Experiences with High Resolution Display Walls in Academic Libraries

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Teaching & Visualization Lab
Opened 2013

10 projectors project a Windows server around 3 sides the room, 270 degrees

94’ X 7’
16,384 X 1,200 pixels

Laptops can connect via HDMI

Controls: Wireless keyboard, AMX touch panel
9 Tables
45 Chairs
All moveable

Display wall
7’x16’
12 HD monitors
7680x3240 pixels
24.88 million pixels

Video switcher
14 inputs

2 PCs on portable carts

Video conferencing
Visualization Studio (2012)
16’ X 6’ Display Wall
9600×3600 (34.5 million) pixels
15 Projectors
4 NVIDIA Quadro GPUs
1mm Bezels

Inputs:
• Analog & Digital Audio
• 10 Video (VGA/DVI)
• Keyboard & Mouse
• USB

55” 1080p Touchtable

7.1 Surround Sound

Room: 20’ X 20’
- Soundproof Room
- Access with ID Card (8am – 11pm)
- Booked via Email
- Low barrier to use
Primary Uses

- Analysis
- Presentations
- Events
- Teaching
% Weekdays in Use
How & Why Large, High Resolution Displays Used?

Understanding researchers’ use of a large, high-resolution display across disciplines
Fateme Rajabiyaodzi, Jagoda Walny, Carrie Mah, John Brosz, & Sheelagh Carpendale
ACM Interactive Tabletops and Surfaces, Nov. 2015
Study Overview

• Qualitative study
• Researchers
• Multiple disciplines
• Bring their own data
• Explore at their own pace
Participants

14 University researchers

More than half were professors

Procedure

1. Familiarized with how the LHRD works
2. Place their data on the screen
3. Explore at their own pace
Aided Discovery & Insight
“.... in here you get much of a better sense of scale of these buildings and what it means on the street. And even in terms of shadow once it was smaller, you see the shadow but you kind of get it [in here] and you are like are my lovely pedestrians in shadow most of the day? maybe that is not the best way to design it.”
Immersive Observations
Observation Strategies
Collaboration
Education
Spatially Immersive Observations
Focus that comes with the darkness & isolation within the room

Temporally Immersive Observations
Use of the room for a long stretches of time

Double Immersion (Internalizing Data)
You are there, right in the data
Find common source
Search for commonalities across distinct artifacts

Examine Traces
Read and understand the original traces

Compare Details
Lay out multiple items and view details

Assemble and Organize
Juxtapose, layout and interpret data
Share With Group
Share artifacts with others in a large space with high resolution

Verification Among Experts
Examining data with colleagues
Verification Among Experts

“What we really want to do with that is have multiple people on it. So to be able to have three people in here and literally to go through every single record and confirm within all three of us.”
**Understand Patterns & Unfamiliar Data**
Show the entire view of the data while explaining smaller parts

**Explain Work Processes**
See process details, learn consistently, learn simultaneously
Understand Unfamiliar Data

“I have been working with these sorts of images for 17 years, so for me I can do the zooming in and out on my computer. I’m used to it ... But for students it is really hard. So to be able to see the whole screen and show them patterns, that could be a really good teaching tool.”
Study Conclusions

Size may not matter, but size plus resolution does.

Aided discoveries and improved design processes.

Helped the process of observation.
Take-aways

• It is working
• Going forward:
  – Collaboration
  – Education
A display wall is not just a display wall

Context
Mapping For Everyone!
Size does matter – even independent of resolution.

Picture of Tyler's class
Introduction

The ubiquitous availability of web-based tools for gathering, exploring, manipulating, and visualizing spatial data has dramatically altered the landscape of analysis and visualization of geographic information systems (GIS) and geographic tools.

Despite the digitization of spatial data and the increasing availability of specialized software, basic skills in statistical analysis and cartography continue to be essential for anyone working with geographic data.

The importance of spatial data and the need for basic skills in spatial analysis and visualization remain as relevant as ever.
A display wall is not just a display wall

Modalities
Display mode

Single image
R E P A R T I C I Ó N

QUE HIZO EL MARQUESE DON FRÉ

Pizarro en Caxamarca, del tesoro q

S. D. H. B. A. B. D. 1531 AVS AL

cazique Atabalpa, señor que era de

las Reynas

Le ofreceré las partes, que se ha de hacer y sesionar

que el cazique, Atabalpa, señor que era de Caxamarca,

sólo se ha de juzgar que se lo ha de traer a

este, dando primero cuenta: cantidad de oro lavado,

cantidad de oro que ha de traer un siglo en que

millares: dice que ha de traer otro esporroé y se

tienen que dar que se lo entregan, y que se

las hayan entregado. Estos son los dones que

que se hacen con las armas, y que se traen de

Cauca, donde se hacen de las armas y que se usan.

