The Use of Personal Response System in Accounting Courses

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Part I

A personal response system (PRS) is an interactive tool that increases class participation. This paper explains (1) the components of a PRS, (2) how to operate a PRS, and (3) its potential costs.

What is PRS?

A PRS uses hand-held wireless transmitters, receivers, and computer software to obtain immediate feedback from students (See Figure 1). The technique is similar to "asking the audience" on the game show *Who Wants to be a Millionaire?*

This easy-to-use tool enhances interaction among students and the instructor and appears to increase learning. The classroom environment becomes more competitive as students strive to select correct answers to questions asked by the instructor. Any time during a lecture, the instructor can project a question on the screen or simply orally ask a question of the class and students provide answers. The instructor obtains immediate feedback that assesses the students' understanding of the concept. Immediate feedback provides satisfaction to the students that they have mastered the concepts and identifies students' misconceptions that a skillful instructor can correct through additional explanations and retest the students' master through reformulation of additional questions.

How Does PRS Operate?

The overall steps to use PRS begin when the instructor presents a question on the screen using the software provided by PRS, a PowerPoint slide, a Word document, or an oral question. Each student selects an answer to the question on a hand-held keypad and transmits a signal to the receiver. The technology for the signal transmission is similar to the infrared technology used in a TV remote. A special cable connects the receiver to the PC. Computer software indicates successful receipt of an individual student's signal, accumulates the data, presents the students' responses in a histogram, and records the responses in a file that allows the instructor to monitor individual student performance and assigns grades.

The PRS software also aids in creating and saving classroom questions. The PRS software can display the number of the question and the question on the computer screen within its software program. When the instructor asks the question, the instructor starts a clock, and the screen displays the allotted time to respond and the time remaining. As students respond to the question by touching the remote keypad, a signal is transmitted. The screen displays a grid with squares to accommodate each student's transmission of a response. These squares change colors and display the individual transmitter's number as a student response is received by the system. When the time expires or when the instructor stops the clock, a histogram presents the students' responses. The students also have the option of recording the confidence level of their responses as high, medium, or low, and the histogram presents these confidence levels in different colors.

Each student's answers are recorded with their transmitter's number within an Excel file. When the session is completed, the instructor can grade these responses against an answer file created

in an Excel worksheet. Within the software, the instructor accesses the students' responses, the answer file, and assigns the desired number of points for the questions. A new Excel file is created that contains each student's transmitter's number and grade.

One receiver is needed for approximately every thirty students. As the number of students increases, the students' signals may jam the receiver because it accepts only one signal at a time. When a signal is received, the receiver will not accept another signal for approximately one tenth of a second. If the receiver is "busy", students may send multiple signals that increase the "jamming." This creates frustration as students repetitively enter a response and watch for the transmitter's number to register on the screen.

Each receiver is capable of accepting thirty to fifty signals. For larger classes, additional receivers are daisy chained in a series with each other via the "in" and "out" connections on their cables. The "out" connects to the computer or to the "in" of another receiver in the chain. The "in" is connected to the "out" of another receiver or left empty if it is at the end of the line or the only receiver.

In a large classroom, the receivers are placed so only one receiver will detect a signal. The most efficient placement is usually the ceiling or the side walls of large lecture halls. The technical upper limit of transmitters that can be received by the system has not been clearly established, but EduCue[1], the manufacturer of one system, estimates a limit of approximately 1000. Instructors have easily implemented PRS in large lecture classes of 400-500 (EduCue, 2003).

A cable connects the receivers to the serial port of the computer to accumulate and tabulate the students' responses. If your computer does not have a serial port, a serial to USB adapter connects the receivers.

A file records the responses of individual students and a transmitter identification number. This transmitter number is assigned to one student through an initial check out sheet for the transmitter or a registration process for the transmitter number. The instructor uses this output to record daily attendance, evaluate students' class participation, or calculate a grade for class participation or an in class quiz.

What is the Cost of a PRS?

Not only is the technology easy to use, but also it is affordable. Recently, one publishing company began providing the technology free to instructors. The publisher provides the receivers, cables, and software at no cost to the university. However, the students are charged approximately $3.00 for a transmitter and $6.00 for a code associated with the publisher's textbook selected for the class. If the student has multiple classes that use the technology, the student uses the same transmitter but must purchase additional codes for each class. Another publishing company is offering instructional resource materials that use TurningPoint, software that integrates PowerPoint presentations with various personal response systems[2]. These supporting materials to their texts provide TurningPoint software and PRS hardware and software to the instructor at no cost. Transmitters must be provided by the university or

purchased by the student.

Another company, EduCue, markets the technology and current costs were available at their website prior to their acquisition by GTCO Calcomp, Inc [3]. For example, a Class Pack of thirty transmitters, one receiver, cable and software costs were approximately $1500 and a Lecture Pack of fifty transmitters, two receivers, cables and software and costs approximately $2400 (EduCue, 2003). If students purchased the receivers through their bookstore, the Class Pack without receivers costs were $1,170 and the Lecture Pack without receivers costs were $1,950. Receivers range from a cost of $27 to $36, depending on the quantity purchased.

