

CAN LARGE CLASSES BE TRULY INTERACTIVE?

How "Clickers" are changing the culture of university classrooms

By now you've heard your colleagues talk about them in terms of praise or blame: those little handsets that many students are carrying—the ones that look like TV remote. These are components of what is commonly known as a Classroom Performance System (CPS), or what some like to call a "classroom response system".

CPS is an electronic solution to a perennial challenge at the university: turning those giant, revenue-producing lecture classes into rich learning experiences for students—experiences that more typically belong to small classes: lots of student participation and frequent feedback on learning.

The latest generation of inexpensive, portable, wireless classroom response systems has revolutionized large class instruction. With modest technical skill, instructors can now walk into a large classroom, poll or quiz students, and get immediate results. Consolidated student responses can be displayed on the screen as a bar graph, so that students can compare their responses with their peers, and the instructor can know instantly what or how students or groups of students are thinking.

Why is this useful to professors?

Before CPS it was difficult to assess student learning or verify attendance in a large class. A quiz required a major classroom management effort of handing out and collecting papers. Grading hundreds of papers was tedious, and the thought of doing so instantly—in real time—was unthinkable. As a result, most instructors did not bother with in-class assessment of student learning on a frequent basis. Many large lecture classes developed the more manageable rhythm of lecture, lecture, lecture, test. But with CPS an instructor can quiz or poll at will. She can stop the lecture at any moment, ask students a question, and get the results immediately. Using these results, the instructor can then address any confusion or misunderstanding indicated by the responses.

"...the technology is merely the means for leading more students to engage in careful analysis of problems. The capability for seamlessly integrating the systems with class and lecture discussion enables the students to become actively engaged in the texts and argument."

Dr. Robert Webking, Professor, Political Science

Many uses of CPS

Assessing student learning. Let's take the example of UTEP biology professor Steve Aley, who, on any given day, wants to make sure that all students in the room understand simple facts. On the overhead projector he might place a question that asks, "Where is the protein DNA polymerase MADE?" Students are then given several seconds to respond, selecting from 5 possible answers.

- A. In the Nucleus.
- B. In the Cytoplasm
- C. In the Endoplasmic Reticulum
- D. In the Golgi.
- E. In the Lysosome

If 9/10 of the students respond correctly, Dr. Aley can proceed to build upon this understanding. If half the students choose the incorrect answer, then he knows that the students need to spend more time on this point.

Increasing student engagement and practicing critical thinking. CPS also allows instructors to make a personal connection to the material of the course, in real time. For example, UTEP political science professor Robert Webking uses the following question to get students to reflect on important issues of society and the individual.





"The rulers in your community believe that Religion "A" is true, and so require everyone to follow it and only it. You believe that Religion "B" is true and that only by practicing it can you or anyone else reach eternal happiness. What should you do?"

- A. Obey the law. Anarchy is a greater evil than eternal damnation.
- B. Convert to religion "A".
- C. Follow religion "B" as much as the law allows, but don't risk death or imprisonment.
- D. Resist the rulers so that you and others can hope to live well.

Depending on the goals of the exercise, students might be asked to respond individually or to discuss in small groups before submitting the group's answer. With a wide array of differing responses displayed on the screen, Dr. Webking now has the opportunity to engage students in a broad conversation, by asking them to explain the logic of a given position. In this way he can stage a spontaneous debate even in a very large class. Once students see how their own opinions compare to those of 300+ other students, the classroom suddenly becomes a place where substantive discussions of issues that matter to students take place.

Tracking student attendance. The CPS system allows an instructor to quickly take roll. A display on the projector screen indicates which students have responded or not, so the instructor can instantly know which students are absent. The system collects this data automatically, and the instructor can load the results into a grade book.

Reducing student anonymity. CPS allows the instructor to request participation from a single individual or a group of individuals. Since each student is identified in the system, the instructor can insist on individual responses from specific students, if desired. This ensures that no one remains anonymous, even in a class of 500 students. The possibility of being asked to respond ensures that students spend time preparing for class and staying focused

once the class has started.

Practical Considerations for the Instructor

CPS receivers and software are free to official university instructors. Company profits come from sale of the handsets to students and from the activation fee paid when a student registers his handset for a course. To order the system for use in your own courses, visit the E-instruction website (www.e-instruction.com), and follow the links for university faculty. The handsets for students cost about \$15 apiece and are ordered and purchased at the bookstore just like textbooks, using an ISBN number. Before the handsets will function in the classroom, students must go online to the E-instruction website and register their handsets for a fee of about \$15. Students can pay online with a credit card, or buy an activation voucher in the bookstore, along with the handset.

Using CPS does not require advanced technical abilities, but the system is not trouble-free. Before the first class meeting, an instructor needs to allow some time to become familiar with how the system operates, and to practice using the different tools in the software. As with learning any new software, there will be unexpected glitches, and it is essential to address these before trying the system out with a real class. At UTEP ISS can arrange for an instructor orientation and help with the initial set-up. ISS also keeps several student handsets available so that potential instructors can replicate for themselves the experience of their students, and therefore better understand how to use the system.

Getting students to comply with the new expectations in a large class will be another challenge. Without clear policies and real deadlines, students may be slow to purchase the handsets, or come to class without them, until they realize that their grades will be affected by these behaviors. A graded quiz given during the second class meeting is usually enough to communicate to students the seriousness of the instructor's intentions in adopting this technology.

"In just over 1 minute, you have an assessment of the entire class -- and unlike asking for a show of hands or colored cards, the students must commit before seeing how their classmates have voted!"

Dr. Steve Aley, Associate Professor, Biology

For additional support, please contact ISS at x7947, or come by the FIT Lab in UGLC 306.