DIY Microfilm Projector/Viewer

This project is to introduce undergraduate students to the following concepts:

• Making for solving problems
• How technology affects our lives
• How technology influences culture and society

*This course can easily be adapted for elementary or high school students, with the teacher leading more of the discussion. At the elementary school level the Projector/Viewer can be built with the help of parents, and the final paper can be replaced with a weekly journal – this can also teach the science behind light behavior, and magnification.
DIY Microfilm Projector/Viewer

Introduction

Digital Environments have become such an intrinsic part of many of our lives, that they not only impact, but shape our world and function as an extension of our selves. Existing in this symbiotic-cyborg state is not without its consequences. Particularly in the developed world technology often causes us to overlook simple approaches to problem solving, leads to feature fatigue, and exacerbates the digital divide. This also plays out on a global scale with advances in technology often creating barriers to the delivery of knowledge and services. In addition, the impact of digital information on shaping and preserving cultural history, has not been fully explored. This course explores how we can recognize and respond to the impact of digital environments on a personal and societal level, including, but not limited to, the concepts of DIY & hacking.
DIY Microfilm Projector/Viewer

**Core Concepts**

A. Humans and technology  
B. Access to knowledge and other types of access  
C. Information in Context  
D. Simplicity and Permanence/Obsolescence  
E. The concept of the hack
Course Objectives

1. Recognize how technology affects individuals.
2. Identify how technology can create barriers to access to knowledge, and other types of barriers.
3. Understand the role that context plays in the knowledge ecosystem and in representing cultural history.
4. Explore different ways that low technology or simple solutions can be successful in resolving critical problems.
5. Critically discuss the benefits and disadvantages of DIY/hacking in a consumer driven, digital and networked society, and in low technology societies.
DIY Microfilm Projector/Viewer

Reading List
Week 1
Introduction
Ernie Smith - *The Strange History of Microfilm, Which Will Be With Us for Centuries – From Carrier Pigeons to Comic Books*

How could digitization create a barrier to access to knowledge and how does microfilm avoid this?
CC – Humans & Technology; Access to knowledge.
CO - Recognize how technology affects individuals. Identify how technology can create barriers to access to knowledge, and other types of barriers.
Week 2
Is anything permanent?
1. NEDCC – “Reformatting: Microfilm & Microfiche”
3. The Hinman Collator (1945-1949)
   http://www.historyofinformation.com/expanded.php?id=2801

What affordances do new technologies create? Which is more permanent – microfilm or digitization? How might digitization affect the cultural record?

CC – Information in Context; Permanence v Obsolescence
CO - Understand the role that context plays in the knowledge ecosystem and in representing cultural history. Explore different ways that low technology or simple solutions can be successful in resolving critical problems.
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Week 3
Who, What, How, Where and When - what causes improvements to life?


5. Burnistoun Season 1, Episode 1 https://youtu.be/5FFRoYhTJQQ; Entranet Talk2Lift http://www.entranet.gr/products/talk2lift

Do technologically advanced products create more problems than solutions? Can we work outside the commercial ecosystem to solve critical problems?

CC – Access to knowledge; the concept of the hack

CO – Explore different ways that low technology or simple solutions can be successful in resolving critical problems. Critically discuss the benefits and disadvantages of DIY/hacking in a consumer driven, digital and networked society, and in low technology societies.
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**Week 4**

**How do we define success?**

6. News Articles for Kenya M-Pesa mobile banking


**Does failure matter?**

**CC – Humans & Technology; Information in Context; Simplicity**

**CO -** Recognize how technology affects individuals. Understand the role that context plays in the knowledge ecosystem. Explore different ways that low technology or simple solutions can be successful in resolving critical problems.
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Week 5

What can happen when we de-institutionalize solutions?

8. Liter of Light Phillipines mini-documentary https://youtu.be/o-Fpsw_yYPg
9. Wendy Koch, National Geographic “Can Houseplants Really Clean the World’s Smoggiest City?”

