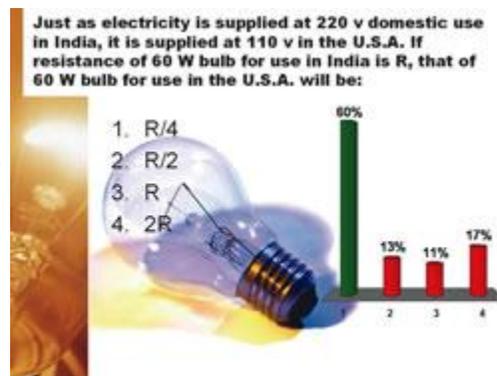


Assessing Students and Collect Data

Student Response Systems allow instructors to track responses made by individual students in addition to collecting anonymous responses. Thus, clickers allow instructors to track participation and the award for the accuracy of responses. You can also use clickers to gather student feedback on course material and teaching style, as you would with end-of-term evaluations.



Assessing Student Learning:

Assess the students' mastery of course content, as it is taught and as the course progresses.

- Prior knowledge and misconceptions
- Evaluate understanding of new topics, concepts, etc.
- Expose and clarify students' misconceptions about concepts, content, etc.
- Differentiate between easier and more difficult concepts
- Determine retention of material

Collect data from all students, anonymously if desire.

- Elicit and discuss diverse points of view when there is no correct answer (e.g. ethics).
- Allow students to see what their peers think.

Provide immediate feedback on the value of the learning session.

- Asking about prior knowledge to set up new material.
- Demonstrate to students that they are not alone in misunderstanding material.

Identify individual students who may be struggling.

Administer an effective review session/mock exam that gives immediate feedback.

Promote interactivity and discussion in large group case-based learning.



Assessment Stages and Objectives:

Clickers can be used to assess student learning at different stages in the learning process.

Pre-Assessments: At the beginning of a term or before a new topic

- What do students already know?
- What are students' misconceptions?

Mid-Topic Assessments: In the middle of mini lectures or before another concept

- Do they understand this principle?
- Can they connect this principle/idea to the previous one?
- Can they apply this concept?
- How is their thinking changing?

Post-Assessments: At the end of a term, topic, or class session

- What is their overall conceptual framework?
- Can they synthesize the concepts to solve problems?
- How had their understanding changed?



Ideas for Assessment Using Clickers:

Reviewing material from the last class or after each key concept

- Ask a few questions at the beginning of the class about the material covered during the previous class to verify familiarity with previous material.
- Brief and consistent revisits to previous material is one way to incorporate multi-pass learning into your course.
- Pose a question or two after covering each new concept to verify that students understand what was just presented before moving on to another topic.
- Scattering questions throughout your presentation can reinforce new concepts and maintain student attention.

Reading Quizzes

- Quiz students at the beginning of class about the material they were responsible for outside of class. Then use class time to discuss difficulties with the reading.
- Have students submit questions about the reading prior to class and turn these questions into clicker questions asked during the next class period.

Homework Quizzes

- Encourages students to complete their homework, in part because they know they will be held accountable for it and in part because they know the homework will be discussed during class in context of these quizzes.
- Use questions about the homework to draft clicker questions for use in class or for pre-exam reviews.

Pre-Exam Reviews

- Using examples from previous exams or using new examples based on the language from and expectations of the exam create a set of clicker questions to review the material that will be covered by the exam.
- Helps students identify areas they personally need to focus on in preparing for the exam

- Helps instructors identify those areas that the whole class is struggling with in order to provide more review of the material before the exam.



Assessing participation and attendance:

Students who believe that an instructor is using clickers primarily or exclusively to enforce student attendance are likely to resent being tracked or monitored. If quizzes are not supplemented with other uses that more clearly benefit student learning, instructors are likely to encounter some student resistance.

It is good to have a solid policy regarding forgotten or lost clickers. Students will sometimes forget clickers.

- Students are more likely to remember to bring their clickers if the devices are used in every class session, if they are used in ways that seem integral to the learning experience, if they are used in their other courses, or if some portion of their grade depends on their use of clickers.
- Some instructors will bring a couple of extra clickers with them to each class for those who might have forgotten.
- Some instructors tell their students that if they forget their clickers or if their clickers are not working for some reason, such as a dead battery, then they can submit their answers to clicker questions on paper at the end of a class session.
- Another way to deal with the issue of forgotten or malfunctioning clickers is to allow students to drop some of their clicker grades.



Grading:

Grading schemes are going to depend upon how much emphasis you want to place on clicker questions within the rest of the course material. If you are using clickers for quizzes, then they should be treated like any other quiz.

- To not grade clicker quizzes runs the risk of making students think that such quizzes are only to track participation.
- The proportion of the overall grade devoted to these clicker quizzes is at the instructor's discretion. Many instructors keep the percentage small, in case of forgotten or lost clickers.
- Depending on how heavily you incorporate clickers in to your course, you may choose to devote a larger percentage of the grade to clicker quizzes and other graded uses.
- One way to deal with the issue of forgotten or malfunctioning clickers is to allow students to drop some of their clicker grades.

Assigning a grade to student responses to clicker questions tends to encourage students to bring their clickers to class and participate by answering questions.

- During the first few classes of a term, it's best not to grade clicker questions in case not all students have them yet and to allow for students to adapt to using clickers.

Accuracy vs. Participation

- Many instructors feel it is inappropriate to grade students on the correctness of their responses to clicker questions during the same class sessions in which the topics of those questions are introduced to the students.
- Grading clicker questions on accuracy can give students who correctly answer critical thinking questions the false sense that they have mastered those questions, when in fact it is often quite possible to answer such questions correctly without fully understanding all the reasons for and against the answer choices.
- Grading clicker questions on accuracy increases the pressure students feel to master course material. Some instructors want their students to feel this pressure, since it can motivate them to seriously engage with course material as it is being presented during class. Others dislike creating high-pressure classroom environments and prefer to grade clicker questions on effort, not accuracy.
- Instructors who grade clicker questions on effort also have the option of penalizing students who fail to reach a certain threshold of questions answered in a semester.

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Cheating:

This is a big fear among instructors – You are not alone in your concern. The issue of cheating arises when grades are assigned in some way based on students' responses to clicker questions.

- Typically, cheating takes for the form of student A giving his clicker to student B before class, student A skipping class, and student B responding to clicker questions with both his own clicker and student A's clicker, making it appear that student A is present in class.
- Being clear about anti-cheating policies and enforcing them when necessary seems to prevent much of this kind of behavior.

There are different ways to deal with this, depending on class size.

- If TAs are available, have them watch for students using more than one clicker. You could have students place their clickers on their desks.
- Use a countdown clock to encourage faster response, balanced with a short enough time to prevent students from using more than one clicker.
- Develop a grading scheme that does not overemphasize clicker questions
- You want to encourage participation but not cheating

If a student is going to cheat, they will always find a way.

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