

Using Technology to Increase Student Interest, Motivation, and (Perhaps) Learning

G. William Hill, Randolph A. Smith, & Marco Horn
Kennesaw State University
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A classroom student response system (SRS) is a technology that allows instructors to record students' responses to multiple-choice questions presented in the classroom and then to instantaneously summarize and visually present the data to the class. Appearing in the early 1970s (see Whitehead & Bassett, 1975), the original systems were hardwired into panels at student seats, costly to install, and limited in their availability to the average instructor because they were generally available only in large auditorium multimedia classrooms, which were few in number. Over the last few years, the SRS technology has evolved to an affordable, wireless, portable, and user-friendly system that is easy to use in any classroom with a computer and projection technology and can be seamlessly integrated into presentation formats such as PowerPoint.

Although some psychologists have conducted research on the impact of incorporating the SRS into large classroom lecture sections (e.g., Brewster, 1996; Stoloff, 1995), the majority of studies have been in the hard sciences such as physics, chemistry, and biology (e.g., Cox & Junkin, 2002; Hake, 1998). The majority of these studies used the SRS in large classroom settings to assess student understanding of lecture material through administering ungraded quizzes, providing instantaneous student feedback to the instructor in a teaching situation that often had little opportunity for individualized student responses before a graded test (e.g., Hake, 1998; Stoloff, 1995). Based on the results, instructors could immediately address content that students understood less well. Although most studies reported positive student attitudes toward using the SRS, the results with respect to student learning are somewhat mixed with some studies reporting a positive impact, as measured by subsequent test results (e.g., Hake, 1998), and others weak or no impact (e.g., Brewster, 1996).

Brewster (1996) also described using the SRS to gather anonymous responses to sensitive issues (e.g., self-reports of having a social phobia) and opinions on issues. She reported that students were more likely to indicate having a social phobia anonymously via the SRS than to disclose it in a traditional classroom. Further, viewing the class results also contributed to increased discussion on the topic.

Because the previous research has primarily focused on using the SRS as a tool to assess understanding after a presentation of the content to students, we decided to explore further Brewster's observation that the SRS is an effective tool for introducing a content area and stimulating discussion and student involvement. We adapted a number of demonstrations and activities for teaching social psychology from several instructor's manuals to be administered using the SRS. In a typical classroom, instructors would present these activities either in survey format for scoring between classes or simply require individuals to raise their hand to respond to each of some set of questions.

Method & Results

The same instructor taught three sections of General Psychology (mean enrollment of 65) over three consecutive semesters (Fall 2002, Spring 2003, and Fall 2003), using the same text, PowerPoint presentations, and exams. The critical addition was SRS-intensive coverage of social psychology for the third exam in the Fall 2003 semester. Table 1 shows an sample SRS item.

Following a brief presentation of the methodology of Milgram's study, students used the SRS to respond to Slides 1 and 2, successively. The instant availability of the class data allowed a comparison and discussion in the context of the data in Slide 3.

The three classes were equivalent on SAT means (range 1024-1039). The three classes differed significantly on the third exam, $F(2, 168) = 4.78, p = .01$, with the SRS group scoring highest (Fall 2002 $M = 78\%$, Spring 2003 $M = 74\%$, Fall 2003 $M = 81\%$).

Fall 2003 students ($N = 47$) completed a survey on usage of the SRS. Using a scale of 5 = *Strongly Agree* to 1 = *Strongly Disagree*, they rated their perspective on the use of the SRS as a teaching tool in class (see Table 2). Students reported that they were more likely to express an opinion using SRS than either a show of hands or verbal responses. In addition, they said that using SRS increased their interest in the topic and their interest and participation during class, they believed that they learned more and understood more about a topic using SRS, and they wished that more classes used SRS. They did not believe that SRS was just another distracting gadget. Although the instructor did not keep attendance records, his anecdotal perception was that attendance in the SRS section was higher than that of the earlier classes. Further, the instructor observed higher levels of student involvement and discussion around SRS-based topics. It appeared that making a SRS response and then instantaneously "seeing" their responses compared to everyone else in the class may have stimulated students to become more actively involved in the subsequent discussion on the topic.

