The “Maker Mindset”: Incubating Fabrication Across Distinct Academic Contexts

ELI Annual Meeting 2017

Jordan Tynes
Manager of Scholarly Innovations
Wellesley College
The Knapp Center: A Timeline of Development

- Fall 2013
  - Started at LTS as Research & Instructional Technology
  - Knapp Center = Digital Media Center = Ghost Town
- Spring 2014
  - Introduced first 3D Printers
  - “Maker Toy Boxes”
- Fall 2014
  - First Knapp Interns = Broadening Support
- Spring 2015
  - Drone shows up on my desk = R&D process develops
- Summer 2015
  - First trip to support work in Greece
- Fall 2015
  - Proposal for a “Portable Maker Space”
- Spring 2016
  - Advisory Committee for Digital Fabrication
- Summer 2016
  - Portable Lab goes to Greece
- This Semester
  - Showcase and Panel for Making and Digital Fabrication
Complementary Development

**HCI Lab**
- Makerbot
- Oculus Rift
- Multitaction Displays

**Media Arts Lab**
- Makerbot
- Vinyl Cutter
- Large Format Printing
- CNC Router (Shop)

**WE Lab**
- Dimension 3D
- Trotec Laser Cutter
- Machine Shop

Differences in Access
Maker Toy Boxes

- Small events around campus
- Practical/Approachable Tasks
- Tech Education
Title Page from *Plutarch’s Lives*
Originally Printed in 1514 by Jodocus Badius Ascensius
Clapp Library, Special Collections

Print made in ARTH 299 taught by Ruth Rogers
Final broadside production in Book Arts Lab
Spring 2014
Data Collection

Data Processing
“[This project] took this theoretical information that we acquired and made it really concrete... It was so hands-on and I felt as if I was somehow in communication with the centuries of people who had been doing this before.”

-Gabriella Fee, Student from ARTH 299, Spring ‘15
Problem:
Spread too thin to support incoming interest.

Solution #1:
The Knapp Interns
Problem:
Spread too thin to support incoming interest.

Solution #2:
Scholarly Innovations Group
Research and Experimentation

OLD WORKFLOW

Scholarly Need
Proof of Concept
R&D

- Faculty Driven
- Learn as you go
- Reactionary
- Difficult to anticipate
- Hard to support
- Low risk/
  Low reward

NEW WORKFLOW

R&D

- Technology & concept driven
- Learn through research
- Flexible
- Methodical
- Developmental
- Can be expensive
- High risk/
  high reward

Proof of Concept

Scholarly Need
Research and Experimentation

OLD WORKFLOWS

Scholarly Need → Proof of Concept → R&D

NEW WORKFLOW

R&D → Proof of Concept → Scholarly Need

Drones vs 3D Scanning
R&D and Inter-Campus Collaboration
Course Support: Consultation is Crucial

- **What are the goals of the course?**
  - Learning outcomes
- **How does this project conceptually connect with those goals?**
- **How much time do you want to dedicate to this project?**
  - Faculty?
  - Students?
  - Staff?
  - Student employees?
- **How will the process be documented?**
- **How will the project be presented?**
  - Ruhlman
- **What sorts of collaborations will be established?**
  - The collaborators need to be consulted, too
- **Other budgetary considerations?**
HEAD OF A GODDESS, 1967.3

Exhibit by Emily Mullin ’16

This marble statue head is slightly larger than life-sized and may portray an unidentified goddess. Both the statue’s size and the fact that the facial features are idealized rather than realistic point to an identification with a deity rather than an individual. The figure’s hair has been pulled back and secured with a thin headband. Though the nose has survived remarkably well, the back of the head is not finished, indicating that the object was likely meant to be viewed from the front. The parted lips give the face a reserved (though not completely static) quality, which is characteristic of Classical sculpture. The drill marks on either corner of the mouth indicate that the lips may have been received at some point. The facial composition is somewhat asymmetrical, though this would not have been noticeable to the viewer if the head had been displayed higher than eye level or tilted slightly to one side. In fact, ancient sculptors would intentionally carve statues with slightly asymmetrical characteristics for this very purpose. When viewed at an oblique angle or from below, the statue would appear to have better proportions than if it had been carved to be completely symmetrical. At the time of its acquisition, the statue head was thought to be a Hellenistic interpretation of an sculpture that had originally been created in the preceding Classical period (5th c. BCE). However, some dailwork and facial features point to a Roman-period creation or recarving.

A 3D scan was taken of this statue head as well as several other objects on this site. The digital image allows the viewer to zoom in and rotate the object, and in doing so to see details that might not be as easy to view in the museum setting. For example, in the case of this object, the 3D scan allows viewers to see the shallow carving in the back of the head.
Course Support: Environmental Studies

Red camera (620-670 nm)  Near-infrared camera (841-876 nm)

NDVI
(Normalized Difference Vegetation Index)

\[
\text{NDVI} = \frac{\text{Near-infrared} - \text{Red}}{\text{Near-infrared} + \text{Red}}
\]
Course Support: Environmental Studies

Red	Near-infrared

NDVI

\[ \leq 0 \quad 1 \]\n
NDVI

\[ \leq 0 \quad 1 \]
Course Support: In Knapp
Research: Hololens
Research: Portable Laboratory for New Media and Digital Fabrication

