Mechanisms for Incorporating Active Learning into Large, Content-Heavy Classrooms

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Questions

- Feel free to ask questions.
- You may ask questions.
- Please ask questions.
- Questions are encouraged.
- The only bad question is one that is not asked.

- Form a group of 4, four, IV, 4
- Get out 2 full, blank sheets of paper per group
- Introduce yourselves
- Write your names on BOTH sheets of paper.

Draw a cell

- Include as many different organelles and structures as you can remember. HEARTS ARE THE ARTIST.
- Label each organelle or structure with its name.
- Make a separate list of organelle names (one per line). DIAMONDS KEEP LIST.
- Spades and Clubs contribute ideas & check work.

Change Roles

- SPADES ARE ARTISTS.
- CLUBS MAKE LIST.
- Add new organelles or make corrections.
- In **6 words or less** write the **function** (not definition) of each organelle on the list.
- If you finish your drawing and functions, check with another group to see what they have

In Class Problems (ICPs) Debriefing - Mechanics

- In Class Problem on 1st Day sets tone
  - In class work – not just lecture
- Card trick changes student roles
  - Lessens non-participation

- Form a group of 4, four, IV, 4

Avoids groups of 2, 3, 5

- Get out 2 full, blank sheets of paper per group
- Introduce yourselves

Acclimate to group work & students

- Write your names on BOTH sheets of paper.

Explicit instructions save time

Pedagogy Behind the Problem

- Draw & label a cell
- Describe function of structures

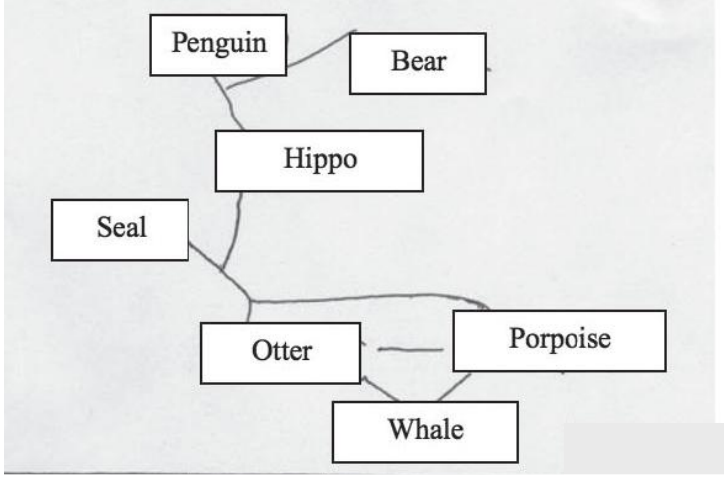
Draw & label a cell

- Should be able to do some = comfort
- Activation of prior knowledge
  - Primes learning & great topic intro
- Diagrams & cartoons utilize visual registers & activate visual memory

Describe function of structures

- More difficult – the important part
- Links the concepts to imagery
  - Helps to construct memory
- Working in teams helps students get through difficult or large problems
  - Also reduces grading load

Another example: Constructing Phylogenetic Trees



Habitat & diet data

- Lecture
- Instructor examples
- Student teams address new problem
- “Collect & project”
- Additional lecture
- Iteration improves performance

- Student examples from Cooper et al., 2006.

In Class Problems

- Exam-like question
- Students have 5-15 minutes to answer
  - Students can work individually or in groups
  - Instructor walks around classroom answering questions
- Collected for grading, discussion, scoring
- Correct answer is immediately provided and discussed in class
- On average, 1.2 per week

In-class problems: Goals

- Reinforce lecture material
- Help instructor and students determine whether or not a topic is understood
- Allow students to teach and learn from peers
- Give practice answering exam-like questions

**Added benefit: Encourages attendance and provides a means for assessing attendance

Learning Advantages

- Help to dispel misconceptions
- Instructor can model problem solving
- Working with images and words improves retention

Grading & Your Effort

- A few points go a long way
- 1 point per problem
- “Lightly” graded
  - Effort/on task
  - Grade occasionally
- If not graded carefully, answers posted on D2L

Create an ICP where students

1. Produce a visual answer
2. And one or more of the following

- Draw on prior knowledge
- Apply a recently discussed concept
- Synthesize information &/or concepts
- Might produce misconceptions

