Introducing Student Response Systems at MU

What are student response systems?

These systems include receivers and "clickers" that can be used in the classroom to increase the level of student engagement and to help instructors get immediate feedback regarding student comprehension. The number of receivers needed for a classroom will vary upon the size and configuration of the room as well as the number of students using the system. The student-clickers are similar to a television or stereo remote control. Each device has several numbers and/or letters buttons so that students can give responses to questions posed by the instructor. Each system also includes software for the instructor that permits identification of students responding, detection of individual responses, and merging of data for charting the trends of answers. Grades from these systems may be exported to Excel, WebCT, or Blackboard. The software packages also may allow importing questions and graphics from other programs, or they are tightly integrated with PowerPoint.

Does using student response systems in the classroom really impact teaching and learning?

MU faculty who use this technology have reported that their students are more engaged – "...they now participate, nearly all of them, a couple of times during a class period. This is important in a large class where getting everyone involved consistently is difficult." ET@MO's handout ***Effectively Planning and Using Student Response Systems in the Classroom,*** provides an overview of ways instructors can prepare for different educational uses:

- Instructor evaluation of students' understanding of concepts
- Polling student views as a springboard for discussion participation, peer interaction
- Gaining attention to introduce a new topic
- Attendance check.

Is this a new kind of technology?

Student response systems have been available in various forms during the past 10 years, primarily in secondary schools. Recently, however, national publishers have been promoting this technology to higher education as a way to increase their profits. By providing free receivers and discounts or rebates for student-clickers sold with new textbooks, they hope to reduce the number of used book sales. Additionally, different publishers have proprietary agreements with different response system companies. Please note that agreements between publishers and manufacturers of these systems differ considerably in detail and flexibility. The publishers have no direct control over the actions of manufacturers and responses to problems. In some cases the equipment is shipped directly from the manufacturer, in others it is repackaged by the publisher. Please be aware that this may lead to confusion as instructors change texts or classrooms, and as students begin having multiple classes using different kinds of clickers.

If different publishers are promoting different student response systems, how is MU going to support instructors using different systems?

Since this technology is new to the MU campus and since publishers are encouraging a much broader use, there are several issues that MU departments are trying to address:

- Determine which auditoriums need to be wired with the different systems
- Identify ways to assist faculty in requesting classrooms that match their needs for a specific system
- Coordinate with the bookstore to order enough clickers to accompany the correct textbooks.

During this early phase of using the response-system technology at MU, ET@MO's new technologies team is currently helping instructors navigate through the various decisions that need to be made as they consider when, where, and how to use student response systems effectively. They maintain close communication with MU staff responsible for scheduling MU classrooms and lecture halls, MU departments responsible for wiring and maintaining auditoriums, and with the MU Bookstores who provide texts and clickers for students. While incorporating new technologies and processes always includes "bumps in the road," this collaborative effort among departments has ensured as smooth an experience as possible.

The technology used for these response systems is changing rapidly. Therefore, ET@MO and others on campus are also investigating new versions of student responses systems as well as potential agreements that might allow MU to maintain a single system (no matter which publisher an instructor selects). This would alleviate many of the difficulties we currently encounter, as well as allowing students to maintain only one clicker for MU classes.

How do I know what system I should use and which one is best for my class?

ET@MO is supporting faculty and coordinating campus resources to help you make the best decision possible. The chart, ***ET@MO's Comparison of Student Response Systems and Their Features***, will provide an overview of each system that is currently available at MU or being discussed by publishers. After you have had a chance to look at these handouts, we encourage you to contact Guy Wilson (wilsong@missouri.edu, 882-4668) or Margaret Gunderson (gundersonm@missouri.edu, 882-0903) for additional information.

ET@MO's Comparison of Student Response Systems and Their Features

Features	Student Response System Brands			
	CPS	**PRS**	**H-ITT**	**ResponseCard**
Remotes (Transmitter)	8 buttons blue transmitter	10 buttons black transmitter	5 response buttons, plus special function button multicolored transmitters	10 buttons gray/white
Remote "Certainty" Buttons	no certainty options	high and low certainty options	no certainty options	no certainty options
Instructor Control	tied to keyboard while using could be controlled with presenter/wireless mouse	can control main functions with remote once a session is started	can control main functions with remote once a session is started	tied to keyboard while using could be controlled with presenter/wireless mouse
Remote Durability	remotes appear to be more durable	remotes appear to be more durable	remotes appear somewhat fragile and smaller	remotes appear to be more durable
Receivers	receivers can pick up signals in a 9o-degree cone	receivers can pick up signals in a 9o-degree cone	receivers can pick up signals from an almost 180-cone	receivers can pick up signals in a 9o-degree cone
Computer System Compatibility	Windows or Mac	Windows or Mac	Windows only - Mac users must currently purchase Virtual PC software to run H-ITT	Windows only - Mac users must currently purchase Virtual PC software to run supplied TurningPoint software.
Compatibility with Other Software	designed to work with Excel, WebCT, and Blackboard grade books - some file manipulation needed	designed to work with Excel, WebCT, and Blackboard grade books	designed to work with Excel, WebCT, and Blackboard grade books - also exports XML formats and has DDE capabilities	supplied with TurningPoint software designed to integrate with PowerPoint for questions and Excel, WebCT, and Blackboard for grade books
Software Functionality	designed to be easily used with questions in other programs - most commonly PowerPoint	designed to be easily used with questions in other programs - most commonly PowerPoint Windows version now has direct PowerPoint integration also works with TurningPoint software	designed to easily import questions from PowerPoint, Word, PDF, HTML and Pearson TestGen PowerPoint slides can be run inside H-ITT also works with TurningPoint software	supplied TurningPoint software fully integrated with PowerPoint

