Active Learning

What does “active learning” mean?

• Take a few minutes to write down a response

• Share your understanding of active learning with a neighbor
• Think-pair-share

• Think-ink-pair-share (TIPS)
1. Students are responsible for their own learning
2. Instructors serve as guides, facilitators, coaches

Telling isn’t teaching and listening isn’t learning
• **Pro-Con Grid**
  What benefits and drawbacks do you see in using active learning?
Pros

- Behaviorally active
- Cognitively involved
- Less distracted, more participation
- Interact with others
- Engage with materials
- Increase motivation
- Accept responsibility for own and others’ learning
- Generate knowledge for self and fellow students
- Multiplies classroom time: Students teaching self and others
- Longer term retention
The impact of active learning on student learning is illustrated in this graph that illustrates class averages on pre- and post-tests of fundamental conceptual knowledge in first-semester introductory physics. Learning gains in active-learning classes are typically two to three times higher in comparison to lecture courses. The data set includes more than 6500 students in 62 classes. (From R. Hake, 1998, Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses, Am. J. Phys. 66: 64-74)
Cons

- Takes more time in class
- More preparation by facilitator
- Equal student involvement?
- Subject dependent
- Classroom space important
- Can be harder to assess individual students

So...

- Must ensure students understand its purposes and benefits
- Learning objectives must be clear to you (and them!)
- May take some time for students to adapt
TEAMWORK

ENSURING THAT YOUR HARD WORK CAN ALWAYS BE RUINED BY SOMEONE ELSE’S INCOMPETENCE.
Fishbowl
The flipped classroom inverts traditional teaching methods, delivering instruction online outside of class and moving “homework” into the classroom.

**THE INVERSION**

The Traditional Classroom
Teacher’s Role: Sage on the Stage

LECTURE TODAY
Homework
Reading and questions for tomorrow

The Flipped Classroom
Teacher’s Role: Guide on the Side

ACTIVITY TODAY
WATCH lecture online tonight

**WHAT A FLIPPED CLASSROOM MODEL DOES**
Chapter 10 Mendel: The Man, the Myth, the Legacy

Why Mendel Succeeded

- People noticed that kids look like their parents many, many generations years ago.
- Took till the __________________ for anyone to make sense of inheritance!

Gregor Mendel:

__________________ Monk

Studied heredity: __________________________

  o Traits: __________________________
  o Genetics: __________________________

__________________

the branch of biology that studies heredity

Steps to Success:

1. Choose subjects (____________________) carefully
   Mendel took a pea in the garden. Why were the peas such a good subject?
   a. Reproduce ____________________ - produce male and female
      i. Male pollen, female egg
      ii. Fertilization: ____________________
      iii. Zygote: ____________________
      iv. Pollination: ____________________
   b. Self- pollination: when male and female gametes from same plant
      unite
      i. Both male and female gametes found on same plant
      ii. When want “cross-fertilization”- ____________________
Consider the classroom space
Tech Support for a New Technology
How much do you know about clickers?

1. Nothing
2. A little bit
3. Quite a lot
4. Everything
Where was Gary born and bred?

1. Australia
2. Minnesota
3. South Africa
4. New Zealand
Fact Checking:
How many planets are in our solar system?

1. 6
2. 7
3. 8
4. 9
5. 10
Fact Checking:
Which of the following animals are monkeys?

1.  
2.  
3.  
4.  
5. All of the above  
6. None of the above

0% 0% 0% 0% 0% 0%
Which Brain is at Rest?

1. 
2. 
3. 
4. 

Relative PET counts

0% 0% 0% 0%
Energy costs

= Similar overall costs in all conditions
Who are *you* more similar to?
Student Perspective:
I would rate my intelligence as higher than the average for the people in this room

1. Strongly Agree
2. Agree
3. Somewhat Agree
4. Somewhat Disagree
5. Disagree
6. Strongly Disagree

Mean = 
Standard Deviation =
Q9. I would rate my intelligence as higher than the Psych125B class average
Critical Thinking:
In a battle between a Viking and a Ninja, who would win?

1. Viking
2. Ninja
Marriage not limited to opposite sex couples?

Obama re-election mistake?

1 = Strongly Agree; 7 = Strongly Disagree
Metacognition:
What causes the phases of the moon?

1. The Moon passing into the Earth’s shadow  
   [High confidence]

2. The Moon passing into the Earth’s shadow  
   [Low confidence]

3. The Moon’s changing position relative to the Sun and Earth  
   [Low confidence]

4. The Moon’s changing position relative to the Sun and Earth  
   [High confidence]
Metacognition:
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3. The Moon’s changing position relative to the Sun and Earth [Low confidence]

4. The Moon’s changing position relative to the Sun and Earth [High confidence]
Using clickers to collect data in class to demonstrate a phenomenon helped me better understand the phenomenon (n=102)

98%
Using clickers helped me identify misunderstandings and misconceptions in my thinking while in class (n=102)

- Strongly Disagree: 0%
- Disagree: 5%
- Disagree Somewhat: 10%
- Agree Somewhat: 15%
- Agree: 40%
- Strongly Agree: 96%
Using clickers in class helped me understand and/or learn the material **better** (n=102)

<table>
<thead>
<tr>
<th>Agreement Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0%</td>
</tr>
<tr>
<td>Disagree</td>
<td>5%</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>10%</td>
</tr>
<tr>
<td>Agree Somewhat</td>
<td>25%</td>
</tr>
<tr>
<td>Agree</td>
<td><strong>97%</strong></td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>30%</td>
</tr>
</tbody>
</table>
Using clickers made me more engaged in the material during class
(n=102)

95%

Using clickers made me more engaged in the material during class (n=102)

- Strongly Disagree
- Disagree
- Disagree Somewhat
- Agree Somewhat
- Agree
- Strongly Agree

95%
I enjoyed using the clickers in class
(n=102)

97%
I would prefer to be in a section of Psych125 that did NOT use clickers (n=102)

97%
• TurningPoint Anywhere (Clickers)

• Poll Everywhere (Online – own device)
  pollev.com/stolafgarymuir
• Socrative (Online – own device)
m.socrative.com
room# 355922
Laptops in the Classroom?
How can I invite, encourage and support my students in being active learners in my classes?