More Ideas for Writing ICPs

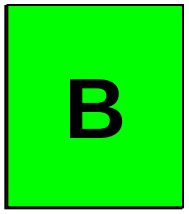
- Have students construct a “real-life” analogy
- Provide a little data & students hypothesize **creative** explanations
- Provide actual data & pose specific questions

Other ICP Types

- Minute problems
  - Phrase or sentence answer – quick check
- Muddiest or most important point
  - A sentence at end of day or topic
- Concept maps
- Students create test questions
- Explain to grandma or roommate

Multiple choice polling

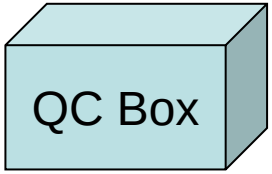
- Show of hands
- Color coded cards
- Clickers
  - Quantitative feedback
  - Credit & grading possibility



- Best when combined with discussion & revote

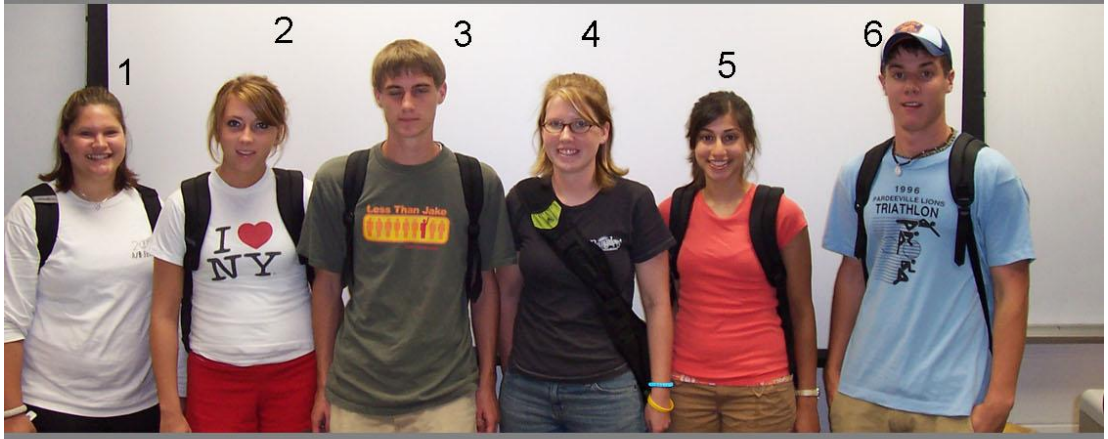
Create an Interactive Environment

- Students act out processes
- Questions & Comments = Quality Control Box.



- Get to know students

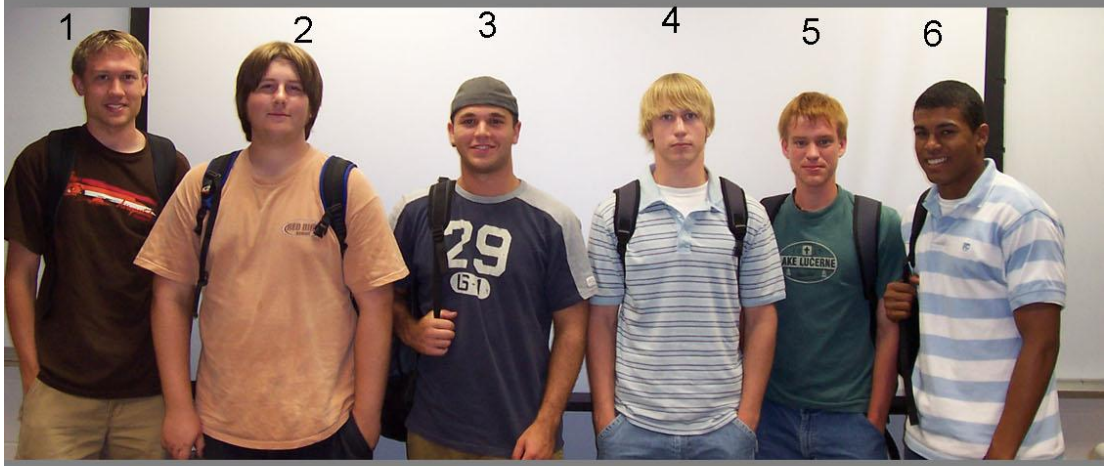
Learning 100+ student names can be fun.