How do we raise solution fluency as global citizens?

CC – Humans & Technology; Information in Context; Simplicity

CO - Recognize how technology affects individuals. Understand the role that context plays in the knowledge ecosystem. Explore different ways that low technology or simple solutions can be successful in resolving critical problems.
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Week 6

Were we always cyborgs?


Do we want ‘The unlimited effect?’
[https://www.youtube.com/watch?v=2RaJYz6W9Tl](https://www.youtube.com/watch?v=2RaJYz6W9Tl)

CC – Humans & Technology; Information in Context.

CO - Recognize how technology affects individuals. Understand the role that context plays in the knowledge ecosystem.
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Week 7 – Break – Mid-Term Projects & Journals Due at end of week

Required Reading for Mid-Term Project


Week 8

**What should equality look like in a digital age?**


**How can technology exacerbate economic divides? How can we address this?**

CC – Humans & Technology; Access to knowledge and other types of access

CO - Recognize how technology affects individuals. Identify how technology can create barriers to access to knowledge, and other types of barriers.
DIY Microfilm Projector/Viewer

Week 9 – Open Lab for Build Project

Week 10 – Presentation of Build Project

Diagram for Build Project
DIY Microfilm Projector/Viewer

Materials List for Build Project

1. LIGHT
   • Kichler Showcase Landscape LED 12 V 7W $8.98 at Lowes Coralville
   • Hillman push button switch
   • 2 9V Duracell batteries $4.11 at Lowes Coralville
   • 2 battery caps with connectors $8.99 at Lowes Coralville
2. 2 Cardboard Boxes in different sizes $3.98 at Lowes Coralville
3. Xacto Knife $4.98 at Lowes Coralville
4. Duct tape $3.94 24 pack at Amazon
5. 2 wooden dowels/pencils $3.98 at Lowes Coralville
6. Paint (optional)
7. Fisher Price ViewMaster $15.76 at Amazon.com
**Coursework**

<table>
<thead>
<tr>
<th>Weekly Attendance</th>
<th>Each week will feature a case study preceded by a short discussion of selected readings and relevant course objectives, a short writing assignment and a short group assignment. Active participation is expected.</th>
<th>25%</th>
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<tbody>
<tr>
<td>4 – week journal – Weeks 2-5</td>
<td>Each student will write a minimum 250 word reflection identifying how they feel (physically, mentally, emotionally) about the technologies they have used throughout the preceding week, and on doing the readings and keeping the journal in either hard copy or electronic form. Include any relevant points from the case study for the upcoming class. <em>This exercise is to help you recognize how technology affects you.</em> CC-CO:A/1</td>
<td>25%</td>
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## DIY Microfilm Projector/Viewer

### Coursework

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>Weight</th>
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<tr>
<td><strong>Mid-Term Group Project</strong></td>
<td>Each group will submit a 1000 word reflection on the analog vs digital process of research and writing, how it affects them and how it would affect persons who do not have access to technology. References to the required reading are expected. The journals of each group member should be submitted with this paper. Submission should be in the format journals are kept.</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Build the Projector/Viewer Groups of 2-3</strong></td>
<td>Students should build the Projector/Viewer and make such modifications and improvements as they see fit – the point is to hack it. Students will present their Projector/Viewer with a 10-minute discussion at during week 10, split equally between discussing the build project and 1 of the course objectives. Explore why anyone would A) want to and b) need to, hack.</td>
<td>25%</td>
</tr>
</tbody>
</table>
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Introduction

Digital Environments have become such an intrinsic part of many of our lives, that they not only impact, but shape our world and function as an extension of our selves. Existing in this symbiotic-cyborg state is not without its consequences. Particularly in the developed world technology often causes us to overlook simple approaches to problem solving, leads to feature fatigue, and exacerbates the digital divide. This also plays out on a global scale with advances in technology often creating barriers to the delivery of knowledge and services. In addition, the impact of digital information on shaping and preserving cultural history, has not been fully explored. This course explores how we can recognize and respond to the impact of digital environments on a personal and societal level, including, but not limited to, the concepts of DIY & hacking.
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Course Objectives

