Developing interactive lectures

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What is an interactive lecture?

- Class meeting in which the instructor takes at least one break from lecturing to conduct an activity in which students work directly with course material

(SERC Starting Point, Intro Geo)
What are the benefits?

- Interactive lecture methods:
  - are preferred by students
  - improve student retention
  - promote deeper understanding of course material
    (McConnell et al., 2003)

- Provides instructor with real-time feedback about student understanding of course material

- Interactive lecture techniques cater to a wider variety of learning styles than traditional lecturing
What are (some) challenges?

- **Time**
  - Need to sacrifice course content to make time for in-class activities.
  - Designing an activity takes time.
  - Some students will finish activities earlier than others.

- **Student population**
  - Students likely used to traditional lecture courses and may be uncomfortable with an interactive format.

- **Implementation**
  - Ease of implementation is influenced by class size, classroom setup, availability of technology, etc.
  - Anxiety: what if the activity completely bombs?
Some interactive lecture strategies

- Think-pair-share
- ConcepTest
- Demonstration
- Working with data
- Jigsaw activity
- Gallery walk
Think-pair-share

- **Think**: Students think *individually* about a response to a question.

- **Pair**: Students discuss their responses with a partner or in small groups.

- **Share**: Instructor asks selected groups for responses.

http://serc.carleton.edu/introgeo/interactive/tpshare.html
ConcepTests

- Quick, conceptual multiple-choice questions embedded in the lecture
- Administered during class to assess student understanding in real time
- Allows anonymous answers to questions
- Can be implemented with or without technology
  - Classroom Personal Response Systems ("clickers")
    - Tallies and displays student responses
  - index cards
Examine the image of rock layers below. Which letter represents the layer that was formed first?

a. A  
b. B  
c. C  
d. D

Image courtesy of USGS
Demonstrations

- Significantly shorter than lab exercises

- Depending on time constraints, may do a predictive demonstration
  - Predict: What do you expect?
  - Run demonstration
  - Reflect: Were your results what you predicted?

- Example of a quick demonstration: water column properties

http://serc.carleton.edu/introgeo/demonstrations/index.html
Working with data

- **Using data in a way that:**
  - Utilizes geoscience habits of mind
  - Allows students to explore uncertainty in data
  - Builds students’ quantitative and critical reasoning

- **Essential elements:**
  - Careful planning
  - Adequate time to implement the exercise, including wrap-up

- **Example of a quick exercise dealing with data:**
  Greenland reflectivity anomalies

http://serc.carleton.edu/usingdata/index.html
Greenland Reflectivity Anomaly


unitless

-0.09
-0.07
-0.06
-0.04
-0.03
-0.01
0.00
0.01
0.03
0.04
0.06
0.07
0.09

Byrd Polar Research Center
Jigsaw activity

- Small-group work in which students teach each other.
- Each team prepares a different topic.

Mixed groups convene, teach each other, and solve a problem that requires input from each member.

http://serc.carleton.edu/NAGTWorkshops/coursedesign/tutorial/jigsaw.html
Gallery walks

- Effective for team building, organizing ideas, synthesis, and physical movement during class
- Questions posted on large pieces of paper around the classroom.
- In small groups, students visit each station, review other groups’ responses, and add to the existing responses.
- When the group returns to its original station, they synthesize the responses and report to the class.

- Example: *Geomagical Mystery Tour of Pitt Campus* (Yes—gallery walks can be done outdoors and even in an urban environment!)

http://serc.carleton.edu/introgeo/gallerywalk/index.html
Your turn

- Take _______ minutes on your own and think of one interactive lecture activity for a course that you teach, have taught, or would like to teach.
- Include a general outline, class time required, how you will assess its effectiveness, and challenges of implementing the activity.
- Reminder--we discussed the following techniques:
  - think-pair-share
  - conceptests
  - demonstrations
  - working with data
  - jigsaw activity
  - gallery walk
Share your idea with someone you don’t already know

- Each person describes his/her activity.
- Each person offers feedback about his/her partner’s activity.