nineteen institutions and groups has not always been easy. When metadata records first came in from the partners, for example, it became clear that the institutions had different ways of describing their objects and of spelling key words (e.g., “armor” instead of “armour”). In order to harmonize the metadata so that they would be easily searchable for users, the programmers needed to carefully standardize terms and styles when rendering the data they received. Yet, there was concern that any changes could compromise the “authenticity” of (i.e., the institutions’ own ways of describing) the records and even change the meaning of the data. Jakobsen and Wallace were able to design a clever solution: a second tab that preserves the original metadata contributed, verbatim, in addition to a record of the standardized format for searches so that discrepancies between the two would be apparent. Other elements that facilitated the partners’ involvement included making it possible for each of them to contribute to the RRN database on their own terms (with or without images, with basic or detailed metadata) through a simple updating process that can be automated from the institutions’ internal collections management software.

The unified RRN database has enabled Jakobsen and Wallace to construct several outputs for the content, each of which aims to serve different user needs. In addition to the main RRN website, the developers created an in-gallery kiosk version “customized” with skins for each institution, as well as a mobile application that RRN members can use to gain access to the Network when inside MOA, a “basic” site for browsers on hand-held devices, and the API for sharing content and data with other platforms.

Now that the core infrastructure has been built, Rowley explained, little effort is required to maintain the RRN website and expand its databases, because “if you wanted to put it in default maintenance mode, you could do that with sort of minimal [impact]” by simply allowing the partners’ CMS’s to feed into the stable site. MOA’s only significant ongoing activities for the Network involve experimenting with new features and ensuring that the data submitted by the partners are ingested properly. Those submissions are accounted for by the individual institutions, as it is a requirement that each must dedicate one day of staff time per year, which is believed to be the minimum amount of annual time each partner needs to contribute. The non-personnel ongoing costs are also quite low, coming in at about \$300 to \$400 a year for the support of the virtual infrastructure, and all the software it uses is freeware.

Five years from now, Rowley would like to see more partners join the RRN and build a new module for the platform that could handle data from the partners’ archives. The stability and simplicity of the site makes both propositions feasible, in theory, as little is needed to ingest the files and data of the partner organizations. And yet, one of the real strengths of the site has come from having developers on staff who can stay alert to new possibilities and experiment along the way. Once those grant-funded positions come to an end, it will be important to determine how ongoing development can still be supported.

The RRN, the MOA CAT, and the Collection Online are the most prominent examples of how digital technologies have assisted the MOA in fulfilling the values of access and democratization noted by Shelton: they make it possible for all interested users with internet connections to retrieve detailed information about MOA’s collection, and the RRN also provides a forum for those users to share their own knowledge with and ask questions of curators and experts. Moreover, the programmatic centralization of the collection-based digitization and storage has also allowed for the relatively easy development of and experimentation with these platforms, should the needs of the users or the specifications of the digital objects or underlying technology change.

Curatorial digital projects

MOA’s digital assets are not limited to its collection-based platforms. Five of the six curators on staff are trained anthropologists, and several of them mount exhibitions in any given year. In 2012, Africa/Pacific Curator Carol Mayer’s “Visions of Enlightenment” showcased the basic symbols and sacred images in Buddhist art, and Pacific Northwest Curator Jennifer Kramer’s “Kesu” shared the carvings and paintings of Kwakwaka’waka artist Doug Cranmer. These exhibitions are typically informed by the curators’ own field research, during which they often amass a significant amount of media, from interviews and oral histories of indigenous peoples to photographs of community buildings and recordings of carvers creating totem poles.

Throughout the curatorial process, MOA staff both gather and create a variety of digital assets. In addition to the research materials the curators produce, in-house staff document the entire process of preparing, mounting, and organizing public programming (lectures, discussions) around an exhibition. Once the records are made, the curators take their cameras and other equipment to Gerald Lawson, the Oral History Lab Coordinator, so that he can transfer the files, standardize them for use and potential re-use on multiple platforms, and place them into folders accessible to the curators on the Museum’s networked hard drive.

In addition to the curators’ activities related to formal exhibitions, they also find innovative ways to communicate their expertise through technology. For example, to share additional images from an exhibition with a community in which she had worked, Kramer enlisted Glymin to develop a proof-of-concept and Broome to hire an outside web developer to create an iPad kiosk. Glymin also created an iPad kiosk with films and photographs to supplement the “One Heart, One Mind” installation, which ran through April 2013.

Some bigger projects require curators to turn to outside sources of financial support. In 2010, Karen Duffek created a webzine “borderzones.ca” that aimed to reveal “the ideas behind the exhibit” she curated, called *Border Zones: New Art across Cultures*. ²⁶ The website had an external project manager and designer, and its creation was backed in part by the exhibition’s

major supporter, Canada Council, which was just one funder among seven. Similarly, “The ‘Respect to Bill Reid’ Pole” website launched in 2002 by Bill McLennan, who is now a curator, Broome, and others at the MOA was made possible by an investment from CHIN’s Virtual Exhibits Investment Program. ²⁷ The latest project to receive support is the “Voices of the Canoe” website, which was created by Curator of Education and Public Programs Jill Baird, Damara Jacobs, and several colleagues and will launch in the first half of 2013. With support from the History Education Network (THEN/HIER), the site uses oral histories and stories to encourage secondary school students to think about the ways different cultures from around the Pacific Ocean conceptualize and narrate history and memory.

Whether they are developed internally “off the sides of peoples’ desks,” as Baird put it, or with the help of grants, these projects exist as stand-alone efforts. While some, such as “Voices of the Canoe,” may draw images and data from the main, CMS-backed collection, they also produce significant digital assets of their own; but these files and data do not generally become part of the same technological infrastructure that supports the MOA CAT, Collection Online, and the RRN.

Instead, the vast digital resources—images, videos, oral histories and interviews, essays, source books on mounted exhibitions—that are featured in these projects typically end up living in protected folders on network hard drives and on increasingly outmoded storage media in bins stacked inside the cubicles of the curators who created them. There is, however, a push among certain staff to treat these materials as they already do the records of formal exhibitions by integrating them into the institutional archives.