1. Recognize how technology affects individuals.
2. Identify how technology can create barriers to access to knowledge, and other types of barriers.
3. Understand the role that context plays in the knowledge ecosystem and in representing cultural history.
4. Explore different ways that low technology or simple solutions can be successful in resolving critical problems.
5. Critically discuss the benefits and disadvantages of DIY/hacking in a consumer driven, digital and networked society, and in low technology societies.
As you go through this course, you want students to recognize that technology has an impact on them, how they function, how they function in society, and how society functions. These impacts can be beneficial, negative, or neutral. They should also be able to identify how technology creates new barriers across countries and economic classes, but in other ways it enables progress for those societies. Students should also see the ways in which technology helps us to do new things, but also just gives us different ways of doing things we have always done e.g. Google can be described as an extension of our brain, but when we make a jotting on a notepad to remember something, are we not also augmenting our memory? How is hanging out on social media the same, and different from hanging out at parks and playgrounds? A discussion question is provided for weeks 2-5 & week 8 to help draw out these issues.
At the beginning of the course you should split the class into 4 groups. The students in each group will carry out the journaling project in each of the 4 modes below over weeks 2-5. For week 6 each student will pick a mode of their choice and explain their choice in the journal.

**Mode 1** - read all course materials digitally, and keep digital journals
**Mode 2** - read all course materials digitally, and keep paper journals
**Mode 3** - print off all course materials for reading (except for video links), but keep digital journals
**Mode 4** - print off all course materials for reading (except for video links), and keep paper journals

These journals will be submitted along with the mid-term project. The instructions are set out above and are geared toward CC-CO:A/1. See Class Instructions for Week 6 for more on this aspect.
Core Concepts

A. Humans and technology
B. Access to knowledge and other types of access
C. Information in Context
D. Simplicity and Permanence/Obsolescence
E. The concept of the hack

• Weeks 1-2 are geared towards Core Concepts B-E.
• Week 3 is geared towards Course Objectives A-B.
• Week 4 is geared towards Course Objective C.
• Week 5 is geared towards Course Objectives A, D & E.
• Week 8 is geared towards Course Objectives B, D & E.
Week 1

Introduction


Ernie Smith - The Strange History of Microfilm, Which Will Be With Us for Centuries – From Carrier Pigeons to Comic Books

Class Structure – Week 1

Discuss what microfilm is used to do and how a microfilm projector works. Point out that even in the digital age, microfilm is considered a highly useful means of preservation. Tie in the concepts of simplicity and permanence v obsolescence.
Week 2

Is anything permanent?

NEDCC – “Reformatting: Microfilm & Microfiche”
https://www.nedcc.org/free-resources/preservation-leaflets/6.-reformatting/6.1-microfilm-and-microfiche

The Hinman Collator (1945-1949)
http://www.historyofinformation.com/expanded.php?id=2801

Week 3

Who, What, How, Where and When - what causes improvements to life?

Kinkajou Portable Library https://designtoimprovelife.dk/kinkajou-portable-library-and-projector/

Burnistoun Season 1, Episode 1 https://youtu.be/5FFRoYhTJQQ; Entranet Talk2Lift
http://www.entranet.gr/products/talk2lift
Week 4

**How do we define success?**


Week 5

**What can happen when we de-institutionalize solutions?**

Liter of Light Phillipines mini-documentary [https://youtu.be/o-Fpsw_yYPg](https://youtu.be/o-Fpsw_yYPg)

Wendy Koch, National Geographic “Can Houseplants Really Clean the World’s Smoggiest City?”
Week 6

Were we always cyborgs?


