

Student Response Systems: A New Kind of Point and Click

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Background

Contemporary educational theory views learning as an interactive process. Students are believed to learn more and develop a deeper understanding of content when they are engaged in the learning process. This theory stands in contradiction to the traditional teaching strategies employed in many university classrooms across the nation.

The most common mode of instruction currently utilized in the university is lecture. This allows faculty to instruct a large number of students and cover a massive amount of material in a limited amount of time. A typical lecture can last anywhere from 30 minutes to over two hours and may involve little or no time devoted to questions from the students about the material covered.

The onus of learning in this instructional model falls squarely on the student. There are limited checks of understanding and the lecture continues regardless of if learning actually takes place. The students serve as “empty vessels” to be filled with the knowledge imparted by the faculty. This is a highly auditory form of learning that is now often supplemented with lectures created in PowerPoint or some other similar presentation software.

Presentation software such as PowerPoint can supplement lectures in a variety of ways. Most presentation software allow the inclusion of images, audio and video. Providing a graphical representation of a process or including a video or image of the content being studied helps engage visual learners. Furthermore, using the typical “PowerPoint outline” format helps scaffold students who struggle with note taking skills. However, the inclusion of multimedia still does not make the lecture experience interactive.

One innovative use of presentation software is the integration of student response systems. Student response systems transform the traditional lecture experience by adding interaction and allowing for frequent checks of understanding. Even in large lecture classes of over 100 students, student response systems have been effectively used to assess understanding, provide student feedback, promote discussion and encourage higher order thinking.

Student Response Systems

Student response systems (SRS) are known by a variety of names including:

- Audience Voting System
- Classroom Communication System

- Classroom Performance System
- Classroom Response System
- Electronic Response System
- Personal Response System

and are often referred to as “clickers” due to the remote control like device used as a student interface. SRS first emerged as novelty item used in corporate training seminars, but have been quickly redefined as an educational innovation. Today, some SRS are packaged or offered as supplements to textbooks and may even include pre-created quizzes, exams and learning “games.”

There are numerous student response systems currently on the market (see the resources section for a partial listing of companies), but most have the same components. The majority of SRS include software, the “clickers” or student interface and some type of receiver. Most SRS use stand alone software, but a few systems integrate directly into presentation software. In addition to providing the functionality to make lectures interactive, most software will also “grade” student responses (if activated by the user) and save both individual student answers and class data.

The student interface component, the “clickers,” may take a variety of forms. Some systems use small “credit card” style responders while others use large “boxy” ones. Smaller clickers are easier to transport, but are also limited in their functionality. Most small responders can only answer multiple choice style questions while the larger models may allow for text or symbol input. Some SRS also offer the ability to interface with PDAs or laptops.

All student response systems also include some type of receiver that “communicates” the individual student responses to the SRS software. Systems that support PDAs or laptops may use a wireless network to do this, but most SRS use a physical receiver. The two most common types of receivers are infrared (IR) and radio frequency (RF). Systems that employ IR receivers tend to be less expensive (sometimes significantly less) but have limitations. Many IR systems support only a limited number of responders and are “line of sight” which means students must point their clickers responders directly at the receiver with nothing blocking the path. In addition, IR is affected by sunlight and may exhibit reduced functionality in brightly lit classrooms.

Prices for student response systems vary widely. Some systems are bundled with certain textbooks and offered free of charge to faculty who select that particular text. In most of these instances, the software and clicker(s) are provided free of charge to the instructor and students much purchase their own clickers. Student prices for receivers can run anywhere from \$20 to over \$200 depending on the receiver type and the publisher. Furthermore, if the use of SRS is not coordinated, students may find themselves required to purchase a different responder for each class. Typically students can resell their responder the same way they’d resell their textbooks.

Another purchase option for SRS is the “classroom set.” In this scenario the purchase price is the combination of the costs for the software license(s), the receiver(s) and the responders. Depending on the number of receivers and responders purchased, this price is likely to be several thousand dollars. The advantage to purchasing a classroom set is that there is no cost to students, students do not need to remember to bring the responders to class and the set can be used by multiple faculty members as long as the timing is coordinated. However, the use of a classroom set

does need to be coordinated and, if the instructor is tracking individual student data, students need to use the same responder each class meeting.

Student Response Systems at Miami University Middletown

On Miami University's Middletown (MUM) campus, student response systems have been used across disciplines and by assorted offices. Originally, faculty in the physics and math departments purchased classroom sets of the eInstruction system. This system uses stand alone software that includes the ability to create interactive games similar to Jeopardy and others. As more faculty began to request SRS, the Educational Technology Center (ETC) explored purchasing a classroom set to be shared by the interested parties.