Catalogue, document and protect museum’s digital content for future use

Overcoming the challenge of sustaining the digital assets that are not, strictly speaking, part of the formal museum collection is something Stevenson, Glymin, Lawson and their colleague Kriszina Laszlo, the Museum’s archivist, have pondered for quite some time.

The aim of the archives at MOA is to catalogue and protect the Museum’s institutional memory both for potential future re-use by people who work in the organization and, because it is a teaching museum, for the museological record. The major value of the archives resides in the collections (series or “fonds”) Laszlo assembles from the materials produced by the curators and other staff involved in creating content. The items she catalogues and stores include resources as diverse as research materials (audio and video recordings, photographs, field notes) and meticulously recorded exhibition documentation.

The vast majority of the objects in the archives is still analog; but as the digital assets of the institution continue to grow, Laszlo and her colleagues would like for the content creators to deposit their files in the DAMS, beside those of the permanent collection. From there, they could be catalogued and ingested into the archives’ own database, ICA AtoM, and then cross-referenced with similar resources and re-used by other staff once the materials are known to exist and are accessible.

This campaign is, in a sense, an effort to integrate the ad-hoc project-based work into the larger programs underlying MOA’s digitized collection, but thus far it has been largely unsuccessful. Some curators are hesitant to hand off their raw materials—videos, audio tapes, culturally sensitive objects, etc.—without a careful selection process and without providing proper context; in other words, without curating them. Yet, as Mayer emphasized, if these files could be carefully chosen and organized before being ingested into MediaBank, her knowledge and that of her colleagues still would not be transparent in the DAMS’s records, and that knowledge is integral to the work and value of the Museum.

Digital content analytics and insights on online users

In 2011, more than 137,000 visitors crossed the Museum’s threshold, and MOA takes great care to foster a deep awareness and understanding of the local, and especially indigenous, communities it serves and with whom it works. The renovation of the Museum building produced designated rooms for viewing specific culturally sensitive objects; the RRN provides a platform for First Nations and other communities to share their knowledge about MOA’s holdings and thereby help complete or correct the Museum’s metadata; and the in-gallery MOA CAT kiosks take into account the literacy and potential disabilities of their users.

Yet, despite their deep relationships with and sensitivities to their physical visitors and collaborators, MOA staff generally know little about their online users, including users of the other collection-based interfaces and whether their experiences using the sites are positive. Only a few basic numbers are available. In 2012, Google Analytics revealed that the Collection Online averaged around 100 visitors a day, with little change over time, while WebLog Expert demonstrated that the onsite MOA CAT, which includes the 14 kiosks in the Multiversity Galleries and staff computers, had an average of a little more than 20,000 page views per day.

Common challenges in sustainability of digital assets

Over the past ten years, MOA has invested a significant amount of effort and resources in developing its accessibility to researchers and to the communities it serves, and a great deal of that investment has been dedicated to the improvement and expansion of its digital infrastructure and assets. However, along with this growth, certain challenges have surfaced about the sustainability of what is created.

Keeping pace with a growing collection

The CFI grant was instrumental in making it possible for MOA to develop not only the vast array of digital assets it has amassed so that it can serve researchers worldwide, but also a strategy for protecting and potentially even enhancing those assets over the long term for the benefit of those patrons. Nevertheless, the advantages of the tightly coordinated workflow that has emerged out of this are accompanied by the question of how it will be maintained. Even though Bruegeman and Stevenson's positions are covered by the base budget of the Museum, the dwindling renewal project fund pays for the photographer, whose time is increasingly overtaxed: within the first month of 2013, MOA had already acquired the volume of objects it has typically brought in over the course of a year, and Bruegeman expects it could receive up to 5,000 more in the following eleven months.

Deep expertise, but no succession plan

The flip side of having a staff with deep expertise and long-standing experience in the organization is the risk that someone's departure will represent a loss of institutional knowledge. The processes in place for digitization are currently being documented by Stevenson, Lawson, and Glymin, but other areas, including the curators' connections and domain expertise, would be extremely difficult to replicate. This situation seems to underline the need to effectively capture their considerable informal expertise and "under the desk" knowledge in a way that can live on and be shared throughout the organization and beyond. For example, as Curator McLennan prepares to retire, several of his colleagues have expressed concerns that thousands of his photographs and contact sheets will be lost if they are not prepared for and deposited in archives before he exits. Additionally, there are no succession or training plans in place should Bruegeman or Stevenson take on different responsibilities at MOA or leave. Given that these databases are the foundation upon which almost all other digital work at the Museum rests, this interruption could pose significant problems across the organization.

Integrating valuable assets beyond the main collection

The one-size-fits-all approach to ingesting and managing the Museum's collection does not currently suit the curators' smaller, exhibition-based projects, and some items and contextual content may be lost if the content creator is unable to find the time to dedicate to them or anyone else with the expertise to be able to do so. Additionally, the variety of content types and sources demands a technological flexibility that poses challenges, and Stevenson is currently working to resolve the roadblocks they have hit in the past, including the matter of how to save the masters of the media produced while also providing the curators with the types of files they need for their own projects. MOA is not alone in this situation. The Royal Ontario Museum (ROM) in Toronto has also struggled with this situation. According to Director and CEO Janet Carding, her institution has addressed it by developing a Drupal website that gives control of departmental pages to curators, research specialists, and others who are trained to use the program, thereby encouraging those who create content to share online more of the materials they produce. [28](#)

Ongoing funding

Life after the end of the renewal project money is still a somewhat open question. Director Shelton sees MOA's mission as deeply tied to the potential of the digital environment, and the Museum may soon be required to reallocate staff or funds within an already tight budget in order to keep developing its digital efforts. Without new financial support, the Museum cannot continue to pay for certain project staff, such as the collection photographer and two RRN programmers, who have played significant roles in building MOA's digital assets and infrastructure; were this situation to come true, collection digitization would slow down dramatically, and the RRN website might not receive any further development.