Week 7 – Break – Mid-Term Projects & Journals Due at end of week

Week 8

What should equality look like in a digital age?

Class Structure – Weeks 2-5, 8.
(a) 1/4 of class time should be used for you to lead an introductory discussion; (b) 5 minutes should be allotted for students to do a ‘fastwrite’ responding to each week’s topic; (c) 1/4 of class time should be used for students to share their views on the week’s topic in small groups or pairs – and craft a single response for the group; (d) ¼ of class time should be used for sharing and discussing group responses; (e) The remainder of the class time should be used for you to lead a wrap up the discussion.

Class Structure – Week 6
Spend the first 20-30 minutes of the class leading an open discussion of the analog vs. digital process of research and writing, with relevant points from this week’s feature fatigue articles. For the remainder of the class divide students into 4 groups to exchange their experiences in reading course materials and keeping journals in print vs. digital formats.
DIY Microfilm Projector

For Teachers - Instructions

These instructions are provided in the teacher section so that you can be a resource for students. Instructions are purposely not provided for students, as the goal is for them to “hack-it”. A diagram and materials list is provided for the students. You should emphasize that students should feel free to approach you with questions.

Disassemble FisherPrice ViewMaster and retain face, and small plastic sheet.

1. Trace and cut a hole in the front panel of the larger box (BOX 1) for the ViewMaster face and insert the ViewMaster face.
2. Open the top back, and top left of Box 1.
3. Build circuit – see https://youtu.be/qRO7sCjA2ac
4. Cut a hole in the front of the smaller box (BOX 2) for the LED bulb and insert the bulb. The battery pack and wires stay inside Box 2. The hole must be aligned with the right lens of the ViewMaster face.
5. Cut a slit the height of the microfilm reel to the right of the LED bulb, almost 27 in the corner of Box 2.
6. Cut a slit the height of the microfilm reel to the right of the LED bulb, almost in the corner of Box 2.
7. Leave switch hanging out of the top of Box 2.
8. Cut a slit in the right side of Box 2 for the microfilm reel.
9. Cut a cardboard panel (I used one of the leaves of Box 2) slightly smaller than the front panel of Box 1.
10. Cut a square in the cardboard panel, the width of the microfilm panel and slightly smaller than the height of the small plastic sheet from the ViewMaster.
11. Use duct tape to adhere the small plastic sheet to the cardboard panel, covering the square cutout.
12. Attach the cardboard panel to the right leaf of Box 1.
13. Cut slits in the leaves of Box 1, bracketing the cardboard panel, the length of the microfilm reel.
14. Insert the microfilm reel into Box 2, then pass the film through the slits in the leaves of Box 1, and into the slit at the right corner of Box 2.
15. Using the pencil, punch a hole through Boxes 1 and 2.
16. Attach the loose end of the microfilm to the pencil, using duct tape, and wind until taut. Close boxes, and secure with duct tape – the switch should be hanging out of the right corner of Box 1.
DIY Microfilm Projector/Viewer

For Teachers

Preparatory Readings to Guide Class Discussions

DIGITAL LITERACY

Trifonas, Learning the Virtual Life: Public Pedagogy in a Digital World


VIRTUAL VALUES

Mary Flanagan and Helen Nissenbaum, Values at Play in Digital Games (Cambridge, MA: MIT Press, 2014).

Hilde G. Corneliussen "World of Warcraft as a Playground for Feminism ".
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For Teachers

Preparatory Readings to Guide Class Discussions

DIGITAL ENVIRONMENTS, THE INDIVIDUAL, AND SOCIETY

Sherry Turkle, * Alone Together: Why We Expect More from Technology and Less from Each Other*

Rainie & Wellman "Networked. The New Social Operating System".

Bennet & Segerberg "The logic of connective action : digital media and the personalization of contentious politics"

Ratto and Boler, eds., *DIY Citizenship: Critical Making and Social Media*