Capturing Learning in the Library Commons: A Whiteboard Photo-Ethnographic Study

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Available at: https://works.bepress.com/richard_stoddart/49/
A Whiteboard Photoethnographic Study: Evidence of Learning in Student Centered Spaces

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Oregon Library Association Annual Conference
April 17, 2015
Do you have whiteboards in your library learning spaces?
Learning in the Library?
Learning in the Commons
Study

*verb*: to apply the mind to the acquisition of learning, whether by means of books, observation, or experiment [read: problem solving]
Library Archeology Activity - Student Artifacts

1. Make list of artifacts students leave behind in the library. (Both physical and electronic)

2. Compare and combine your list with your neighbor

Cave painting from the Lascaux cave
Cognitive Artifacts

“... informational devices such as maps, white boards, paper pads, etc., which are specifically designed to display and maintain information in an accessible way to several people at the same time.”

Garbis and Wern, 1999
Whiteboards are a Medium and Place

“...the physical location of (a) whiteboard, its users, and the social practice that develops around the use of that whiteboard work in concert to shape its role in an environment.”

Tang, Lanir, Greenberg, and Fels, 2009
## Transitioning Between Tasks

<table>
<thead>
<tr>
<th></th>
<th>Independent</th>
<th>Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synchronous</strong></td>
<td>Work(er)</td>
<td>Real-Time Interaction</td>
</tr>
<tr>
<td></td>
<td>● Problem solving</td>
<td>● Brainstorming</td>
</tr>
<tr>
<td></td>
<td>● External study notes</td>
<td>● Group work</td>
</tr>
<tr>
<td><strong>Asynchronous</strong></td>
<td>Personal Management</td>
<td>Ongoing Tasks</td>
</tr>
<tr>
<td></td>
<td>● Task list</td>
<td>● Project to-do list</td>
</tr>
<tr>
<td></td>
<td>● Due dates</td>
<td>● Answer keys</td>
</tr>
</tbody>
</table>

Tang, Lanir, Greenberg, and Fels, 2009
External Representations

1. **Sentential** (verbal) - expressions form a sequence corresponding on a one-to-one basis, to sentences in natural language descriptions…

2. **Diagrammatic** (pictorial) - expressions correspond, on a one-to-one basis, to components of a diagram…

Larkin and Simon, 1987
Visualization in Learning

- Process is important for sense-making (Wileman, 1993)
- Product helps with info retrieval
  - dual coding of information - sentential and pictorial increases likelihood of retrieval of knowledge (Paivio, 1986)
Initial Rubric

A. Study notes both pictorial and verbal
B. Study notes indicate distinctiveness from another concept or from something of personal importance by including highlighting
C. Study notes are organized to show interrelatedness
D. Study notes show relatedness to something the learner already knows

Cifuentes, 1991
Rubric Modification

A. The study notes are both pictorial and verbal.

___ 1. There is no attempt to make pictorial or verbal study notes.

___ 2. The study notes are either all pictorial or all verbal. This category includes highlighted text.

___ 3. The study notes are either emphasized verbal or emphasized pictorial.

___ 4. The study notes are primarily verbal with pictorial cues to meaning or pictorial with verbal cues to meaning.

___ 5. The study notes are pictorially and verbally balanced.

B. The study notes indicate distinctiveness from another concept or from something.

[Cifuentes, 1991]
Inter-rater Reliability

C. The study notes are organized to show interrelatedness.

1. There is no attempt to show interrelatedness in the text or in the study notes.
2. Interrelatedness is shown with highlighting, numbers, arrows, etc. within the text.
3. Interrelatedness is shown through the generation of an outline or other primarily verbal means.
4. Interrelatedness is shown by a structural diagram or a verbal/pictorial representation showing one relationship.
5. Interrelatedness is shown by a structural diagram or a verbal/pictorial representation showing more than one relationship. (e.g. Charts, tables, graphs, a series of arrows or numbers, borders and/or symbols.)