This reliance on outside grants is certainly not unique to MOA. As Stephanie Poisson, Project Manager for Web and Multimedia at the McCord Museum in Montreal, revealed, almost all the opportunities for digitization at her institution and the infrastructure to support them have only been possible with the help of grant funding or because they ensure that most digitization coincides with exhibitions for which the Museum needs records.

9 steps to digital sustainability success for the Museum of Anthropology (MOA)

The Museum of Anthropology (MOA) has achieved what many of its peer institutions have not yet been able to, namely, the digitization of its permanent collection and development of a supporting database infrastructure, activities which were largely possible because of MOA's research focus and relatively small size.

To some extent, the Museum was in the right place at the right time. When it received the CFI grant, CFI had primarily supported science research and had not yet invested significantly in digitization or in a department in a faculty of arts. But by grounding its proposal in the organization's own research mission, MOA was able to secure a major award whose impact will endure well beyond the term of the grant.

Other museum leaders are also seeking new and innovative sources of support for digital work. Mark Engstrom, Deputy Director of Collections and Research at ROM, is looking for clever approaches, including fundraising, to support the further development of his institution's extensive online resources. A recent example is the mobile application created at ROM to augment the 2012 exhibition "Ultimate Dinosaurs: Giants from Godwana," which was sponsored by the financial company Raymond James Ltd. [29](#) Despite this one success, Engstrom is still unsure of how they will raise money going forward.

Given the current challenges of the Canadian funding landscape, it has been difficult for many other organizations to identify funding sources for projects of the scale of MOA's. Nevertheless, there are a handful of strategies that MOA has used to support its digital work that offer useful models for other institutions that may be looking for ways to develop their own capacities and

infrastructures, even if that development is more modest or must take place incrementally.

A central infrastructure for digital assets

MOA has been able to coordinate all its digital collection files and data in its collections management software and digital asset management system. This organization makes the collection easily accessible to those who work inside the Museum, as they can use the databases to retrieve images and information when working on their own projects. Curators, outreach staff, and others can draw on the content in a variety of ways, feeding it to the Collection Online, the MOA CAT, and the Reciprocal Research Network's partner platform and customizing it for in-gallery displays, iPad kiosks, online exhibitions, and advertisements, among other uses. Other institutions have also recognized the value of aggregating their digital materials in centralized databases, thus allowing their staff to take advantage of their institutions' vast digital assets in a variety and potentially unlimited number of ways. [30](#)

An articulated workflow to expand the digital collection

Along with the implementation of a technological infrastructure to store data and assets, staff at MOA designed and implemented a straightforward process for digitizing the permanent collection during the Museum's renewal effort. At the forefront of their minds was the sustainability of the process, i.e., the need to try to guarantee that the workflow would be efficient enough to accommodate future additions to the collection at relatively low cost and demanding little time. While MOA is still determining just how they will finance digitization going forward, the processes and infrastructure now in place will ensure this work is as manageable and inexpensive as possible. [31](#)

An inclusive approach to designing a digital strategy

The organization of the back-end databases and collection digitization processes at MOA was a team effort, as was the development of the three public-facing platforms for the collection. In each case, the interests of a variety of stakeholders were taken into account, including those of not only the internal staff who manage these assets and this infrastructure, but also the patrons the Museum serves and the partners with whom it works. The RRN is perhaps the most patent example, for, as members of the leading organization, MOA's RRN team must manage their own wishes along with those of eighteen other institutions and cultural groups, each with their own concerns. At the same time, they must also try to respond the needs of the RRN's users. Although such cooperation could slow down development, working closely with stakeholders in the early stages can result in greater support and longer-term commitment from them, which can help to increase the longevity and impact of the resources that are created.

User-centered experiences

In designing the MOA CAT, the development team devoted significant time to considering how visitors at the Museum respond to the objects in (what was then) the Visible Storage, because they wanted the in-gallery kiosks to complement the visitors' interests and behaviors. As a result, not only does the MOA CAT share object metadata and contextual materials, but this information can be retrieved by "touching" object locations in their digital representations on the computer screens. A better sense of the needs and conduct of the Museum's visitors' helped to ensure not only that the in-gallery technology would be accessible to its users, but also that the users would value the information shared with them. [32](#)

Agile development process

The Research Reciprocal Network has benefited enormously from the fact that its programmers are on MOA's staff. Because Jakobsen and Wallace work at the Museum, the RRN pilot website was able to be built and launched quickly with the understanding that the developers would be available to follow its use closely and make adjustments as needed or desired. Knowing that they would be available for a long period, they could avoid having to work like contingent, external hires who must execute a set of requirements according to a predetermined deadline and developed before it is fully understood how users would respond to the site. It may not always be possible for other institutions to bring programming expertise in house, but having the flexibility to get an early version out to users was key in permitting MOA's RRN team to iterate and modify the site in real time, based on user needs.

In addition to the lessons drawn from MOA's experiences, Ithaka S+R's research into models for sustaining digital work in cultural heritage institutions has offered further observations of other organizations' methods for sustaining their online resources. [33](#)

Realistically assessing the future needs of digital resources at the outset

The sustainable development of digital materials often requires more than preserving files and depositing them in a stable server. Outreach could help to ensure that the intended audience is aware of the materials that have been created, and, in time, stale interfaces might need refreshing. [34](#) Articulating the intended impact of a project and then defining at the outset the ongoing activities likely needed to achieve that goal can help to clarify expectations about the future of a project and plan for it. [35](#)

Looking beyond the catalogue

Online catalogues will not be useful for individuals who either do not know about them or cannot find in them the information they seek, and the needs of online users may be different from those who visit cultural heritage institutions in person. In order to best reach and serve an audience, it can be worth perusing the user research already more commonly undertaken to

understand onsite visitors, including why the resources the institution holds—digital or analog—are sought and valued by them. [36](#)

Finding the balance between centralized and distributed responsibilities

It is challenging for many organizations to answer the question of which digital asset management activities can be delegated to staff with technical, marketing, or other non-content-based expertise and which should be left with the content experts who produced those resources, provided the relevant research to create them, or helped to build the physical collection. Yet finding that balance can help to establish more efficient workflows without sacrificing quality. [37](#)

