Interactive Engagement: video examples from UBC classes

Students working in groups
Video Clips of UBC Classes

A selection: 3 examples of different successful implementations of group work in class

**Biology 112: Unicellular Life**
George Spiegelman, STLF Jared Taylor
Very large 1st year course, 300 students per section

**Earth & Ocean Sci. 340: Global Climate Change**
Sara Harris and Phil Austin
Medium-size (70 students) course for non-majors

**Physics 408: Optics**
David Jones, STLF Louis Deslauriers
Smaller (35 students) upper division course

note: there are many other good examples (e.g. PHYS 304, EOSC 355, ....)
Biology 112: Unicellular Life

George Spiegelman, STLF Jared Taylor

- Very large 1st year course, 300 students per section
- No Tutorials or labs
- Pre-reading assignments & quizzes
- Many classes have clicker questions, peer discussion, short group activities, short writing assignments
- Some classes are entirely based on group activities (invention or structured problem solving activities)
- Invention activities resulted in dramatically improved innovative problem solving
BIOL 112 video

Invention activity video clips

- 50 min activities including setup and wrap-up
- Invent a machine (analogy with process in cell)
- Students work in groups of 3
- 2-3 instructors present + TA
- Video clips showing various stages
EOSC 340: Global Climate Change

Sara Harris and Phil Austin (no STLF help)

- Medium-size (~ 70 students)
- Brand new course for general science majors
- Pre-class reading and quizzes, clickers, a few non-clicker small-group activities
- 2 instructors team teaching
Short activity – Calculate how much more carbon can we emit and keep temperatures from rising more than 2° above pre-industrial level

– Students work in group of 4 - roles assigned
– 2 instructors present
– Wrap-up (not shown) get example solutions from volunteers
Physics 408: Optics

David Jones, STLF Louis Deslauriers

• Smaller (35 students) upper division course
• Mostly 4<sup>th</sup>-5<sup>th</sup> year Engineering-Physics Majors
  These students have been quite successful in the usual lecture-based courses and were not comfortable initially with doing things differently
• Pre-reading assignments & quizzes
• In-class group activities & clicker questions with peer discussion, No lectures
• Significant increase in learning demonstrated vs. previous terms (same instructor)
Activity on using Jones calculus to calculate transmission of light through a series of polarizers

– ~10 min activity
– Video clips showing various stages
– Note: students had *not* been lectured on this (they did pre-reading and quiz)
Summary

Attendance high & students very engaged

∼50-60% attendance pure lecture ⇒ ∼80–90% with activities
∼50% engagement (typical lecture) ⇒ 85–100% w/activities

Evidence for significantly more learning than lecture-based classes (**see posters**):

Physics data: improve by ∼15% vs. previous term(s)
Biology data: improved innovative problem solving

Effective Strategies for Group Work:

– Design activities to align with learning goals
– Have students do pre-reading where appropriate
– Monitor progress, give feedback during activity
– Re-synchronize when necessary
– Have students explain to whole class, if possible
– Have students turn something in and/or show solutions
Poster session 11am-1:30pm room 101
Details on everything being done and learned

Refreshments in Lobby, ★Food★ at noon

Afternoon Workshop & Discussion
1:30 – 3:00pm, room 101 – How to Most Effectively Measure the Learning that Matters (workshop led by Carl Wieman)

3:15 – 4:30pm, room 101 – Incorporating Writing in the Science Curriculum; what and how? (discussion)