Teaching Choices with Clickers

When you decide to use clickers in your classroom, there are several things to consider. Below you will find information to help you integrate clickers with your courses.

Structuring Class Time:

Balance content with questions and the class discussion they provoke.

- Using clicker questions is going to take up to time within a lecture.
- You will have to restructure your lectures to include time for questions. But replace instead of displace portions of a lecture.
- Build in one or two minutes for presenting and polling each question and at least 2-3 minutes of discussion. Never leave a polling slide without responding to the distribution of responses.
- The amount of time it takes to collect responses will vary by class size, easy of question, obviousness of answer, and what instructors have their students do prior to submitting their answers.
- Once adapted to clicker use, students will typically begin answering a question once it is displayed.
- Using a countdown clock can speed things along by showing students how long they have to respond.

Use class time to build core concepts and allow pre-class reading and post-class homework to provide the rest.

Using class time to resolve misconceptions revealed by clicker questions.

- Student feedback on how well they understand topics – the ability to move quickly through topics they understand and spend more time on topics they struggle with.
- Use question slides when the understanding of a concept is critical to proceeding with new content.
- Remember to include discussion time for each question. Even if the majority gets the answer correct, there is still value in explaining the rationale behind the choices.

Lecturing vs. active student engagement – short term vs. long term effectiveness

Online pre-class reading quizzes vs. in-class reading quizzes
• Consider alternate (web-based) technology as a way to move certain class room
  elements to pre-/post-class times to free up class time to deal with
  misunderstandings and confusion surrounding core topics and concepts
• Although questions at the beginning and end of class sessions can serve particular
  and useful functions, questions asked every ten to fifteen minutes can help focus
  students’ attention throughout class.
• Use clicker quizzes or other means to briefly check for homework/reading follow
  through and any confusion about the material.

Allow for extra time: the time you plan for and the time it takes are rarely the same thing.

• It’s a balance between too much time and not enough - remember to take into
  account time to read the question and the choices
• Because of the time commitment required by clicker questions, don’t ask too many
  in one session but use them sparingly to highlight certain points. A few questions
  effectively discussed are better than a lot that are glossed over (three to four
  questions in a 50-minute lecture to highlight key points).

It is possible to structure an entire lecture around clicker questions, but
there should be a particular goal behind this, such as a pre-exam review or
review after a long break.

Avoid “instructor-centered” classrooms

• When discussing clicker question, make sure to ask the students why they chose a
  particular answer. Discuss the results.
• Don’t necessarily discuss the question before the students choose their
  responses. Allow the students to ponder the question during the time allowed for
  polling.
• After the poll, allow class discussion and student questions to clarify the question
  and any potential ambiguities.

Large lecture vs. small class:

Use clickers to see what all the students in a large lecture think about a particular
question.

• This can help make participation grades more objective.
• Have students respond individually before breaking into small groups – allows all
  students to think about the question independent of their peers.

Small courses allow instructors to generate classroom environments that make
it safer for students to share their perspectives, including those that involve
minority viewpoints and potentially wrong answers, decreasing the need for
providing students a way to respond anonymously.

• In a small class, students are better able to guess which of their peers responded
  in particular ways to a clicker question based on the results displayed to the class.
• There can be more pressure in smaller courses than in larger ones for students to
  provide answers to questions, particularly opinion questions, with which they think
their instructor agrees even when those answers are not the students’ honest responses.

### Handling questions in a lecture:

**Tracking Students**
- When you want to track participation and individual results
- When you want to assign scores to quizzes and other clicker activities

**Running Anonymously**
- Use questions to generate discussion around difficult or controversial questions
- Pose questions where the students might object to being tracked

**Placement and number of questions:**
- Because of the time commitment required by clicker questions, don’t ask too many in one session but use them sparingly to highlight certain points. A few questions effectively discussed are better than a lot that are glossed over (three to four questions in a 50-minute lecture to highlight key points).
- Use question slides when the understanding of a concept is critical to proceeding with new content.
- Although questions at the beginning and end of class sessions can serve particular and useful functions, questions asked every ten to fifteen minutes can help focus students’ attention throughout class.

**You can create all clicker question lectures.**
- Useful for pre-exam reviews or end-of-course reviews
- Also useful for agile teaching, where question results direct what material is covered and in what order
- Structure lectures around games, such as Jeopardy and Who Wants to be a Millionaire?

**When to reveal results and correct answer:**
- It depends on how you want to structure the discussion or if the bulk of the class chooses the correct answer.
- Showing the results, especially if the results are mixed, allows you to discuss all the choices and why one might be better than the others. You can also discuss why that answer is the best choice.
- You may want to hold off on showing the results and correct answer if you plan on using Peer Instruction or small group discussion of the question.
- Some instructors choose to indicate the correct answer to a clicker question immediately after the results are displayed to the students. It gives the students rapid feedback on their learning and can add a bit of dramatic flair to the display of the results.
- When some students learn the correct answer to a clicker question they disengage with any subsequent discussion of the question, incorrectly assuming that they fully understand the question because they know the correct answer.
- If the question has a single correct answer and the popular answer is incorrect, then instructors likely want to have the students spend more time discussing it. In this case, it might be worth while holding off on indicating the correct answer until after a discussion of the results.

**On-the-fly questions** (those not planned before class)

- Use these spontaneous questions to poll students about material generated by class discussion
- Often a class discussion leads to spontaneous clicker questions; other times rhetorical questions can be turned into productive clicker questions. Either way, asking such questions is one avenue for practicing agile teaching.

---

**Question Wrap-Up:**

- Summarize key points or arguments students put forth, possibly adding ones they missed
- Make connections to related questions and topics, pose “what if” alternative questions for future pondering, and segue into next question
- Use before and after polls to see how students changed their minds after discussion
- Deliver mini-lecture if students’ answers reveal gap in knowledge or understanding
- Keep this section short and tied directly to students’ recent and upcoming learning activities
- Focus on the reasoning behind choices, both on your part and on the students’ part

---

**Getting Feedback & Assessing Teaching:**

- Clickers enable instructors to collect information on student learning from all students in a classroom quickly, easily, and simultaneously.
- The information on student learning provided by clickers can be used by instructors to modify their lesson plans during class to respond to immediate student learning needs.
- Formative assessment not only provides instructors with useful information about student learning, it also lets students know what they understand and do not understand.
- Missing a question motivates students to want to get the next one correct, so they are more engaged in the discussion.
- The use of a classroom response system can greatly increase the speed and efficiency with which instructors collect, grade, and record student performance on quizzes and tests.
- Monitor progress on a semester-long assignment such as a paper, project, or presentation.
- Ask students after the first or second assignment of the semester (a problem set, a short paper, a lab report) how long it took them to complete that assignment. This provides a sense of how difficult the assignment was – useful information to have when planning future assignments.
• Quiz students on various points made in the course syllabus throughout the semester in order to remind students of those points.
• Ask students prior to the first exam which of a set of possible study strategies is likely to be most effective in preparing for the exam.
• Ask the kinds of questions that frequently appear on end-of-semester course evaluation forms that students complete and ask them during the semester.
• Gather feedback on teaching styles.