Identifying partners to create a wider network of support

To help distribute some of the responsibility for creating, maintaining, and enhancing digital resources, some institutions have drawn on the relationships they already have with other organizations. University and college museums and libraries can partner with each other or with other campus units to share equipment and technical staff. Organizations belonging to and financed by the same municipality can create a single IT unit with broader expertise to support all those institutions. And museums and libraries in related disciplines (e.g., natural history) can work together to define best practices for digital work that may be specific to their fields (e.g., digital 3D renderings of articulated skeletons). [38](#)

For a research project with the goal of exploring and sharing “institutional strategies” that aim to sustain digital content, it is sobering to come to the conclusion that many organizations may simply not have the financial resources to establish major digitization programs in the near term. Although project-based funding for large-scale digitization may not be readily available for Canadian cultural institutions, those fortunate enough to have the funds to develop their digital assets will surely be looking to build solid technical infrastructure and workflows that can support their collections as they grow. Starting from a strong base, they can develop and update interfaces to suit different audiences, as MOA has done for their in-gallery visitors, their remote users, and the academic anthropologists and other community members who participate in the RRN.

For institutions that have not yet identified sources of funding, the approach to building their digital assets may be less obvious. Perhaps the general infrastructure at MOA suggests a model that could be extended further. A sector-wide solution might emerge or cross-institutional partnerships might form that would permit multiple organizations to deposit content into one unified “back-end” solution. With that foundation in place, individual museums could invest in developing customized interfaces to suit their users. As observed with the RRN, standardizing metadata among similar collections is not a simple task, but is it not impossible. Arriving at the right scale for such a shared solution or partnership, whether by institution, by institutional type, or across the sector, is one possible direction; it is one that will surely benefit from continued communication of knowledge and institutional strategies among the museums and cultural institutions of Canada.

Interviewees on the digital case study of the Museum of Anthropology (MOA)

Museum of Anthropology, University of British Columbia

- Jill Baird, Curator, Education and Public Programmes
- Skooker Broome, Manager, Design and Production
- Pam Brown, Curator, Pacific Northwest
- Nancy Bruegeman, Collections Manager
- Karen Duffek, Curator, Contemporary Visual Arts and Pacific Northwest
- Mawuena Glymin, IT Manager
- Damara Jacobs, Coordinator, Educational and Public Programs
- Nicholas Jakobsen, Developer, Research Reciprocal Network
- Jennifer Kramer, Curator, Pacific Northwest; Assistant Professor, Anthropology
- Krisztina Laszlo, Archivist
- Gerry Lawson, Oral History and Language Lab Coordinator
- Bill McLennan, Curator, Pacific Northwest
- Carol Mayer, Head of Curatorial Department; Curator, Africa/Pacific
- Anna Pappalardo, Assistant Director, Financial Resources
- Susan Rowley, Curator, Arctic and Public Archaeology; Associate Professor, Department of Anthropology; Lead, Research Reciprocal Network; Director, Laboratory of Archaeology
- Anthony Shelton, Director; Professor, Department of Anthropology
- Ann Stevenson, Information Manager
- Ryan Wallace, Developer, Research Reciprocal Network

Landscape review

- Janet Carding, Director and CEO, Royal Ontario Museum
- Mark Engstrom, Deputy Director of Collections and Research, Royal Ontario Museum
- Bill Greenlaw, Executive Director, Archives, Museums and Libraries, Department of Communities, Culture and Heritage; Executive Director, Nova Scotia Museum
- Carol Pauzé, Director of Programming, Montréal Science Centre
- Stephanie Poisson, Project Manager, Web and Multimedia, McCord Museum
- Caroline Riedel, Curator of Collections, Maltwood Art Museum and Gallery, University of Victoria (responded via email)

Digital strategy case study interview guide of the Museum of Anthropology (MOA)

Background of Interviewee

- What are your personal responsibilities at the museum?
- Where are you located in the organization?
- How are you involved with digital content projects?

Digital Strategy

- How does your museum define the value of the digital assets it creates?
- Who is responsible for digitization? What does the digitization workflow look like?
- What determines the content the museum will digitize? What determines the technical processes for digitization?

Process

- Who (or what departments) makes these decisions?
- What happens to materials once they are digitized? Are they fed into a single catalogue or many? Are they repurposed (for online exhibitions, apps, learning resources) in any way?
- Who is responsible for the interfaces created to share the digital content?
- Does the museum take on—or have plans to take on—outside projects or host materials from other organizations? If so, what are the museum's priorities in making those decisions?

Impact

- In what terms does your institution measure the impact of its digital content?
- What mechanisms do you use to assess impact?
- What are the tactics you use to increase impact? (Outreach? Marketing? Partnerships? Etc.)

Financial Sustainability

- Where does the financial support to create and sustain digital content come from? (Is it ad-hoc, part of the museum's budget, from licensing content, etc.?)
- Has this changed over the years? How do you expect it to change in the future?
- Does your institution generate revenue from digitized content? If so, how do you decide what to make freely available and what to charge for? What models have been most successful?
- What other needs/concerns do administrators have concerning digital content creation/sustainability?

Landscape

- In terms of its digital strategy, where do you think your museum stands relative to its peer institutions?
- Are there other museums you feel are exceptionally good or innovative in their approach to digital content?

A museum professional tool to help digital content creators with sustainability issues

Introductory guide to the Health Check Tool for digital content creators in cultural heritage institutions

Taking the pulse of your digital resources

While creating digital content requires a great deal of planning and management, how well are those resources faring post-build? Creators of digital content at cultural heritage institutions are often focused on developing and funding new projects, whether digitized collections, online exhibitions, or other digital assets, such that the ongoing support of these resources may be overlooked. While the stages involved in creating new content tend to be well recorded and draw together participants from across an organization, once they are “completed,” it is often assumed that they may need little ongoing attention. But this is not always the case. While it is important to make sure that the underlying technology is still functional, it is only one concern among many. Regularly assessing the “health” of digital resources is the best method for insuring their long-term sustainability.