The ETC purchased the TurningPoint system with 30 responders and an IR receiver. TurningPoint was selected because it integrated directly into PowerPoint, which permitted the integration of multimedia. In addition, our faculty are already familiar with PowerPoint which meant a low learning curve and quick adoption of the system. The system was grouped with a tablet notebook and a projector so faculty could use the system in any classroom on (or off) campus.

To date, the system has been used in botany, chemistry, computer information technology, English, history, nursing and physics courses with anywhere between 10 and 80 students at a time. The system has also been used by admissions to poll and collect data about students attending information sessions, by student services to add interaction to freshman orientation sessions, and by the Center for Teaching and Learning (CTL) for small group instructional diagnosis. The botany and chemistry departments recently purchased their own TurningPoint system; nursing and the CTL are considering this option as well.

Most faculty who are using the system to supplement lecture use an adapted lecture model that assesses student understanding of new concepts and promotes application and extension of those concepts. In this model, a typical 50 minute lecture is broken down into 4 or 5 "mini-lectures" that cover a distinct concept or group of concepts. At the end of the mini-lecture, the instructor uses the SRS to pose 2 or 3 questions to assess understanding. Some instructors pose a question, display the aggregate student responses and then ask students to discuss their responses with the people sitting near them (prior to disclosing the correct response). The instructor then poses the same question again to assess whether peer interaction increased understanding of the concept.

This type of assessment provides valuable feedback to the instructor. As one instructor stated, "[SRS] enabled me to vary the lecture format. Students appeared to enjoy the interaction. I knew immediately what concepts were not understood." This model helps the instructor determine if a concept needs to be explained further or in more detail. This is especially important when concepts build upon each other. This model also encourages students to process and interact with new concepts while they are still "fresh" in their mind and employs frequent breaks in lecture to prevent confusion.

While the nursing department has been using the lecture model outlined above, they've also developed a unique application of the system that fits the practical nature of nursing. Nursing courses tend to have large enrollments which makes scenario activities difficult to organize and manage. The student response system has helped nursing faculty address this issue through the development of scenario based presentations. These presentations can assume a variety of for-

mats. A faculty member might give a verbal description of the scenario, provide an image or audio file of symptoms or show a short video. The students then respond to a number of questions where they indicate how they should respond, choose the correct procedure or make a diagnosis. This allows students to begin applying knowledge prior to entering the field.

The English department and the Center for Teaching and Learning have also developed a unique application of our student response system. Faculty have often reported that students are reluctant to engage in discussion particularly when probed about controversial topics. Even when the discussion topic seems relatively mundane, some students never engage. Using the SRS to ask difficult questions, students have a “voice” to respond while maintaining their anonymity. Furthermore, posting the aggregate responses has proved to ignite discussion as the computer boldly “starts the conversation.” One faculty member stated, “the ‘clickers’ definitely helped increase class discussion. Once the results of certain questions were posted everyone wanted to say something!”

Perhaps due to the novelty of the SRS, student responses have also been positive. Student anecdotes from various faculty surveys include:

- “More interesting than regular lecture.”
- “I knew right away if I didn’t understand something”
- “Let me think about stuff before we moved on.”
- “Gave me a way to participate without talking.”
- “I liked talking about answers and then getting a second chance!”
- “Helped me realize I wasn’t the only clueless one in class.”

There have been challenges, but our students tend to understand some problems with new technologies. Students today appear to feel very comfortable with a “remote control” type device in their hands. They want and appreciate the immediate feedback they receive when SRS systems are used.

Recommendations

Based on our experiences using SRS, we would like to make the following recommendations:

- If you require students to purchase a responder, plan to use it regularly. This is particularly important if the responders will be considered expensive by your students.
- Use your SRS for surveys or non-graded assignments several times before attempting any type testing that impacts student grades. This gives you and your students a chance to familiarize yourselves with the system and work out any issues that might impact the testing procedure.
- Ask your textbook publisher if your textbook can be bundled with a SRS. If so, ask if you can “borrow” a system to try with your students prior to committing.
- Encourage your Center for Teaching and Learning or Technology Services to purchase a classroom set that interested faculty can borrow.
- Test your first few presentations using actual responders. Be sure to test any timings your system might allow you to add.

- Plan for problems. Keep extra batteries on hand and have a back-up plan in case the system isn't working properly.
- Think outside the box when using SRS. The more interaction and higher order thinking you can build into the presentation the better.
- Have fun!

Resources

Audience Response <http://www.audienceresponse.com>

Class in Hand <http://classinhand.wfu.edu>

H-iTT <http://www.h-itt.com>

Qwizdom <http://www.qwizdom.com>

eInstruction <http://www.einstruction.com>

TurningPoint <http://www.turningtechnologies.com>

Reply Systems <http://www.replysystems.com>

Numina <http://aa.uncw.edu/numina/srs>