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THE LIBRARY OR INFORMATION CENTER OF THE FUTURE
The Future of Digital Scholarship

Libraries and museums are experimenting with technologies that encourage user interaction and help increase interest in specialized research and collections.

By Susan Berstler; Chris Erdmann, MLIS; John Brosz, PhD; Shawna Sadler, MLS; Lisa Hardy, MLIS; Markus Wust, MLIS; and Matt Bernhardt, MArch

Earlier this year, librarians, technologists and faculty from the University of Calgary Library, Calgary Public Library, Harvard Library, North Carolina State University Libraries, and Massachusetts Institute of Technology Libraries came together to share information about their current projects, discuss next steps, and brainstorm future projects. The occasion was LIBERACT 2014, an “unconference” held March 11-12 at the University of Calgary’s Taylor Family Digital Library.

LIBERACT 2014 focused on interactive technologies in libraries and museums, and each workshop attendee was also a presenter. As the conference progressed, a consensus emerged that both cross-university and cross-disciplinary communication and collaboration are needed as staff in libraries and museums strive to stay current in this rapidly changing field.

Learning and Research Spaces

Continuing a theme introduced at the LIBERACT 2013 workshop at Harvard, LIBERACT 2014 examined the role that new technologies (both software and hardware) play in creating innovative learning and research spaces in libraries and museums. The following projects were presented and discussed:

Bohemian Bookshelf. Bohemian Bookshelf (Thudt et al. 2012) is serendipitous book discovery visualization software. It was previously presented at LIBERACT 2013 and has since been further refined and deployed by John Brosz, Chelsea Ambler, and Susan Powelson of the University of Calgary’s Health Science Library to promote their Mackie Family History of Neuroscience special collection.

Susan Berstler is the information technology coordinator for the Tozer and Cabot Libraries at Harvard University. Chris Erdmann is head librarian of the Harvard-Smithsonian Center for Astrophysics in the John G. Wolkach Library. John Brosz is the visualization research coordinator in the Office of Libraries & Cultural Resources at the University of Calgary. Shawna Sadler is the director of digital library and innovation at Deakin University in Australia. Lisa Hardy is the facilities design lead at the Calgary Public Library. Markus Wust is the digital collections and preservation librarian at North Carolina State University. Matt Bernhardt is a Web developer for the Massachusetts Institute of Technology Libraries. Inquiries about the article can be directed to Susan Berstler at Berstler@fas.harvard.edu.
In addition to being available online, Bohemian Bookshelf is installed on a touch table in a high-traffic area of the library, providing a physical presence for this special collection. The Bohemian Bookshelf’s fun, attention-grabbing interface provides a mechanism to attract wider public interest to a collection that otherwise is known only by specialist researchers.

Library Explorer. The Harvard Library UX (user experience) project started when Chris Erdmann began working with LADS, open source software created by Brown University’s Graphics, Visualization, & Interaction Group for the purpose of viewing large, digitized artworks. LADS later became Library Explorer (LE), and its promise—to allow patrons to explore, edit and share digital collections—led the Harvard Library to purchase three SUR40 touch tables with PixelSense that had been produced under a short-lived collaboration between Microsoft and Samsung. The touch tables were originally called Surface 2.0, but Microsoft then co-opted the name “Surface” for its new tablet, which was introduced less than six months after the tables first shipped in 2012.

A lack of vendor support aside, Harvard’s experiences with the tables made clear that these new touch technologies are light years away from being plug-and-play devices, but they are still invaluable for experimenting with gesture-based technologies in library settings. The scarcity of affordable and library-specific commercial software greatly limited the functionality of the tables in the three libraries where they were deployed, but the tables’ horizontal surface and ability to support both multiple touches and multiple users made them a huge hit with students, staff and faculty.

A key observation made by the UX project team was that table users exhibited a strong desire to interact with objects and to annotate and share content between the tables and other devices. The experience at Harvard also demonstrated the potential of these new technologies to enhance the discovery of library collections.