The **Health Check Tool** following this guide offers questions to help digital content creators think about the ongoing support dedicated to the materials they produce and to prompt them to think about whether their resources are meeting the goals their creators intended: Who is managing the resource today? Is it still considered to be valuable to its audience? Who are its users, and how are they using it? Is the interface and functionality meeting the needs of its audience? These and other questions are designed to help project leaders consider which resources may be worth ongoing investment.

While the questions posed in the tool are generally applicable to any sort of digital project, there are some categories of digital resources that are especially common in museums and other heritage organizations and that may particularly benefit from thinking more specifically about the following categories of resources:

Digital collections

The creation of a digital collection is a major undertaking and often a critical aspect of an institution's digital strategy. Collection may represent a specific curated set of materials, or—less commonly—the full holdings of the institution. In either case, the digital images and contextual material around irate major assets of the institution and provide the basis for the latter's public presentation extra muros.

Some sustainability concerns may include: Integration of multiple databases housing separate siloed collections and created as projects over several years. Developing ongoing workflows to continue to build the collection, as needed. Long-term protection of these assets.

Consider the following questions:

- Has the management of the collection changed over time? If so, how?
- How are additions made to the collection, and how are the associated expenses covered?
- What preservation activities are undertaken on a regular basis?

Online exhibitions

Museums and historical societies regularly mount exhibitions, and sometimes this process can also create digital assets, as installations are captured in photographs, video or other digital media. How is this media preserved and shared once the exhibition has ended? When an online exhibition is created, how will it be preserved and shared in way that amplifies the holdings of the institution?

Some sustainability concerns may include: Stand-alone websites that are not integrated into a museum's core system. Online exhibitions that are created once and include valuable content that might not be included in any searchable database. Curators' informal collection of valuable documents or artifacts that are not part of the institution's “collection,” which, if better integrated, could be a valuable part of the contextual material that helps researchers and other visitors to understand and enjoy the collection.

Consider the following questions:

- Where is the original content presented in this exhibition stored?
- If additional digital content (e.g., from field research) was created in the development of this exhibition, are those materials in a central digital asset management system?
- If this resource was created to supplement a physical exhibition for which made digital records were made, are those materials in a digital asset management system?
- Are the materials listed above easily accessible to others in the organization who may find them useful? Can these files be used again? Are permissions, where required, accessible?

Educational resources

Lesson plans, contextual materials, and even full websites are often created to help educate students and others about the expertise at a given institution. Some may be fairly closed-ended, while others may continue to grow over time.

Some sustainability concerns may include: Ensuring that the digital assets created for and used in the resource are stored and preserved in a safe management system. Building these units in a way that draws directly on the core collection. Understanding the user base and its needs so that materials will remain relevant and valuable to those communities.

Consider the following questions:

- If the resource is a website, is it hosted by the museum, or by a third-party provider? What arrangements are in place to provide for its ongoing support?
- Where are the source files of the materials presented in this resource stored?
- Is there any ongoing support for developing or enhancing the interface or material?
- How are teacher and student needs being understood and addressed?
- Is the resource reaching its intended audience?

Software projects

Mobile applications, games, and other software are often designed to help unlock the richness of the materials held by an organization or highlight a specific area of expertise. Some are intended to be used specifically onsite to enrich the experience of visitors to the museum; others might serve to draw attention to the collections, encouraging both onsite and virtual interactions with the institution's holdings.

Some sustainability concerns may include: Expensive application development not firmly rooted in user needs. Costs to develop projects and to keep iterating on them over time. Difficulty in transitioning from an “experiment” to an ongoing service that requires ongoing support.

Consider the following questions:

- Who is managing this project? Was it intended to be an experiment or an ongoing product or service that will require support and development over time?
- What was the goal of developing this: to broaden the audience, increase engagement, increase the number of visitors to the site, to provide an education, or something else?
- How well it is attaining these goals?
- Was a third party involved in the creation of the software? If so, what rules govern the reuse of this resource within your organization?

The questions that follow in the Health Check Tool may not be equally useful for every project you manage, but they are intended to guide you through the process of evaluating the goals, successes, weaknesses and future needs of your digital resources, so that you can decide what changes might be most valuable to undertake in order to increase their value to your organization's mission.

Health Check Tool for digital content creators in cultural heritage institutions

[Health Check Tool in Word format](#) (58 KB) | [About the freeware \(Word\)](#)

In order to complete the Health Check Tool, you should use the version in Word format. You can either complete and save it electronically, or print it and complete it by hand.

This tool is for:

- **Digital project leaders** who want to review the ongoing needs of their projects
- **Library, museum, and university administrators** who want to “take the pulse” of a digital project for which they are responsible

While the activities required to get digital content projects up and running are generally well documented, those needed to support projects as they mature may be less obvious and are not always discussed once the project has been launched.

This Health Check Tool provides an opportunity for you to think about the kinds of activities and resources—money, staff, and otherwise—that are being dedicated to your digital project on an ongoing basis. This will enable you to take a fresh look at whether your project is delivering the desired impact in the communities you aim to serve and to consider new ways to enhance the value of its content for your users.

Description of the project

- Name of project
- When was this project first created, and, if applicable, when did it first become available to users online?
- I consider this project to be... (select one of the following)

In answering this question, consider the ideal scenario for your resource after it has been made public. If funding/capacity were no issue, what model would deliver the greatest impact?

- **A “pure maintenance” project.** It just requires some basic support to ensure that formats are up to date and usable. Whether undertaken by the project itself or by the platform or institution that hosts it, preservation is required. But ongoing work to add content, enhance access, or update technology infrastructures may be unnecessary, as it may be offered by the host platform.

- **A “growth” project.** This type of project requires specific ongoing maintenance and understanding of the communities that use it and shows signs of user uptake that you want to encourage. This is, or has the potential to become, a highly valuable, widely used resource.

- Describe the sort of impact you want the project to have.

By “impact,” we mean the ultimate goal of the resource. The actual impact of a resource may shift over time—a resource that begins as a research resource may morph into a teaching tool. Think about your current aspirations for the resource. Consider the audiences that you seek to influence and how you would like to influence them.

- Who currently manages this collection?

