

Flipped Classroom with distance technology

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Context

Course: Introduction to Algorithms

Serves: Graduate students

Challenges

- A diverse student group from CS, CCIB, and MBS programs on two campuses (Camden + NB)
- Technical content involving lots of math, logical reasoning, and analysis of abstract problems

The Plan

Flipped classroom; Synchronous interaction with feedback

Course Content and Learning Goals

- Develop a formal understanding of **resource complexity**
- Create, experiment with, and analyze common ways of storing data for efficient access (**data structures**)
- Design **algorithms** for typical problems in computational science
- Analyze the algorithms for **correctness** and **efficiency**

Why Flipping Makes Sense

- Diverse population from the Business school; CCIB PhD program; and CS Masters program.
- Students learn by actually solving problems, and not watching others solve them!
- Students learn in teams.
- Continuous assessment during class time.

Flipped Classroom

Material

- Videos from an MIT course
- An e-textbook with built-in tools for animating programming demonstrations
- Supplementary PDFs on specific topics

Interactions

- Formative assessments (Socratic)
- Identifying and clarifying muddiest points
- Sakai quizzes
- Interactive workbooks for “literate” programming

Distance Learning Technology

Digital Classroom

- Used to display explanations, code and web-based apps
- IPad/Classview or PC display

Lifesize System

- Used to connect Armitage 124 (Camden) with Tillett 118 (Livingstone)

Some Details ...

Digital Classroom

- Instructor PC
- iPad Air connected through Apple TV
- Can switch between PC and iPad

Lifesize 220i System

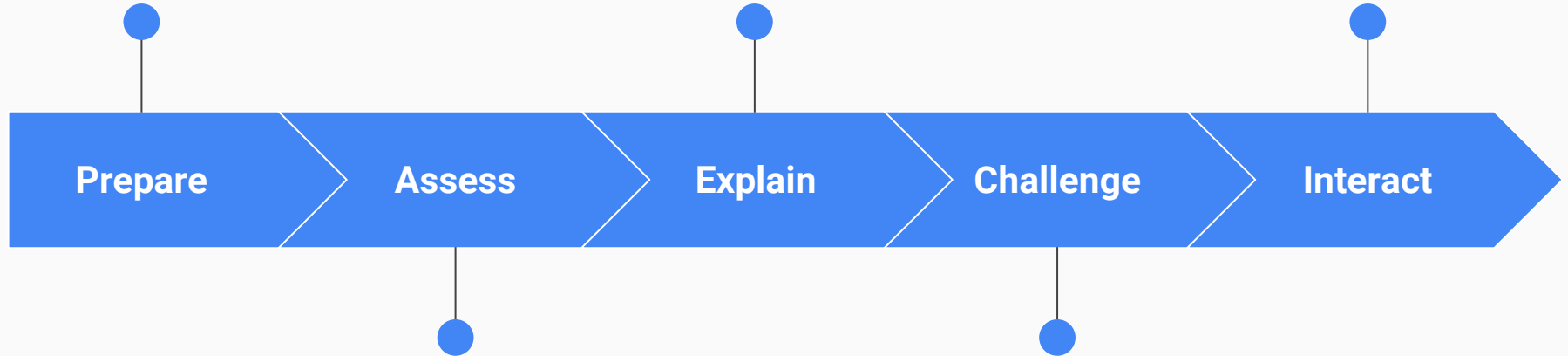
- Several HD cameras, microphones and rear/front displays
- Can switch between projection view and PC display capture
- Similar systems in Tillett and ATG

How It Works

Topics and video links
published on Sakai:
homework!

IPad tools like Explain
Everything to create
publishable boards

Sakai forums; regular
chat sessions; office
hours



Sakai quiz; Socrative
quiz; Warmup
Problem; Muddiest
point

Teamwork to solve
problems (theory and
programming)

Lessons Learned

Classroom Technical Glitches

Lifesize system issues: connectivity; controls; camera placement

Interactivity

Lack of visual cues for initiating dialogue

Limitations of Course content/technology

One solution would have an integrated (projectable), sharable, writable whiteboard!

Future Directions

1. Improve interactivity through better apps
2. More use of content-specific tools: e.g. algorithm animation
3. Distance learning technology versus fully online: an ongoing (internal) debate!