Visualization Studio. Another technology presented at LIBERACT 2014 was the University of Calgary’s Visualization Studio, which is designed to support e-scholarship, collaboration and innovation. It features a large display wall—explicitly requested by faculty to work with large, high-resolution imagery and big data—and a touch table.

The studio is used by faculty and graduate students for a wide variety of research projects. Examples of studio uses are inspecting and transcribing ancient manuscripts, mapping and presenting community resources, developing new touch- and gesture-based computer interfaces, presenting iOS applications, exploring small details in digital reproductions of paintings, and simulating a command-and-control center for emergency management.

Interaction and Public Display
Both the Taylor Family Digital Library at the University of Calgary and North Carolina State’s James B. Hunt Library have made use of new technologies to allow the public to interact with (or, in some cases, add to) displayed content using methods ranging from QR codes to art installations.

Interactive art. The Taylor Family Digital Library has two large media walls, each consisting of eight screens. The screens are used for many purposes, but the most important one is to increase the exposure of research created on campus.

During LIBERACT 2014, one media wall featured an interactive art installation titled Toro EnviStiendi by Jean-René Leblanc, a professor at the University of Calgary. The installation uses input from a Microsoft Kinect sensor to select...
from looping video clips of an agitated bull. As a viewer moves closer to the screens, the bull charges.

Toro is a favorite of the students and staff and exemplifies the use of technology to highlight current university research in the library. The screens also are a wonderful means of connecting the university to the surrounding community of Calgary and southern Alberta, especially during events such as the Calgary Stampede.

**Video wall remote.** When the James B. Hunt Library opened in 2013, it quickly drew attention for the variety and sophistication of the content creation and visualization technologies it offers students and faculty. Among the library’s most prominent technological features are five large public display walls that utilize Christie’s MicroTiles technology for a variety of purposes, such as promoting library services, showcasing faculty and student work, and displaying digital art.

Only one of the walls is touch-enabled (thereby allowing users to directly interact with the content on display), so library staff have been experimenting with ways of adding interactive capabilities to the other walls. One promising approach has been the creation of Web-based “remote control” pages that users can access through the Web browsers on their mobile devices. Using standard Web technologies such as WebSockets, these remote control pages can exchange data with pages shown on the display walls and allow users to select and control content. An early example was a select page for an exhibit of scientific data visualizations that was on display in October 2013 (see news story at http://news.lib.ncsu.edu/2013/10/15/choose-your-own-adventure-at-places-spaces-exhibit/).

One project under development is an application that was inspired by Matt Bernhardt’s presentation at LIBERACT about the publication of 3D models. The application will display galleries of 3D models on one of the Hunt Library video walls (the models were submitted by users of the library’s 3D printing service). Using a mobile device, visitors will be able to select a specific model and rotate it as well as zoom in and out of the display.

**Touch table applications.** Lindsey Sharman, curator of the University of Calgary’s Founders’ Gallery, has incorporated two different touch table applications into the gallery’s shows. One, Library Explorer, was discussed previously; the other, Eleven Women Facing War, was a Web page that was quickly redesigned and adapted for use on the touch table. While the Web page provided a more stable user experience than Library Explorer, Lindsey expressed needs for additional content creation on touch tables, better table reliability, additional security functionality, and more customization options for presenting imagery and videos.

**Additional Presentations**

**Digital fabrication in academic libraries.** Matt Bernhardt argued that digital fabrication as a library-integrated service is much more complex than merely offering 3D printing. The question, then, is how library offerings such as reference and finding, data management, and repositories fit with digital fabrication? Can libraries work together to create a shared discovery platform for 3D files?

**Public library use of interactive technologies.** With a network of 18 locations in a city whose population is growing faster than its infrastructure can keep pace, the Calgary Public Library is looking at service delivery options that will allow patrons to connect with the library and each other in non-traditional settings. Library staff are currently working to design an “open” library in a recreational facility that will offer self-service options and provide an interactive experience to connect virtually with library staff and resources. The unique quality of this space is that it will be unstaffed during some operating hours, requiring visitors to self-direct their activities. An application that allows visitors to browse, discover and borrow in an open environment, as well as share and collaborate with others, is being explored.