There may or may not be one person with primary responsibility for the success of this resource, and the person who is running it now may not be the same person who created it.

- What department manages this collection?

It may be managed by an IT group, a collections team, or an academic department. Bear in mind that other departments might also play a role in supporting this work.

- Does this project have any external partners involved in its management? If so, what is the nature of the partnership (e.g., is your content hosted externally; do you host your content but partner with others for access to equipment or other materials)?

Think about any collaborations with bodies outside of the home institution that may assist with content, technical support, marketing, etc.

- If external partners or funders help to support this project, what agreements govern this relationship? When do the terms next come up for review?

Consider both implicit and explicit agreements that might include financial requirements, preservation plans, etc.

- If you are unsure of the answers to the questions in this section, who or what role do you think would have the answers?

Ongoing Support

Even if the digital project you are reviewing does not have its own budget line, there are still likely to be activities and costs associated with its maintenance and enhancement aimed at keeping the project current and valuable to users. The questions below will help you to think about what these ongoing activities are and what resources are required to carry them out.

- What activities are involved in the current ongoing maintenance or enhancement of the project? If more money or other resources could be allocated, what activities would be most valuable in increasing your project’s impact? Think about the roles these activities have or would have in the project.

What activities are involved in the current ongoing maintenance or enhancement of the project?

	Current ongoing activities	Ongoing activities next year
Project management		
Marketing and outreach		
Content selection		
Legal services		
Content production (e.g., scanning, metadata creation)		
Financial and accounting services		
Information technology and support services (e.g., server space, tech support, upgrades, etc.)		
Indirect costs (e.g., office space, supplies)		
Digital preservation		
Other (please describe)		

- What are the current costs associated with the ongoing support of this project?
 - IT support
 - Application/vendor support

- Software
 - Office space
 - Equipment
 - Travel/hospitality for partners
 - Other
- How many total staff, in full-time equivalents (FTEs), are involved with the ongoing maintenance or development of this project?
Take into account all staff associated with the project in FTEs, whether they are paid through the resource's budget funding or not.
 - How are the costs for this project currently funded? (List source and amounts for each category.) Do you expect this to change in the next year, and if so, how?
 - Grants
 - Contributions from partner organizations
 - Base budget from your institution (direct funding)
 - In-kind support (please describe)
 - Other funding sources (please describe)
 - Earned income (e.g., via sponsorship, advertising, subscriptions, etc.)
 - Donations or individual philanthropy
 - When was the content of the resource most recently updated?
This includes adding, deleting, or editing content or any material directly related to the resource's materials (e.g., metadata).
 - When was the user interface of the resource most recently updated?
Consider any visual, structural, or organizational changes that may affect how users see or interact with your resource.
 - If you are unsure of the answers to the questions in this section, who or what role do you think would have the answers?

Preservation standards checklist

Preservation is often the first concern of managers seeking to ensure the future of their resources. The following checklist outlines specific steps based on preservation “best practices” for resources that require specific preservation activities. This is by no means a comprehensive list of the steps required for a comprehensive preservation strategy; think of it as an introduction to potential preservation activities for your resource.

- Which of the following preservation activities do you conduct or plan to conduct on a regular basis?
 - Generate and manage descriptive, structural, event, and preservation metadata.
 - Back up all master and derivative versions of the objects and metadata.
 - Document which parties are responsible for maintaining the intellectual content and which parties are responsible for maintaining the technical integrity of the collection.
 - Define supported preservation formats and document which files in your preservation platform are supported and which are not.
 - Regularly check the files for corruption (e.g., by use of a checksum).
 - Unfamiliar with the terminology and/or current practices in the organization.
 - Other
- If you are unsure of the answers to the questions in this section, who or what role do you think would have the answers?

Audience, usage, and impact

Who and how many individuals do you hope will use this digital resource, and how will you reach them? Understanding who your users are and what they want and need from your project helps you to evaluate the way money and other resources are allocated to support the project. This will help you to make informed decisions and, if needed, changes that can assist you in assessing and achieving the impact you desire. The following questions are intended to encourage you to consider the audiences for which this resource is maintained and evaluate current tactics for engaging them.

- Who do you see as the main audience(s) for this project?
While resources may aspire to reach all audiences, think about only the most likely or most relevant groups. Potential audiences could include researchers in specific disciplines, students, or subject enthusiasts. Be as specific as possible.
- What metrics do you use to measure and evaluate the impact of this project? How have these metrics and measurements changed since last year? See the chart on the next page, and use the most current figures for your project, and separate them by audience, if possible.
Consider only those metrics that you use to measure and evaluate your impact. If there are exceptional factors that have affected these metrics, you may want to take those into account as you think about these changes.

What metrics do you use to measure and evaluate the impact of this project?

	Current metrics	Change since last year	Goal for next year
Number of content accesses (e.g., page views, downloads)			
Total audience reached (e.g., number of unique visitors)			
Usage in teaching (e.g., number of students reached)			
User loyalty (e.g., return visits, frequency of visits over time)			
User engagement (e.g., time on site, returning users)			
Referrals			
Usage in research (e.g., citations or references in published work)			
Awards			
Media coverage			
Citations/usage in prominent contexts			
Other (please describe)			

- If there are no metrics of evaluation in place for this project, what would you like to know about how this project is used?
- If you are unsure of the answers to the questions in this section, who or what role do you think would have the answers?

Evaluate the risks

Given your responses to the items above, which statement below best characterizes the current level of investment and support for this project?

- 5 - adequate for performing all of the activities needed to increase the value of this resource and achieve greater impact
- 4 - adequate for performing the majority of the activities needed to achieve greater impact
- 3 - adequate for performing some of the activities needed to achieve greater impact
- 2 - adequate for performing only the most critical maintenance, preservation, and other activities to maintain the project's value
- 1 - not adequate for performing any of the maintenance, preservation and other activities needed to maintain the project's value

Based on the current status of your project and the sustainability and impact needs of your project, evaluate your success in each of the categories below by rating each category from 1-10. In the rows below, please outline goals for the next year in each of these columns and specific action steps needed to achieve these goals.