Conclusion

The use of PRS appears to be a valuable tool for increasing interactivity within accounting courses. Not only is the technology easy to use but also available at low costs to universities. As instructors continue to develop courses that include the use of PRS, various research opportunities exist to determine whether PRS enhances learning.

Figure 1

Picture of EduCue's PRS system (Source: http://www.educue.com/Home.htm)

References:
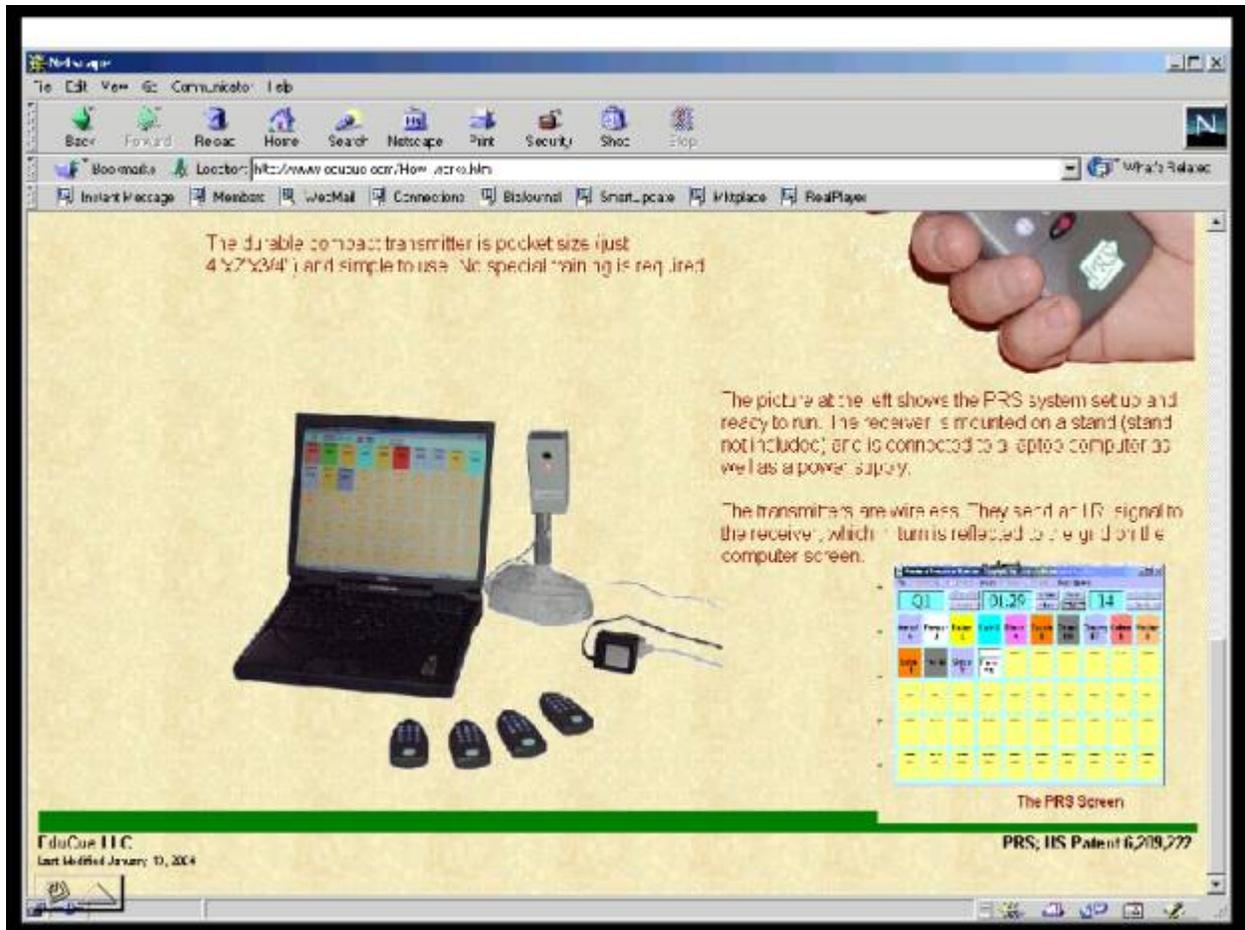
EduCue, http://www.educue.com/Home.htm September 28, 2003.

[1] EduCue was acquired by GTCO Calcomp, Inc in August, 2004. EduCue's website is directing questions about the system to: http://www.gtco.com/interwriteprs.htm

[2] See http://www.turningpoint.thomsonlearningconnections.com/index.html for details.

[3] See http://www.educue.com/Packages.htm. EduCue's website is directing questions about the system to: http://www.gtco.com/interwriteprs.htm