[Cifuentes, 1991]
You Try It

- Find a partner
- Review indicators for Skill A Inventory
- Review example sheet for Skill A
- Code 3 images for Skill A (e.g. A2 or A5)
- What other things would you want to code about each image?
More Whiteboard Codes

- **Subject** (STEM, Social Sciences, Arts & Humanities, or Misc)
- **Pictorial Types** (matrixes, tables, charts, diagrams, timelines, maps, icons)
- **Verbal Types** (outlines, problem solving, categorization, etc.)

Cifuentes, 1991
Visualization Skills

Balance of Pictorial and Verbal Visualization

Balance Score (avg)

- AH (2)
- SS (13)
- STEM (219)
Visualization Skills

Distinctiveness of Concepts

- AH (2)
- SS (13)
- STEM (219)
Visualization Skills

![Chart showing interrelatedness of concepts for AH (2), SS (13), and STEM (219).]

![Equation on a whiteboard: $E + S \rightleftharpoons ES \rightarrow E + P$.]
Pictorial Visualization

Visualizations Types by Discipline

<table>
<thead>
<tr>
<th>Board Type</th>
<th>Number of Pictorial Visualizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM</td>
<td>133</td>
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<tr>
<td>AH/SS</td>
<td>26</td>
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</table>

<table>
<thead>
<tr>
<th># Boards</th>
<th>Pic Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>133</td>
<td>Diagram</td>
</tr>
<tr>
<td>26</td>
<td>Chart</td>
</tr>
<tr>
<td>17</td>
<td>Table</td>
</tr>
<tr>
<td>12</td>
<td>Icon</td>
</tr>
<tr>
<td>3</td>
<td>Timeline</td>
</tr>
<tr>
<td>1</td>
<td>Map</td>
</tr>
</tbody>
</table>
Types of Verbal Visualizations

- outlines
- math problems
- annotations
- chem problems
- definitions
- scenarios
- categorization
- programming
- instructions
Verbal Visualization Types Used

Average Number per Whiteboard

- Arts/Humanities: 1.36
- Social Sciences: 1
- Science/Technology: 1

Legend:
- Blue: Arts/Humanities
- Red: Social Sciences
- Yellow: Science/Technology
Summary

- Whiteboard visualization is discipline-dependent
- Whiteboards support STEM learning at OSU per evidence of heavy use
- Low technology = High learning impact
Possible Study Outcomes

- **Graph whiteboards** to support STEM visualizations
- **Whiteboard checkout** to support asynchronous learning
- **Visualization / Visual Literacy workshops** to enhance study skills, cognition, and information retention
ACRL Visual Literacy Competencies

ACRL Visual Literacy Competency Standards for Higher Education

In an interdisciplinary, higher education environment, a visually literate individual is able to:

• **Determine the nature and extent of the visual materials needed**
• Find and access needed images and visual media effectively and efficiently
• Interpret and analyze the meanings of images and visual media
• Evaluate images and their sources
• **Use images and visual media effectively**
• **Design and create meaningful images and visual media**
• Understand many of the ethical, legal, social, and economic issues surrounding the creation and use of images and visual media, and access and use visual materials ethically
Proxy for Collaborative Learning?

<table>
<thead>
<tr>
<th>Marker Checkout</th>
<th>OSU</th>
<th>UI</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
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<td>384</td>
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<tr>
<td>2012</td>
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<td>1079</td>
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<tr>
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<td>8591</td>
<td>1998</td>
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<tr>
<td>2015</td>
<td>2862</td>
<td>385</td>
</tr>
</tbody>
</table>
Further Research

- How do students characterize the usefulness of visualizations?
- Why the library? Just about space/whiteboards?
- How can the library better help students learn?
Library Archaeology Activity: What tools do you have?

Make a list of the technology, tools, or methods that you can capture/uncover student activity in your library.
References


Image Credits

Taking Notes on a Door (flickr user, Valley Library (OSU)):
https://www.flickr.com/photos/osuvalleylibrary/2322614912/in/set-72157600785507433

Open for New Ideas: https://www.flickr.com/photos/sirwwoods/5019863323/

Cave painting, Anthropos (2): https://commons.wikimedia.org/wiki/File:Cave_painting,_Anthropos_%282%29.jpeg


Archeology Tool Kit: http://www.archtools.eu/
Questions?