Beyond the paper: incorporating 3D printing into your curriculum

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What we’re going to cover

- **Activity** - “Which class was it in?”
- **Presentation** - Intro to 3D printing
- **Demo** - Intro to basic 3D modeling
- **Discussion** - Sample assignment
- **Brainstorm** - How could I use this?
- **Debrief** - Questions & ideas
Activity - “What class was it in?”

- What classes or disciplines could this model be used in?
- What topics might be covered in class that day?
- Could the model positively impact student learning? How?
- Could the model negatively impact student learning? How?
Presentation - Intro to 3D printing

- Where designs come from
- Types of 3D printing/manufacturing
- How our printers work
- Does this support student learning?
Additive vs Subtractive

image from North Carolina State’s Laboratory for Integrated Manufacturing Science & Technology (L-IMST)

http://www.mse.ncsu.edu/imst/images/subtractive-vs-additive.jpg
Fused Deposition Modeling (FDM)

image from imgarcade.com http://bit.ly/1a6vk8Z
Demo - TinkerCAD.com
...The cost of failure has gone down. What I mean by that is - to start a website costs almost nothing. To start something that would have been like a website before the Internet would have cost hundreds of millions of dollars.
What will students learn?

Gamers spend 80% of the time failing.
They’ll Also Increase Their Digital Fluency!

An **evolving aptitude** that empowers the individual to effectively and ethically

- Interpret information
- Design content
- Communicate ideas in a digitally connected world.

- Discover meaning
- Construct knowledge

We believe this aptitude thrives when **inquiry, play, and exploration are valued** and encouraged as meaningful learning experiences.

http://ctl.boisestate.edu/idea/home/definition-digital-fluency/
Uses in teaching

- Biology
- Education
- Engineering
- Art
- History
- Business
- Special Collections
- Idaho Entrepreneurial Challenge
- Theater
- English
Discussion - Sample Assignment

• Students use design thinking tools to identify a consumer point of pain.

• Create a prototype and test it on a sample of 25 people.

• The feedback is used to refine the prototype and repeat the process.
Student Experience

• Enthusiasm and engagement-self-directed projects
• Problem solving
• Enjoyed project based learning
• Strong team cohesion
• Exercised imagination, creativity, and independent thinking
• Pride in creating an original design
Learning Outcomes

• Independent problem solving
• Persistence in the face of setbacks
• Understanding the non-linear nature of innovation
• Creating something other than an app
• Integrate multiple perspectives to define complex problems
Personal Experience/ Insight

• I hear and I forget. I see and I remember. I do and I understand.
• Move from compartmentalized lecture-based instruction toward project-based learning.
• Design projects that allow students to build something they value.
• 3D bridges shop and art classes we took in HS and computer labs students took.
Brainstorm - How could YOU use this?
Debrief - Ideas/ Q&A

● What ideas will you walk away with?
● What do you know now?
● What are you excited about?
● What are you confused about?
THANK YOU!

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