Activities for sustainability: dashboard

	Currency of content	User interface	Tech infrastructure	Audience	Other impact measure(s)	Preservation	Financial stability
Rating							
Goal for next year							
Action Needed							

Next steps and timeline

- Who will you need to work with to take these steps?
- When will you review progress again?

For additional guidance on some of the topics discussed above, you may want to visit the following resources

- On preservation activities and best practices, consult [materials published by the non-profit Digital Preservation Coalition](#)
- On audience research, see the Strategic Content Alliance-funded [Guide to Research Audiences](#), which provides a comprehensive overview of the basic principles
- On impact measurement, see the Oxford Internet Institute's [Toolkit for the Impact of Digitised Scholarly Resources](#) (2009), which presents a framework and set of best practices

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- 1 William Y. Arms, *Digital Libraries* (Cambridge: MIT, 2000), p. 4.
For more on the prevalence (and limitations) of undertaking digitization as a preservation strategy, see the interview "Preservation in the Digital Age," in *Conservation Perspectives: The Getty Conservation Institute Newsletter*, 22.3 (Fall 2007). The Ithaka S+R study of Association of Research Library member institutions also found that over 50% of respondents from ARL institutions said that the creation of their digitized special collections was motivated by "preservation, as a way to protect fragile originals." See Nancy L. Maron and Sarah Pickle, *Appraising Our Digital Investment: Sustainability of Digitized Special Collections in ARL Libraries* (February 2013), <http://www.sr.ithaka.org/research-publications/appraising-our-digital-investment>. Additionally, as Claire Hudson has written, another motivation for digitization in museums, especially, is the need to create inventories of their holdings, which may be the reason why so many museums seek to create digital records of all their holdings. See Hudson's essay "The Digital Museum" in *Evaluating and Measuring the Value, Use and Impact of Digital Collections*, ed. by Lorna M. Hughes (London: Facet, 2012), pp. 35-48.
 - 2 See Caroline Dunmore on the typical "evolutionary scale" of museum websites, from "no web presence" up through the "website constituting additional museum site." Located in "Museums and the Web," in *The Responsive Museum: Working with Audiences in the Twenty-first Century*, ed. Caroline Lang, et al. (Burlington: Ashgate, 2006), pp. 95-114. Additional references can be found in the section, "Bibliography for the case study on museum digital content sustainability."
 - 3 Available at <http://www.centredessciencesdemontreal.com/static/autopsy/index.htm> and <http://www.bbc.co.uk/arts/yourpaintings/>.
 - 4 Available at <https://www.rijksmuseum.nl/en/rijksstudio> and <http://film.iwmcollections.org.uk/>.
 - 5 The application can be found here: <http://www.oldportofmontreal.com/heritage/wintering.html>.
 - 6 The Museum of Anthropology's website is located at <http://www.moa.ubc.ca/>.
 - 7 Nancy L. Maron, et al., *Sustaining Our Digital Future: Institutional Strategies for Digital Content* (January 2013), <http://www.sr.ithaka.org/research-publications/sustaining-our-digital-future>. Other relevant work includes Maron, et al., *Sustaining Digital Resources: An On-the-Ground View of Projects Today* (July 2009) <http://www.sr.ithaka.org/research-publications/sustaining-digital-resources-ground-view-projects-today> and Maron and Matthew Loy, *Revenue, Recession, Reliance: Revisiting the SCA/Ithaka S+R Case Studies in Sustainability* (October 2011) <http://www.sr.ithaka.org/research-publications/revenue-recession-reliance-revisiting-scaithaka-sr-case-studies-sustainability>.
 - 8 A complete list of those interviewed is available in the section "Interviewees on the digital case study of the Museum of Anthropology (MOA)" of this report.
 - 9 Available in the section "Digital strategy case study interview guide of the Museum of Anthropology (MOA)" of this report.
 - 10 See: <http://www.sr.ithaka.org/research-publications/sustaining-our-digital-future>