Inserting Graphics	graphics somewhat limited by size	graphics need to be about 2 inches or less to be used with PRS' question tool No limit on size of graphics used with PowerPoint	graphics not limited by size PowerPoint graphics used inside H-ITT limited in size by space required for H-ITT response grid (functionally half of the screen)	graphics not limited by size, but must be in PowerPoint
Grade Book Feature	graphically attractive grade book and marking interface exportable to WebCT and Blackboard	text-heavy grade book and marking interface exportable to WebCT and Blackboard	more graphically attractive grade book and marking interface exportable to WebCT and Blackboard	use Excel, WebCT or Blackboard for grade book
Student Registration	students must be registered through a web interface requiring purchase of an access code	students can be registered through Excel - ET@MO will provide a web form and script to generate the files needed	students can be registered through Excel - ET@MO will provide a web form and script to generate the files needed	students can be registered through Excel - ET@MO will provide a web form and script to generate the files needed
Publisher Support	Supported by McGraw-Hill only (exclusive contract)	Supported by Pearson, Thomson, Wiley, and BFW Thomson provides copy of TurningPoint software to the instructor	Supported by Pearson and Thomson Thomson provides copy of TurningPoint software to the instructor	Supported by Thomson Thomson provides copy of TurningPoint software to the instructor
Installations at MU	Available in Waters Auditorium, Physics 126, and Conservation Hall	Available in Middlebush Auditorium and Physics 114 as of WS2005	Available in Physics 126	No permanent installations at MU currently or in near future.
Recommendations & Support	Recommended for users of McGraw-Hill text in the above classrooms. ET@MO supports in installed classrooms	Recommended. ET@MO supports faculty both in above classrooms and using portable sets for use in smaller classrooms (up to 60 sutdents)	ET@MO supports in installed classrooms	ET@MO has little experience with the system at this time and cannot make recommendations. ET@MO will support faculty using portable sets for use in smaller classrooms (up to 80 students)

Type of Costs		Student Response Systems		
	CPS	**PRS**	**H-ITT**	**ResponseCard**
Direct Costs for Students	*Direct Pricing from Manufacturer:* Transmitter: $3.00 *Access Code:* $18.00	*Direct Pricing from Manufacturer:* Transmitter: $30.70 (prices are based on orders of 100 or more units by the bookstore) *Access Code:* N/A	*Direct Pricing from Manufacturer:* Transmitter: approximately $30.00 ($22.50 cost plus what H-ITT considers an average bookstore markup) *Access Code:* N/A	*Direct Pricing from Manufacturer:* Transmitter: approximately $30.00 (before Bookstore markup) *Access Code*: N/A
Publisher Supported Costs (with new books)	*McGraw-Hill Pricing:* *Transmitter:* $3.00 *Access Code:* $6.00 (other options on access codes are available for multi-semester pricing) *Receivers:* McGraw-Hill provides one receiver for every 80 enrollments	*Pearson Pricing:* *Transmitter:* $10.70 after rebate. *Thomson, Wiley, Bedford/St. Martins, W.H. Freeman & Worth Pricing:* transmitter bundled with text for an additional $15.00. *Access Code:* N/A *Receivers:* Thomson, Wiley, Bedford/St. Martins, W.H. Freeman & Worth provide one receiver for every 40 enrollments Wiley provides one receiver plus additional receivers at the discounted price of $100 per unit.	*Pearson Pricing:* *Transmitter:* approximately $5.00 after rebate (based on average bookstore markup) *Thomson Pricing:* transmitter bundled with text for an additional $15.00. *Access Code:* N/A *Receivers:* Pearson and Thomson provide one receiver for every 40 enrollments	*Thomson Pricing:* transmitter bundled with text for an additional $15.00. *Access Code:* N/A *Receivers:* Thomson provides one receiver for every 80 enrollments

Note on Pricing: Pricing details based on information from manufacturers and publishers. It may be subject to modification. Updated 11/18/2004

Effectively Planning and Using Student Response Systems in the Classroom

The following ideas and suggestions were compiled from faculty and staff who have experienced response systems at MU.

With help from ET@MO staff, determine what response system you can use – and why you want to use it.

During this early phase of adopting the technology at MU, there are different response systems in use. These systems encourage active learning in large lectures as well as classes that range from 30-100 students. Different publishers are aligned with different systems and their student discounts and free receivers are incentives for faculty. If cost is not an issue, then instructors need to look at the different software and hardware features that best match the way they want to use the system in their class.