- Supportive of Field Research
- Works in conjunction with on-campus labs
- Non-definitive use of technology
- Focus on data collection
- Rapid prototyping in the field
- Requires experienced personnel

Equipment List:
- DJI Inspire 1 (drone)
- DJI Phantom 3 Pro (drone)
- Artec Spider (3D scanner)
- Skanect (3D scanner)
- Bukito (3D Printer)
- Canon 70D (DSLR camera)
- Portable Photo Studio
- Ricoh Theta S (360 camera)
- Agisoft Photoscan (photogrammetry software)
- Pix4D (photogrammetry software)
- 2x Field Production Laptops (Mac/PC)
- RAID Storage
Research: Portable Laboratory for New Media and Digital Fabrication
Research: Portable Laboratory for New Media and Digital Fabrication
New Developments and Going Forward

- Advisory Committee on Library and Technology Policy (ACLTP)
- Making and Fabrication Subcommittee
- New Collaborations
- Complementary Purchasing
- Credit-Bearing Coursework

Frames of Mind

Curator’s Note

A Case for Writing Visually

In making Frames of Mind, our chief goal was “to write” an audio-visual essay that stands on its own. Frames of Mind therefore aspires to the ideal condition of needing no accompanying written text. Indeed, a video essay of the argumentative/expository kind such as ours should speak for itself, not unlike a written essay. Academic videography being in its infancy, however, it may be helpful to provide the user of Frames of Mind with some contextual information and reflections.

1. Our approach to creating Frames of Mind was greatly influenced by our respective roles in education. We were in search of an academic exercise that would invigorate two conventions of cinema studies. Our solution came in the form of a video essay. Frames of Mind is a seamless collaboration between film history, theory and video production. Here is a negotiation of two pervasive traditions, one invested in text and the other in the creation of images and sound. Both forms tell a story of research and intellectual exploration, but, in the case of our visual essay – one form is not distinguishable from the other. The two methods of cinematic investigation are completely interlinked as a single intellectual entity. This involved a good deal of taking apart and putting back together. Our process began as it usually does: with viewing. Research and conversation ensured, forming the basis of our written text: the script. This was the document that gave visual elements their scaffolding. Then, the process went back and forth between word and vision until these two components unified harmoniously.

2. In our search for an academic exercise, pedagogical concerns always took center stage. With Frames of Mind, we wished to encourage...
New Developments and Going Forward

- Advisory Committee on Library and Technology Policy (ACLTP)
- Making and Fabrication Subcommittee
- New Collaborations
- Complementary Purchasing
- Credit-Bearing Coursework

Frames of Mind

This is an excellent audiovisual essay (although I note all its references are to the visual – visual essay, optical unconscious, etc. – and never to the audio dimension of cinema, albeit, arguing both a specific analytical case in relation to Rosalind’s Rome Open City, and a general championing of ‘videoessay’ as a vibrant form of ‘liquid theory’).

The montages of the piece is crisp and suggestive, and the multi-screen technique is well used to display the evidence (a little in the style of the video-essay artist Kogonada). Although the accompanying statement asserts that the images are left to “speak for themselves”, this is not really

Curator’s Note

A Case for Writing Visually

In making Frames of Mind, our chief goal was “to write” an audio-visual essay that stands on its own. Frames of Mind therefore aspires to the ideal condition of needing no accompanying written text. Indeed, a video essay of the argumentative/expository kind such as ours should speak for itself, not unlike a written essay. Academic videography being in its infancy, however, it may be helpful to provide the user of Frames of Mind with some contextual information and reflections.

1. Our approach to creating Frames of Mind was greatly influenced by our respective roles in education. We were in search of an academic exercise that would invigorate two conventions of cinema studies. Our solution came in the form of a video essay. Frames of Mind is a seamless collaboration between film history/theory and video production. Here is a negotiation of two pervasive traditions, one invested in text and the other in the creation of images/sound. Both forms tell a story of research and intellectual exploration, but – in the case of our visual essay – one form is not distinguishable from the other. The methods of cinematic investigation are completely intertwined as a single intellectual entity. This involved a good deal of taking apart and putting back together. Our process began as it usually does: with viewing, research and conversation ensued, forming the basis of our written text: the script. This was the document that gave visual elements their scaffolding. Then, the process went back and forth between word and vision until these two components unfolded harmoniously.

2. In our search for an academic exercise, pedagogical concerns always took center stage. With Frames of Mind, we wished to encourage
New Developments and Going Forward

- Advisory Committee on Library and Technology Policy (ACLTP)
- Making and Fabrication Subcommittee
- New Collaborations
- Complementary Purchasing
- Credit-Bearing Coursework

MAS/CS 225

Making and Fabrication: Methods, Culture, and a Heuristic Approach to Technology

Makerspaces often provide a grassroots workshop for members of a community to share ideas, identify needs, build technological skills, generate concepts and physically bring them into existence. This course will study the “maker movement” as a culture and ask students to become participants in our very own makerspace community. Students will investigate and utilize maker tools and techniques, including vector-based design, programming in Processing, VR, analog and digital microcontrollers, MAX/MSP/Jitter, image/video compression, photogrammetry, 3D modeling/scanning and printing. Students will be required to work collaboratively and independently in our makerspace to develop several projects that physically communicate their own academic interests.
Questions?