Conclusions

Although these results provide only weak evidence that using the SRS significantly impacted student test performance, the SRS provides the instructor with several advantages over more traditional paper-and-pencil and oral methods of using in class demonstrations and activities. First, the students clearly enjoy using the SRS and report greater involvement and interest in topics that incorporate the SRS. In addition, the SRS reduces the time involved for instructors to hand out, take up, and then score data from surveys and allows for a instantaneous administration and discussion of a demonstration or activity that can be adapted to the SRS. For faculty who may be interested in SRS, the Appendix includes contact information for several vendors.

References

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- Cox, A. J., & Junkin, W. F., III. (2002). Enhanced student learning in the introductory physics laboratory. *Physics Education, 37*, 1-8.
- Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics, 66*, 64-74.
- Stoloff, M. (1995). Teaching physiological psychology in a multimedia classroom. *Teaching of Psychology, 22*, 138-141.
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Table 1

*Sample Item Used for SRS Presentation.*PowerPoint Slide 1

Shock level at which you believe that you would disobey the experimenter in Milgram's study.

1. Slight Shock (15-60 volts)
2. Moderate Shock (75-120 volts)
3. Strong Shock (135-180 volts)
4. Very Strong Shock (195-240 volts)
5. Intense Shock (255-300 volts)
6. Extreme Intense Shock (315-360 volts)
7. Danger: Severe Shock (375-420 volts)
8. XXX Shock, Extreme Health Risk (435-450 volts)

PowerPoint Slide 2

Shock level at which I believe the average college student would disobey the experimenter in Milgram's study.

(same choices as Slide 1)

PowerPoint Slide 3

Percentage of Milgram's participants who stopped at a particular shock level.

- | | |
|-------|--|
| 0% | Slight Shock (15-60 volts) |
| 0% | Moderate Shock (75-120 volts) |
| 0% | Strong Shock (135-180 volts) |
| 0% | Very Strong Shock (195-240 volts) |
| 12.5% | Intense Shock (255-300 volts) |
| 20% | Extreme Intense Shock (315-360 volts) |
| 2.5% | Danger: Severe Shock (375-420 volts) |
| 65% | XXX Shock, Extreme Health Risk (435-450 volts) |

Table 2

Mean Ratings and Standard Deviations for Survey Items on SRS Usage.

Question	<i>M</i>	<i>SD</i>	<i>N</i>
1. I am more likely to express an opinion on a survey or questionnaire in class when the instructor asks questions that require me to raise my hand in response.	3.21	1.27	47
2. I am more likely to express an opinion on a survey or questionnaire in class when the instructor asks the class to respond out loud with a response or opinion.	3.15	1.14	47
3. I am more likely to express an opinion on a survey or questionnaire in class using the Student Response System.	4.66	.64	47
4. Using the Student Response System in class increases my interest in the topic being discussed.	4.36	.76	47
5. Knowing that we are using the Student Response System increases the likelihood that I want to attend class.	3.26	1.25	46
6. The instructor's use of the Student Response System in class does NOT enhance my understanding of the material.	1.91*	.97	47
7. I prefer lectures and demonstrations that incorporate the Student Response System.	4.34	.87	47
8. The Student Response System is just another gadget, and its use distracts me during class.	1.57*	.54	46
9. Using the Student Response System increases my attention and participation level during class.	4.38	.74	47
10. I learn more about a topic when the Student Response System is used to gather and display immediate feedback from the entire class.	4.23	.73	47
11. The Student Response System is a good tool for gathering class data and opinions about a topic as a lead-in to discussing the topic in detail.	4.45	.58	47
12. I think questionnaires and practice tests should just be handed out to individual students for their own Student feedback and am not interested in seeing the entire class's responses using the Student Response System.	1.76*	.60	46
13. I like using the Student Response System to administer practice questions because it indicates how well I understand course content compared to my classmates.	4.13	.80	47
14. I believe that the use of the Student Response System enhanced my performance on the Social Psychology content on Test 3.	3.64	.99	47
15. I wish more of my classes used the Student Response System.	4.22	.79	46

* For these items, lower ratings are more positive with respect to SRS usage.