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Display mode

Multiple similar artifacts
Display mode
Multiple distinct artifacts
A REVOLUTIONARY BREAK
BY REPUBLICAN BOLTERS

They Attempt to Organize a “Rump House” in the Pennsylvania Legislature

THE DEMOCRATS GLEEFLY HELP THEM

An Unprecedented and Unjustifiable Act Which is Part of a Game of Spectacular Politics to Influence the Senatorial Contest

From a Staff Correspondent.

HARRISBURG, March 11—By the same revolutionary tactics by which they sought to break up the joint convention at the outlet of the United States Senatorial seat, the democrats of Senate Seat No. 5 were able to bring about the election of a member of the Pennsylvania House of Representatives who in turn was able to carry with him a large majority of the Pennsylvania Senate to the seat of the Senate Seat No. 5. Under the leadership of William F. Wilson, of Philadelphia, though outside of whom is a member of the late house and the House of Representatives, the same member had the hold of the Senate Seat No. 5 which he has held since 1899. Taking a roll of the Senate Seat No. 5, Wilson will now make trouble.
Carex lupulina Muhl. ex Willd.
Ballow Sedge, hop-sedge

This perennial sedge to 30–40 cm tall, forming a loose tuft of flowering culms and leaves. The culms are light green, pilose, and densely branched. The leaf sheaths are somewhat inflated basally, the blades are lanceolate, and the ligules are membranous. The spikes are 2–3 cm long and 1 cm wide, they are accumbent, and the spikelets are yellow. The fruits are ellipsoid to obovate, 1.5–2 cm long, the caryopsis is black, and the hirsute dorsal beak is 1–1.5 cm long. The sedge is found in wet and damp places near water bodies, in ditches, and in wet meadows. It flowers in June and July. The sedge is an important wetland plant and is used in landscaping and ornamental gardening.
Quercus garryana Douglas ex Hook.

Oregon white oak, Brewer Oak, Garry oak, Oregon oak

Description:
Oregon white oak (Quercus garryana), a broad-leaved deciduous hardwood with a wide distribution across the Pacific Coast, is the largest deciduous oak species in North America. It is native to the Pacific Northwest and is found in a variety of habitats, including coastal dunes, floodplains, and riverine forests. The tree can reach heights of up to 40 meters and is often associated with black cottonwood and alder. It is an important species for biodiversity, providing food and habitat for many wildlife species. The leaves are large and lobed, turning bright red in the fall. The acorns are edible and are a significant food source for local wildlife.
Display mode
Multiple artifacts
Multiple sources
Plan for the Day

- 1:30-1:40: Setting Up and Intro to DSL.
- 1:40-1:45: Group Work
- 1:45-1:55: Break
- 2:00-2:30: Sections
- 2:30-3:30: Individual Conferences
Interaction
A final reality check

Easier

Traditional uses
Innovation in Teaching
Humanities

Harder

Innovative uses
Research
Sciences

Staffing is critical
Goal

Contribute to the university’s research infrastructure. Provide spaces and expert consultation to facilitate visualization of research across a variety of disciplines.
4 visualization walls in public spaces in Hunt Library
1 visualization room at D.H. Hill Library
3 visualization rooms at Hunt Library
Who has used our visualization rooms?
High tech space requests by engineering department

- Computer Science: 31
- Electrical & Computer: 13
- Mechanical & Aerospace: 9
- Academic Affairs: 7
- Mechanical: 6
- Civil, Construction, & Environmental: 4
- Materials Science & Engineering: 4
- Nuclear: 3
- Chemical & Biomolecular: 2
- Industrial & Systems: 1
High tech space requests by university status

- Faculty: 179
- Graduate Student: 122
- Other: 6
- Unknown: 4
- Staff: 2
Primary Uses

Analysis
Presentations
Events
Teaching
2 examples that highlight:

- Immersion
- Observation
- Collaboration
- Education
“Without the T&V facilities, I would not have been able to showcase my work as effectively as possible. I am grateful to be part of a university were such facilities help accomplish our research goals.”

Syed Hussain
Ph.D. candidate in Electrical and Computer Engineering
“This really shows the capability of the data. There’s so much that we normally can’t see.”

Douglas Shoemaker
graduate student with the Center for Geospatial Analytics
Everything does not always happen as expected
Visiting Scholar at NCSU Libraries, used the library’s dramatic visualization spaces to chronicle the rise and fall of Black Mountain College, founded in 1933 near Asheville, North Carolina.

The Farm at Black Mountain College: A Hunt Library Happening from NCSU Libraries on Vimeo.

How It Got Started

Hunt Library is filled from top to bottom with advanced display technology and innovative spaces. David Silver (Associate Professor, University of San Francisco) is a passionate scholar, public speaker and innovator.

Silver’s presence as a Visiting Scholar was the perfect opportunity to feature the library’s new technology.

STORY LEAD

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