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

EOSC 340 video

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 4th-5th 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)

PHYS 408 video

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

Carl Wieman Science Education Initiative
at the University of British Columbia

2009-10 End of Year Event

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)