Some Teaching Styles

- Tutoring: 1-3 students
- Seminar: 3-15 students
- Small class: 15-35 students
- Large class: 35-300 students
Problems with Large Lectures

- Audience difficulty in maintaining focus
- Lack of feedback—did they get it?
- Passive vs. active learning
Some Solutions to Lecture Problems

Audience difficulty in maintaining focus
• Be an exciting, dynamic lecturer
• Bells and whistles—multimedia, etc.

Lack of feedback—did they get it?
• Eye contact
• Show of hands
• “Can anyone tell me…”
• Call on individual students

Passive vs. active learning
• ?
Clickers for Large Lectures: One Approach

1. Discuss new concept (traditional lecture): 5-10 minutes
2. Pose a multiple-choice question to students
3. Students discuss question in small groups of 2-4: 3-5 minutes
4. Students vote via clickers
5. If desired, call on 1-3 individual students to explain their results (1-3 minutes)
6. Entire class sees results
7. Evaluate vote (2-3 minutes): move on if most got it, or devote more discussion to a tricky point.
What is value added?

• Students wake up!
• Feedback to instructor
• Students forced to actively engage with material
• Learning by doing, learning through social interactions
Turntable Bugs

Two bugs are sitting on a turntable which is rotating with constant angular speed. One is exactly twice as far from the axis as the other. Which of the following is true?

1. The acceleration of the outer bug is four times as large as that of the inner bug.
2. The acceleration of the outer bug is two times as large as that of the inner bug.
3. The acceleration of the outer bug is the same as that of the inner bug.
4. The acceleration of the outer bug is half that of the inner bug.
5. The acceleration of the outer bug is one fourth that of the inner bug.
6. None of the above.
What Makes a Good Clicker Question?

- Uses concepts that have just been presented
- Makes students think critically
- More than one answer that could make sense
- Qualitative questions often better than quantitative
- 50-75% success rate (although questions with 100% success rates can be morale boosters)
Other Uses

- Poll student opinions, views on social/ethical questions
- Demographics of students in social science classes
- Graded quizzes
- Attendance (carries risks)
Results

• Student responses generally positive: some love it, most are favorable, a minority feel this is meaningless technology for its own sake
• Instructors generally enjoy this teaching approach, but it comes with overhead in preparation time
• Quantitative metrics lacking—does it really improve test scores? Long term retention?
Other Comments

• Not my idea! In use at many institutions.
• But relatively unused at Penn.
• Technology is a moving target—use smartphones etc.? 