eLearning Tool Series

Using "clickers" to Engage Students and Enhance Learning

Classroom Performance Systems (CPS) are used to collect responses to questions posed in a lecture or similar setting, a familiar example is the "poll the audience lifeline" on the game show, "Who wants to be a Millionaire?". For faculty; clickers are being used extensively to gauge student understanding of content and identify concepts that are proving difficult for students to grasp. For students, clickers provide a quick way to validate their own learning, helping them identify areas that need improvement.

What is a "Clicker"?

"Clicker" is the colloquial term for a personal response device similar to a TV remote control. The radio (or infra red) signal from the individual student clickers is picked up by a receiver connected to a computer in the classroom which collates: records and immediately displays the results graphically. The technology is easy to use and can be made available to students at a reasonable cost. They are already very popular in scores of colleges and universities around the world. Each clicker can be registered to a specific student (or not, depending on the teacher's choice).

Why use "Clickers"?

Asking students questions about course material helps get them engaged in the learning process. However, many students are reluctant to speak up in the classroom or even raise their hands, which makes it difficult for an instructor to interpret their level of comprehension. Since students clicker responses are anonymous, at least as far as other students are concerned the peer pressure is removed and students are much more willing to participate. This helps empower the quieter students in a lecture hall as their opinion and contribution matters. Seeing the class responses helps students to see they are not alone. High response rates are not uncommon. Once you start using clickers, students are often disappointed if you don't use them in classes.

Posing questions ahead of lecture material helps an instructor judge students' initial understanding and adjust lecture material accordingly. Students can benefit by assessing their existing knowledge and ability. If they get it wrong, then it encourages them to pay attention, and if they are right, it becomes positive reinforcement.

Using clickers after a "mini" lecture, provides an instant application opportunity and allows common misconceptions to be revealed and explored. It also facilitates further discussion as often "teaching moments" are created. This type of approach can be used creatively to develop problem solving skills and strategies. You can always repeat a question to reassess understanding after further discussion as a class or in smaller groups. The immediate feedback is important (see the Tip sheet on "Using Assessment tools for Blended or Face-to-Face course" in the Assessment Series).

Alternatively, clickers can be used to collect statistical data in an opinion survey, to promote discussion or to allow students to select topics for discussion.

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Give Me an Example

When the class size is above 50 students, the classroom dynamic changes and it can be difficult to promote active learning in conventional ways. Clickers have been used in several chemistry courses since Fall 2004. These multi-section classes have 170 or more students per section. In these classes, radio frequency clickers have been used to help facilitate engagement and enhance the learning experience.

Crouch and Mazur (2001) suggest that these devices can also be used to support a form of peer instruction. The process begins with the instructor posing a question or problem. Students initially work individually towards a solution and 'vote' on what they believe is the correct answer by selecting a numbered or lettered response (i.e., A, B, C, D) with their clicker. The results are then projected on a screen at the front of the room. If the question involves applying knowledge, instead of memory recall, there is usually a broad range of responses. Students are then required to compare and discuss their solutions with those sitting next to them, in order to come to a consensus regarding the answer. A second 'vote' is taken, but this time only one clicker per group can be utilized. In most circumstances, the range of responses decreases – usually centering around the correct answer.

More Ideas:

- Use regularly during the semester (75% or more of lectures).
- Use several times per lecture (every 10-15 minutes) - this can act as a refocusing point
- Use clickers at the beginning of class to review assigned problems.
- Turn questions asked by students into class questions, get a few answers from the class and use these as the answer options.
- Use clicker responses for credit, but strike a balance between participation and success (e.g. one point for an answer, an extra point if it's correct).
- Don't make answers worth excessive credit or students may ask others to "click" for them.
- An alternative to this process includes having students generate the questions and use cell phones as the clicker devices.

Other Considerations

- It is important that a single system be used campus wide. If students are asked to use multiple systems (i.e. carry several clickers) across different courses then it will dramatically reduce the effectiveness of the technology and create a bad impression with students.
- It is important to know when and how to ask a question.
- Question design should focus on student learning and engagement, covering key concepts rather than "teaching to the exam".
- Adopting clickers will probably require some adjustment in teaching style. Questions need to be asked and time dedicated to this task - but remember that, "less can be more". Less content discussed in more detail can result in richer learning.

Where Can I Go for More Information?

1. An investigation of the effectiveness of electronic classroom communication systems in large lecture classes

A study by Manjula D. Sharma, Joe Khachan, Ben Chan and John O'Byrne of the University of Sydney on the use of classroom response systems in large lecture classes

http://www.ascilite.org.au/ajet/ajet21/sharma.html

2. Peer Instruction: Ten years of experience and results

This article by Catherine H. Crouch and Eric Mazur (2001) explains how a peer instruction process can be supported through the use of a classroom response system.

http://mazur-www.harvard.edu/publications.php?function=search&topic=8

3. Transforming Student Learning with Classroom Communication Systems

A research bulletin from the EDUCAUSE Centre for Applied Research about how classroom response systems can be used to transform student learning

http://www.crlt.umich.edu/inst/ECARCRS.pdf

4. Student Response Systems - EDUCAUSE Learning Initiative Library

An extensive listing of resources and articles related to the use of classroom response systems in higher education

http://www.educause.edu/content.asp?page_id=645&PARENT_ID=697&bhcp=1

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