Start as early as possible to learn the system.

Practice in Advance. MU faculty indicate that getting started was sometimes the most difficult part – and confirming the system is in working order is part of getting started. If you are using an infrared system in a large auditorium, ET@MO and ASC staff can help in making sure that the receivers are positioned correctly so that fluorescent lighting doesn't interfere and all sections of the classroom receive needed coverage. In planning for use during a lecture, some faculty arrange for a student assistant or a TA to help with managing the technology during class time. To be effective, however, it is important for assistants to also learn the system, as well as your expectations of their involvement.

Crisis Management. Anyone who frequently works with technology knows that it is always good to have a "Plan B" to rely upon when things go wrong. Instructors should discuss with the support team how to handle times when the response system might not work they way you want it to. Depending upon the system being used, this could include anything from resetting the technology to changing your instructional method for discussions.

Plan and organize how you will use it in class.

Instructional Style. One challenge for faculty is the difference in how a class period is organized to use the technology effectively. The mindset of the instructor is important. If the instructor is willing to make a change from the lecture-only approach to an approach that includes pacing content and more student engagement, then this technology will be a great help.

Work in Progress. Some MU instructors found that it helped if they viewed the new approach as a "work in progress." They focused on learning how to use the technology and getting comfortable with student engagement during the first semester. Then they refined questions and different active learning methods to take full advantage of what can be done to engage students through the student response system.

Based on how you want to use the system in class, develop questions that will encourage student responses.

Benefits. Students use their own registered remotes to respond to multiple-choice questions posted by the instructor. Instructors can set up the software so that they can survey students with or without capturing student IDs. Instructors have found that this system encourages greater response rates for students who are reluctant to be identified. For example, it provides avenues to help students more easily focus on content rather than individual differences (i.e., gender, physical disabilities, and language or culture differences).

Discussion Purpose. Some instructors prefer displaying the questions within the system software, outside the system on overheads, or in PowerPoint slides used during lecture. Regardless of the method, the important point is that the questions are structured in a way that accomplishes the instructor's goals:

- Instructor evaluation of students' understanding of concepts
- Polling student views as a springboard for discussion participation or peer interaction
- Gaining attention to introduce a new topic
- Attendance check

Question Style. Creating discussion questions that lead to effective interactions remains a challenge. Research has shown that students respond best when questions connect to practical problems. Instructors may use discussion to accomplish one or more of the following:

- Help students to reconsider prior views
- Distinguish among alternatives
- Develop new insights that link prior and introduced ideas
- Seeking new information
- Promote some ideas over others
- Coalesce previously distinct notions
- Restructure ideas to enhance connections.
- Apply new ideas to personally-relevant problems.

Response to discussion questions may be either individually focused or used as a group method to encourage peer discussion or instruction. For example, the instructor divides the class into small groups and allows only single group answers or answers that represent a group consensus.

During the first week(s) of class, prepare students in how to use the technology.

MU faculty have found it very helpful for students if they use the following methods.

Syllabus. Along with their textbook information, include information in the syllabus about the remotes.

1) Indicate why you are using the student response system and where/how they can get the remotes.
2) Include information about how to register, linking their own name to that individual remote.
3) Reinforce that remotes will be used frequently in class and are the student's responsibility to keep safe.

Instructor's Introduction of the System.

1) In class reinforce the information in the syllabus.
2) Indicate that answers from the remotes will be private, collected automatically and almost instantaneously, and consolidated into a summary of all answers for polling the class.
3) If the classroom is large, help different sections of the class to know the receiver they should aim at when clicking answers on the remote. Note that the closest receiver may not be the most convenient, because of angles of the receivers. Also, many students have a tendency to point their clickers straight up at the ceiling. This is appropriate only from a few seats in each classroom.

Instructor Forewarning.

1) Prepare students to know that lost remotes should be turned into the instructor so it can be matched from the registration list to the owner. If students lose clickers, they should check with the instructor. If needed, another may be purchased from the bookstore and the student will need to register the new ID number.
2) When needed, students should replace the batteries at their own expense.
3) If the remote is not functioning correctly, students should read the directions for information of how to reset the remote.
4) Students should not use another person's remote because this links answers to the wrong name and they will not receive participation points.
5) Discuss academic honesty and the class honor code; sending a remote to be used by a different student in the class risks the consequences of academic dishonesty.
6) Help students know how you will handle times when the technology does not work.

Instructor Activity.

1) Demonstrate how the remote transmitters and the receivers work. Post an ice-breaker type of question for students to respond to. Allow them discuss the question with peers nearby. Then ask them to select the best answer to the question.
2) Show students how they may know whether their answer has been received or not, as well as how to know if they change their answer.
3) Then demonstrate the comparative charts to show trends in class responses.
4) Repeat with a different question, eventually leading to one that introduces the topic to be discussed during the class period.

When using the system throughout the semester, introduce the activity with an explanation of your objective and encourage student responses.

One MU instructor served as such an effective role model when using the system that the students reflected the same kind of behaviors when giving their individual and group presentations to the rest of the class.