1._____ 4._____

2._____ 5._____

3._____ 6._____



1._____ 4._____

2._____ 5._____

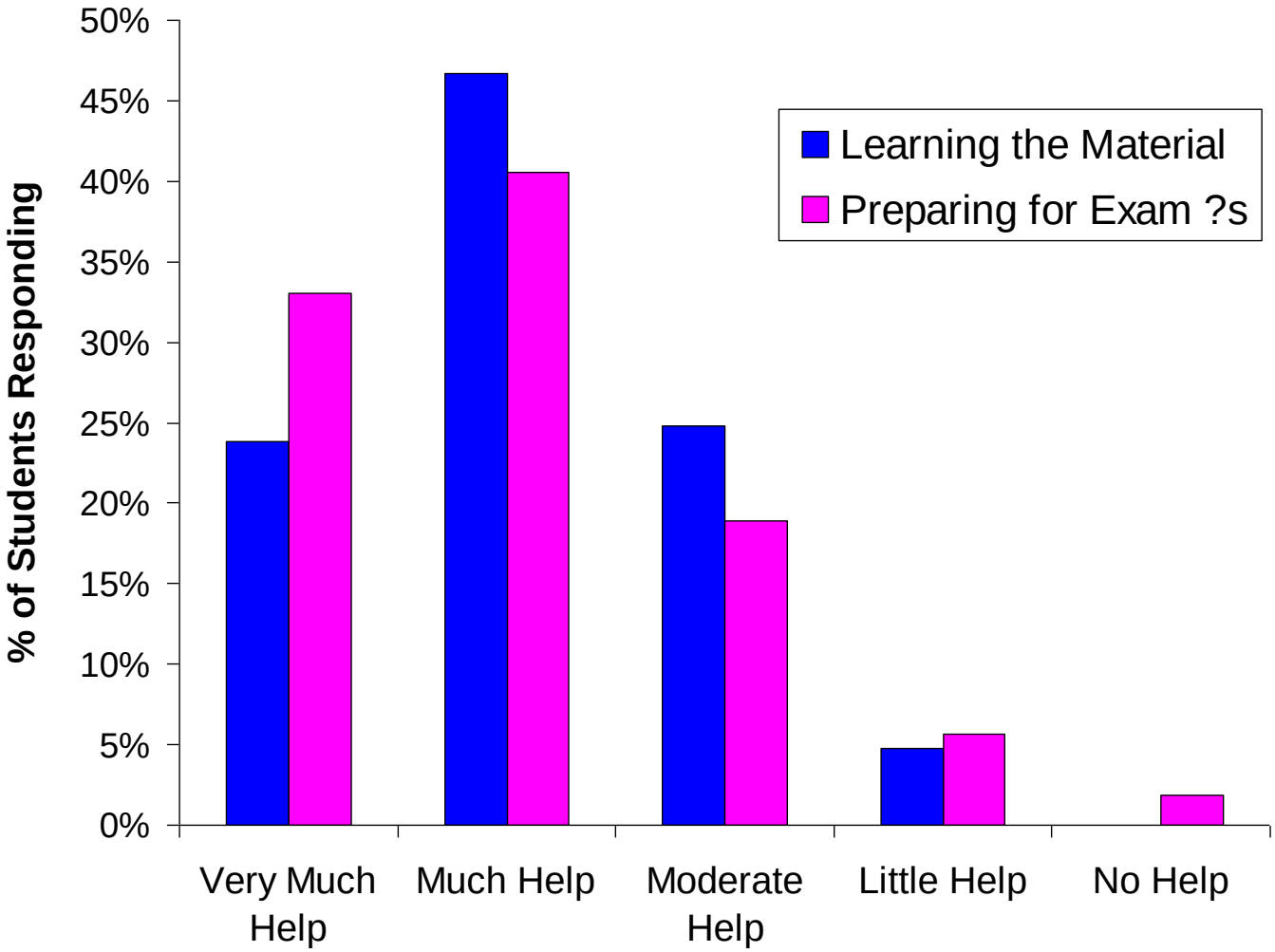
3._____ 6._____

A Few References

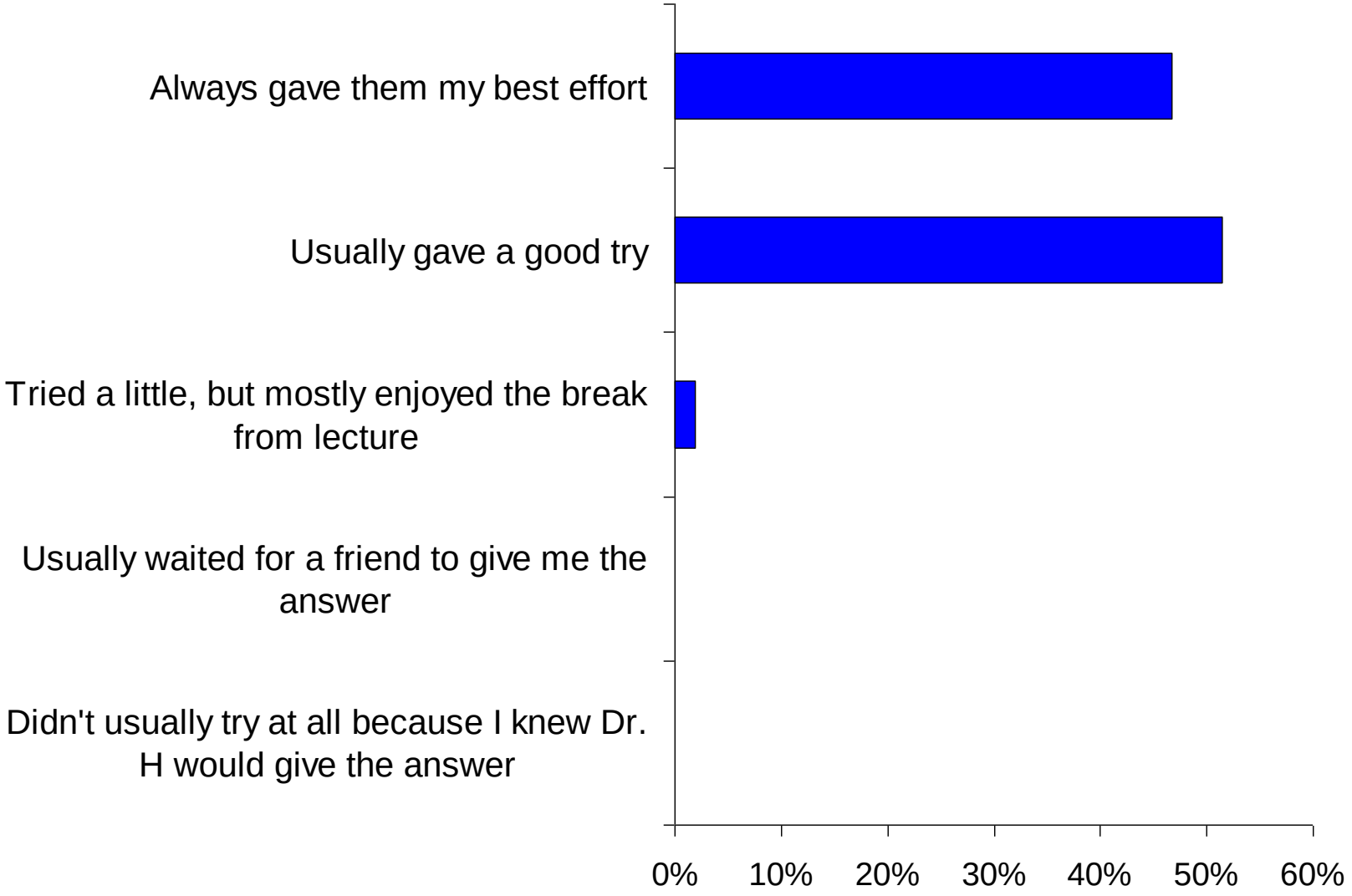
- Cooper, S., D. Hanmer, B. Cerbin. 2006. Problem-Solving Modules in Large Introductory Biology Lectures. *Amer. Biol. Teacher* 68:578-583.
- Thomas A. Angelo, K. Patricia Cross. 1993. *Classroom assessment techniques: a handbook for college teachers*. Jossey-Bass Publishers. San Francisco.
- http://www.ntlf.com/html/lib/bib/assess.htm
- Case Studies: http://library.buffalo.edu/libraries/projects/cases/case.html

How much did the ICPs help you in…

n = 105



How did you approach the ICPs?



Student Complaints vs. Buy-in

- Discuss advantages in syllabus & 1st day
- Stress importance for student learning & grades
- Accentuate the positive
- Use them as teaching moments
- Don’t do it just to do it.

Case Studies

- Blend out of class work with in class work
- In class component is important
- Opportunity for higher order thinking plus