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Beyond Knowledge Management

Library's new visualization lab featuring Crestron DigitalMedia™ is a game-changer on several levels

It was never quite right to think of libraries as mere repositories of knowledge. Scholars have always used them as places to synthesize information, draw inferences, and create new works extending human understanding.

Yet, Harriette Hemmasi, Joukowsky Family University Librarian at Brown University in Providence, RI, suggests that the library's role in these activities can and should accelerate.

"There's great opportunity to interact in new ways with scholarly information and build on it in our new visualization laboratory," she explains. "While it once took years or even decades to analyze and get a sense of what was known about a particular topic, now we can find, access, contrast, compare and draw inferences from vast amounts of data quickly and collaboratively."

Breaking ground

The concept behind the Patrick Ma Digital Scholarship Lab seems simple. It's essentially a classroom dominated by a 7' x 16' video wall that's tied into a massive amount of computing power from a media network based on Crestron DigitalMedia™ technology.

In practice, however, the lab is much more. It's breaking down barriers for teaching and scholarship in four important ways.

As a conceptualization device. When used as a single very high-resolution display, the video wall allows scholars, teachers and students to visualize the meaning of very large sets of data. "All disciplines are becoming more data intensive and data aware," Hemmasi explains. Yet, human beings often have difficulty conceptualizing what they cannot see. "For example, one of our professors has been using data sets from our high-performance computing facility to create extremely detailed visualizations, illustrating concepts in planetary science that might not otherwise be possible to explain."

"Some of the visualizations we've tried here have been spectacularly successful," adds Patrick Rashleigh, Data Visualization Coordinator for the library. "Here's a simple example. Geographical information is very powerful in this lab because it allows you to see the larger landscape but then zoom in to grasp the finer details. You can't do that on a smaller display, because when you zoom in you lose the context and when you zoom out you lose the details."

As a comparison device. The video wall can also be divided, providing from two to twelve high-definition images for side-by-side comparisons. “We’ve compared satellite images of changing landscapes, so you can see bodies of water shrinking over time, and we’ve also compared pages from rare manuscripts,” Rashleigh says. “Even a single display, 1/12 of our video wall, provides an impressive 1080 by 1920 resolution.”

As a collaborative device. The lab includes 14 AV inputs to allow multiple students and scholars to simultaneously display material from their own laptops and other devices. “One of our goals at Brown is to engage students as partners in the learning process,” says Hemmasi. “The wall gives them a unique voice and visual authority to back up their ideas. This shifts the role of the professor from dispenser of knowledge to participant in the learning process.”

An additional set of tools –two computers running Windows® 8 with touch support and 50" touch-sensitive displays– add to the collaborative analytic process. With these systems, small groups of users can manipulate data and images with their hands, outputting to any section of the video wall or the wall as a whole. “It’s a remarkable device,” says Hemmasi. “It makes you think about the possibilities for collaborative learning and knowledge making.”

As a communications device. The lab is also helping the library blur the boundaries between the campus and distant locations. “We have a class on African issues booked for the spring semester,” Rashleigh says, “and we’ll be bringing in

speakers regularly from Africa through video conferences.” By connecting a high-definition video teleconferencing system directly to the video wall, the lab creates a multi-image platform to connect presenters, students, computer and video images (regardless of their location) in ways that standard distance learning setups cannot.

The Digital Scholarship Lab with all of its unique capabilities is helping provide an evolutionary step for the library itself. “The library is no longer an ‘observatory of knowledge’ but a ‘place of production for knowledge,’ Hemmasi declares. “This tool is not creating that trend but it’s helping us move in that direction much more quickly and effectively than previously possible.”

Building the lab

According to Hemmasi, the idea behind the Digital Scholarship Lab began when the Library commissioned a fine-quality digitization of the Garibaldi panorama, a fragile 4.5' by 270' historical document, painted on both sides, depicting the life and work of Italian patriot Giuseppe Garibaldi. “Andy van Dam, a distinguished computer science professor at Brown, along with several of his star students, built a prototype environment using Microsoft® Surface™ that enabled easy, multi-touch access to the massive scroll and related research documents. It was a great learning tool but with only a 30-inch screen, it was good for just three to four users.” The next step was to look at larger screens, and as they explored that possibility they began to realize what a visualization lab could achieve.



Photos courtesy of Brown University

The lab is based on three key technologies, implemented by systems integrator Ambient Sound, Inc. of Warwick, RI.

High-definition signal transport and switching. According to Joe Madritch, the project manager for Ambient Sound, it was crucial to be able to bring any source, whether digital or analog, into the video wall or any section of the wall at full resolution and at the highest possible quality. They would also need the ability to switch a large number of sources into a large number of display configurations without loss of quality.

“Brown had already standardized on Crestron DigitalMedia technology, and that was the ideal choice for this setup,” Madritch explains. Ambient Sound engineers Tom Barrett and Josh Hogan designed a system using a DigitalMedia switcher with 32 inputs and 32 outputs, carrying all video and audio signals on DigitalMedia 8G cable on a high-bandwidth IP network. The inputs include 14 Crestron wall plates, each able to accept HDMI®, VGA, USB and stereo audio connectors, the two touch-screen-equipped computers, a Tandberg® C60 video conferencing system, a Blu-ray™ player and twelve additional audio/video outputs from the room’s dedicated computer workstation. Video processing was also a concern, as Barrett and Hogan needed to display extremely high-resolution images from the lab’s dedicated workstation.

They decided to equip this workstation with two AMD® FirePro™ W600 graphic cards, each able to output six 1920 x 1080 images to individual displays or, in combination, a single 7680 x 3240 image across twelve displays. The video wall

consists of twelve 55" NEC® X551UN thin-bezel LED monitors hung on the wall of the lab using a custom-designed mounting system. Output from the video cards or various other sources comes to the appropriate monitor via the DigitalMedia switcher.

For the two Windows 8 systems, the Ambient Sound engineers recommended the use of Panasonic® 50" TH-50PF30U plasmas, each equipped with a Panasonic TY-TP50P30K Dual-Touch overlay, mounted horizontally on a Da-lite® MM5C-39FS rolling video conferencing cart. Users standing at the table-like displays manipulate data and images using the touch screens and their work is enlarged on the video wall.

System control. Hogan and Barrett decided to operate the routing of the various signals using Crestron control with a 15" touch screen providing the user interface. “I tried to make it as intuitive as possible,” Hogan reports. “You simply select an image of your display destination, whether one screen, two, four or all twelve, then touch what you want to send to that display.” Hogan also included, on separate menus, controls for the lights, the Blu-ray player and the video conferencing system.

“We wanted a place where students or faculty could just walk into the room and begin using the equipment, and that’s what we’ve got,” Hemmasi says. “The computing power is enormous but the entry barriers are very low.”

Rashleigh adds that the lab is open to anyone on campus to use for almost any purpose. “We’re trying to err on the side of permissiveness, and so far that’s worked out well.” The lab has been used for classes, research, meetings, even art exhibits. “We’re still experimenting, and I’m sure we will be for some time,” says Hemmasi. “But we love the room and are thrilled with what it will allow students and faculty to do.”

View a short video about the Patrick Ma Digital Scholarship Lab on the Brown Library website: <http://library.brown.edu/dsl/>

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