Using Clickers Effectively in Large Lectures
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All of the following represents advice based on our experience teaching biology in large lectures at UCI.

Philosophy of Clicker Use
1. We refer to clickers as “participation” not “attendance.” This has several benefits:
   a. It promotes the message of student engagement and the value of lecture
   b. Students do not feel they are being forced to come to class
   c. We don’t need to record attendance by other methods if their clicker is broken
2. We encourage problem-solving in class. Difficult questions and inclusion of more than one right answer on some (not all) problems can foster discussion.
3. We encourage interaction between students, and between students and faculty. Often we allow students to discuss an answer before voting. We sometimes allow them to vote a second time when there is disagreement about the answer, and we provide feedback about the logic needed to solve the problem.
4. We use questions to point out misconceptions. This helps students value the upcoming material since they know they don’t understand it yet.
5. We assess what students have learned after we have covered a topic. This helps us modify our teaching to me more effective.

Techniques to Simplify Clicker Use
1. Students only need to click on most questions (50%) each day, not all. While this allows some students to arrive late, it also reduces student emails about missed points.
2. We don’t require clicker answers to be correct to receive credit.
3. Students only need to click in at about 75% of lectures to get full credit. Students can be occasionally sick or out of town without extra administrative work.
4. Our clickers are worth 3 pts out of about 200 total, with points awarded as follows:
   a. 1 point for registering and clicking by the end of Week 2.
   b. A “successful” day of participating means clicking in at least 50% of the time
   c. 0.1 points for every day successfully clicked in (50% of questions)
   d. 2 point maximum. Almost all students successfully get these 2 points

Minimizing Teacher and Student Clicker Confusion
1. All teaching faculty and the clicker TA should meet before class begins to set up software and sync settings on all computers/flash drives
2. Faculty need to “zip” and email the clicker “Grades” folders for each class at the end of every lecture day to the TA.
3. The clicker TA should create a “Clicker points” Gradebook in EEE, and post total points received every Friday. We have found that weekly posting of clicker points prevents significant administrative trouble at the end of the term.
4. Know the email and phone number of the clicker expert on your campus. They are wealth of tips and problem-solving ideas.
Implementation Strategy

1. Post a “clicker FAQ” on the class web page before class begins (email us for a sample)
2. First lecture: We discuss how and WHY we use clickers
   a. Purpose is to learn to solve problems while learning, be engaged and provide feedback to us that improves our teaching
   b. No points associated with correct answer.
   c. Not attendance. No need to tell us if a clicker is forgotten, since they only need to click in most days for full credit.
3. Timing clicker questions
   a. Average 3-5 questions/ 50 minute lecture
   b. 1 opener question before class starts signals start of class
   c. A clicker question after each 10 minutes of lecture revitalizes students
   d. 1 question near end prevents students from leaving early

Creating Clicker Questions

1. Use old exam questions. Allows students to gauge likely performance on an exam.
2. Use “expose a misconception” questions. Before beginning a topic, create a question that will catch a common misconception among students. In meiosis, for example, test on the differences between Prophase I and Prophase II.
3. Use questions to test comprehension at the end of a lecture segment. If students do not answer correctly, you can explain the material differently right away.
4. Create survey questions. Find out how well your teaching technique is working by asking the students to give feedback.

Use Clickers to Improve your Teaching

We regularly use the following feedback to make our lectures more effective and rewarding:

1. Take notes on (or ask TA to write down) student accuracy for each question. We keep the questions that exposed misconceptions or generated discussion, and change questions that were too easy or too confusing.
2. Utilize student suggestions. We asked students about the clicker questions, and found they liked the old exam questions, but wanted to know the Bloom’s level of difficulty (comprehension, application, analysis). We were able to add this.
3. Use exams to find natural clicker breaks. When you see your exam results, determine what topics students struggled with. Modify your lecture notes to clarify these topics, and insert that exam question as a clicker question to check your explanation.

Have fun, take risks, and you will be amazed at what you learn from the students using this tool.