In other locations, the CPL is investigating similar applications that will provide an interactive experience even when the library is closed. LIBERACT participants agreed that there is potential for public libraries and universities to collaborate on the development of interactive and touch technologies to engage and enlighten library users. Public libraries, with their diverse user groups and service offerings, also present a valuable opportunity for researchers to observe and study the use of interactive technologies.

**Faculty advances with new technologies.** Not surprisingly, the two presentations by University of Calgary faculty members included some of the most forward-thinking ideas about technology, library collections, data visualization and more. Sheelah Carpendale and Stefania Forlini discussed the processes
they followed and the challenges they encountered in designing interactive visualizations to further exploration and research into library collections.

Carpendale’s presentation included a quote attributed to Henry Ford: “If I had asked people what they wanted, they would have said faster horses.” Though Ford may or may not have said that, the quote’s relevance to attempts by today’s library administrators to budget and plan for the needs of future patrons is clear. Usability studies based on current library practices can only go so far, so collaboration with technology visionaries is needed.

Carpendale raised the issue of what she called “data barons” and “data serfs.” At the University of Calgary, her close relationship with the Taylor Family Library helps bridge this divide. There is a role for libraries to play in helping ensure wider access to big data and the tools needed to analyze it in a meaningful way.

Tied to the collection of data is the visualization of data. Stefania Forlino spoke of her work with the university’s Bob Gibson Collection of Speculative Fiction to develop a data visualization tool that allowed users to browse, analyze and search this special collection in a non-textual manner. Paying attention to faculty research projects and student classroom needs as they relate to library collections can help libraries make informed decisions regarding new software and hardware purchases. Closer communication between faculty, librarians and technologists during this process is vital.

Sharing information about institutional experiences with emerging technologies can be a cost-saving measure. Chris Erdmann and Susan Berstler’s experiences with the SUR40 touch table with PixelSense echoed the problems experienced at the University of Calgary with their touch tables. The bumps and grinds being experienced at MIT with their pilot digital fabrication program can perhaps be lessened by learning from the Hunt Library’s experiences at North Carolina State.

**Staff, training and IT support.** Successfully integrating new technologies into libraries and museums comes at a cost. Both patron support and faculty collaboration depend on institutions hiring and training adequate staff, including librarians and technologists. One successful aspect of the University of Calgary’s Visualization Studio is the dedicated support of a staff member who provides the facility with both technical and research expertise and credibility, thanks to his advanced degree in computer science. At Harvard, discussions about the upcoming renovation of the Cabot Science Library have included not only architects, project managers and librarians but also IT specialists as well as faculty from across the sciences, arts and humanities.

**New Ideas and Next Steps**

More libraries and museums are taking the leap and investing in interactive technologies. For example, Deakin University in Australia has just opened a new library at its Geelong Waterfront campus. The library includes an interactive space created by five touch screens on pivots, with directional speakers. Much of the content displayed on these screens is drawn from the library’s collection and is used to market and promote awareness of image-based collections. The screens invite viewer participation, such as in the accompanying image, where great works of art are presented in a gallery-like setting with touch-screen buttons below the exhibition.

Workshops such as LIBERACT 2013 and LIBERACT 2014 have helped lay an important foundation for much-needed collaboration between libraries and museums in areas such as gesture-based technologies, digital fabrication and discovery, interactive devices, and data visualization. Discussions are under way for LIBERACT 2015.

**Recurring Themes**

**Communication, collaboration and cost.** Communication and collaboration as cost-saving measures, both within a university and/or across institutions, were discussed frequently at LIBERACT. In this age of tight budgets and spiraling collections costs, it is important that decisions regarding technology spending be made intelligently while acknowledging the need for such investments so that library patrons can fully participate in digital scholarship.

Interactive presentation at Deakin University’s Geelong Waterfront campus (© 2014 Deakin University Library).