- 11** Comité des Sages, "The New Renaissance" (January 2011) http://ec.europa.eu/culture/documents/report_comite_des_sages.pdf. And for more on supranational funding, see European Commission, "ICT PSP 7" (December 2012) http://ec.europa.eu/research/participants/portal/page/call_CIP:efp7_SESSION_ID=Q83FRHVYhB6WZPvdJMYFLOXHPvqhSf80dy6mNvl23xYSLgyhhcnQ!1563113187?callIdentifier=CIP-ICT-PSP-2013-7&specificProgram=ICT-PSP. The European Commission dedicated €125.7 million in December 2012 to fund digital projects across the continent in 2013 alone.
- 12** Canadian ePolicy Resource Centre, "Canadian Culture Online Policy Statement" (May 2008) <http://www.ic.gc.ca/eic/site/ceprc-ccrcp.nsf/eng/home>.
- 13** SSHRC, "Digital Economy" (November 2012) http://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/priority_areas-domaines_prioritaires/digital_research-recherche_numerique-eng.aspx. For more on the CIF's funds, see <http://www.innovation.ca/en/OurFunds>.
- 14** Additional information about the LAC's digital strategy and former funding streams are available: LAC, "Digital Collection Development Policy" (February 2006) <http://www.collectionscanada.gc.ca/collection/003-200-e.html>; LAC, "Canadian Digital Information Strategy" (October 2007), <http://www.lac-bac.gc.ca/obj/O12033/f2/O12033-1000-e.pdf>; "Canadian Digital Information Strategy: Final report on consultations with stakeholder communities 2005 to 2008" (February 2010), http://datalib.library.ualberta.ca/data/CDIS_FinalReport_eng_REVISED_Final.pdf.
- 15** CHIN, "Annual Reports" <http://www.rcip-chin.gc.ca/apropos-about/rapports-reports/index-eng.jsp>.
- 16** Available at <http://www.museevirtuel-virtualmuseum.ca/index-eng.jsp>.
- 17** The non-profit Canadiana.org (<http://www.canadiana.ca/en/home>) was initially founded in 1978 as the Canadian Institution for Historical Microreproductions, and its members, which include most major Canadian research institutions and other organizations like Parks Canada, pay membership dues to the organization. In return, Canadiana.org is now available to assist with the digitization and ongoing management of the members' collections. The organization was originally created to preserve and provide access to Canada's print heritage, and it believes that it has continued to serve that goal by offering to digitize materials, host them, and make them discoverable through a shared portal, as well as ingest them into a dark archive.
- 18** MOA, "About the Museum: Our Mission" (2013), <http://moa.ubc.ca/about/index.php>.
- 19** MOA also houses UBC's Laboratory of Archaeology's collection, about 535,000 objects.
- 20** The title of the project awarded the CFI grant is "A Partnership of Peoples: A New Infrastructure for Collaborative Research at the University of British Columbia's Museum of Anthropology."
- 21** MOA's records are also uploaded to CHIN's Artefacts Canada Humanities Database of museum object records (<http://www.rcip-chin.gc.ca/artefact/index-eng.jsp>), and from there users who wish to see images of objects can click on links that will take them to the Museum's Collection Online.
- 22** Other MOA CAT team members included developer Rory Mathews, Curator Carol Mayer, and MOA's former Technology Program Manager, Sivia Sadofsky, who was the lead for the project and conducted the initial user testing. Communications Manager Jennifer Webb and Stevenson were also involved, as was Bruegeman, who continues to serve as the "business" owner of the system.
- 23** Available here: <http://collection-online.moa.ubc.ca/>.
- 24** More about the RRR can be found at <http://rrrpilot.org> and <http://www.museumsandtheweb.com/mw2010/papers/rowley/rowley.html>
- 25** Ibid.
- 26** Available at <http://moa.ubc.ca/borderzones/>.
- 27** Available at http://www.museevirtuel-virtualmuseum.ca/sgc-cms/expositions-exhibitions/bill_reid/english/index.html.
- 28** Website of the Royal Ontario Museum: <http://www.rom.on.ca/en>.
- 29** More information about the application can be found here <http://www.rom.on.ca/en/exhibitions-galleries/exhibitions/past-exhibitions/ultimate-dinos/about-ultimate-dinos>. ROM also generates some licensing revenue from their digitized materials, but the \$40,000 or so it brings in annually neither covers the salary of the individual who manages the licenses nor does it necessarily end up supporting digital work in the Museum.
- 30** Another institution that has centralized its assets is the Imperial War Museums (IWM), which consolidated more than 140 databases into one DAMS over the past few years. This has allowed the IWM to develop websites for licensing films and images, educational materials for teachers and students, and mobile applications to share more of and more about the collections with visitors, and all of these platforms can pull from the same database as the unified online catalogue. See, for example, the following photograph by CJ Ware,

which has a link from the catalogue record to the licensing website and displays metadata from the same record on both (although the display format is different): <http://www.iwm.org.uk/collections/item/object/205186185>. Maron, et al., *Sustaining Our Digital Future*, pp. 40-41.

- 31** An efficient workflow has also been of central concern for Poisson, who manages a staff of two at the McCord Museum. A key aspect of that workflow is a clear order of prioritization for digitization, which is necessary because her team has limited time and money. First priority are items the Museum needs images of because the objects are displayed in a current exhibit that need to be advertised on the Museum's website; second are non-exhibit items already on display that thus do not require additional time or a specialist for handling (e.g., costumes that are already on mannequins); and third are items that are easy to scan (e.g., slides and photographs).
- 32** At the University College London, Mark Carnall, Curator at the Grant Museum of Zoology, has also attempted to leverage his museum's digital resources to connect more with visitors. Because most of the Grant's holdings are not unique and are presented with greater context on websites such as Wikipedia, Carnall knew it was unlikely that the Museum's online collection would attract much traffic. As a result, he sought to engage more deeply with onsite visitors by implementing a QRator program that allows individuals to use their mobile phones to scan codes positioned next to objects on display and thereby learn more about those objects and comment on them. (For further discussion of the Grant Museum, see Maron, et al., *Sustaining Our Digital Future*, pp. 38-40.) The Royal Ontario Museum provides yet another example: In response to noticing that visitors use their phones to look up additional information about objects on display in the Museum, Director Carding has begun to encourage her staff to embrace these mobile technologies and provide more context and activities themselves by developing mobile applications specifically for onsite visitor use.
- 33** For further discussion on these topics, see Maron, et al., *Sustaining Our Digital Future*.
- 34** According to Poisson, the McCord Museum is currently attempting to compensate retroactively for their insufficient planning in the early stages of some of their (now ongoing) digital projects. They have realized that, before they can decide which projects they want to keep supporting and in what ways, they must first ask what their objective in doing so would be, i.e., "Do we want to be a museum that gives lesson plans to teachers, or do we want to be a resource from which teachers can create their own lesson plans?"
- 35** On this point, digital project leaders might find Ithaka S+R's *Framework for Post-Grant Sustainability Planning* useful, located at <http://www.sr.ithaka.org/sites/default/files/files/Sustainability%20Planning%20Tool.pdf>.
- 36** Noticing that only a few images received the vast majority of visitor attention on his institution's website, John Stack, Head of Online at the Tate Museum, has altered slightly the interface of his Museum's digital catalogue so that lesser-known works could be recommended to users based on the latter's interests. The aim of this modification was to drive online visitors "deeper" into the Tate's collections. (For more on the Tate, see Maron, et al., *Sustaining Our Digital Future*, p. 43.) Yet as Claire Hudson points out, more elaborate development of useful materials, functionality, and applications can be quite challenging for museums, whose visitors typically range from school-age children to expert researchers (p. 44).
- 37** In allowing ROM's curators to upload their own materials to the organization's website, Director Carding has reduced the amount of time needed for IT staff to assist with these simpler tasks and thereby granted them more freedom to experiment with developing the Museum's more technically sophisticated applications and programs. A clearer division of labor and basic web training in user-friendly software for curators can help prevent situations in which an IT team with diverse responsibilities is constantly called on to code and publish scores of small pieces making up a large digitization project as a collection grows. For more, see Hudson, p. 40.
- 38** See [footnote 17](#) for more information on one such partnership, Canadiana.org.