Student Response Systems: An Overview for Ways to Get Students More Involved

学生応答システム：学生がもっと参加する方法の概要

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Abstract

近年、大学の多人教クラスへの学生　応答システム（SRS）の導入は、すぐに評価ができる環境を作ることにより、学生のフォーカスを強化する手段として、教育者の間で関心を集めている。この概要では、多くの北米の大学に続いて学生の応答のデバイスのアプリケーションを検討する。さらに、日本で開発されたローテク代替ローテクは、SRS 名目価格でほとんど教室に実装できることを実証するために導入される。大学の教育者にとって、学生がすべてのクラスでリモートデバイスを利用して質問に答えることが期待できるので、SRS デバイスの出現は、学生の学習状況をより説明しやすくできるという利点がある。その後、クラスの参加者は、アラートと講義に集中し続けている必要がある。研究にあれば、その瞬間の対象とフィードバックの SRS の技術を使用して、より意欲的であることが分かっている。また、教育はすぐに SRS の帰還―クラスの連続を通じて講義資料や読書割り当ての学生の理解度を決定することができる。

Key words: ☐ Student response systems (SRS) ☐ Learner accountability
☐ Interactive classroom ☐ Large-sized university lectures
☐ Low-tech handheld devices ☐ Remote control clickers

Introduction

Quite similar to a television remote control, student response systems (SRS's)—also known as classroom or audience response systems, electronic voting systems, and colloquially referred to as clickers—initial aim was to reduce the teacher fronted time of a unilateral lecture format to allow students to participate more freely in class. Using this remote device, students enter responses or answers by choosing a corresponding correct number or letter—usually based on true/false or multiple-choice questions—created by the teacher for each particular class. This process consists of student responses being sent using a radio frequency that is then interpreted by software installed on the instructor's computer. Once the answers are sent, educators can then display class responses using a powerpoint or keynote graphical chart like a histogram in a mere matter of minutes (Deal, 2007).

With this technology, students can quickly ascertain whether their answers were correct and how they compared to the rest of the class. In simple terms, SRS devices provide instant assessment regarding their understanding of the classroom material. Steinberg (2010) estimates that over half a million students at several thousand American universities are now using these devices. One obvious advantage of employing SRS technology versus having students choose answers by raising their hands is the issue of anonymity. Using SRS can alleviate the potential embarrassment of students choosing an incorrect answer in front of classmates. Hodges (2010) pointed out that eliminating this anxiety makes students feel more at ease and supportive of working with clickers.

For educators, the main advantage of implementing SRS as a methodological tool is that it facilitates feedback concerning student comprehension of reading assignments and can dictate whether to proceed with more challenging material or review weak areas revealed by student answers based on in-class responses. In today's large university required core classrooms, some teachers may assume that students understand key concepts, but are disappointed when exams reveal an overall lower level of comprehension than anticipated. One way to counter this condition is by introducing student response systems throughout the semester because they are able to quantify the percentage of students that complete the readings and/or assignments, and understand the course's main concepts. Furthermore, the presence of SRS encourages students to review their textbooks and notes since classroom lectures now include their recorded responses. Also, the device could serve as the catalyst for those students that do not understand lecture material to either seek assistance from their teachers after class or find a knowledgeable classmate to help them overcome any academic deficiencies.

Another worthwhile application of SRS is that participants can log into a system and type in their student numbers at the beginning of class. This routine can eliminate the tedious task of conducting attendance by teachers. In fact, taking attendance for many large lecture style classes is quite often an exercise in futility. Thus, the student response system can be utilized as a practical attendance report that can be readily imported into a software program to chart both student participation and attendance. One caveat to this technological advancement is that SRS would summarily eliminate the need to call out student names for attendance and limit individual interaction. Some educators may feel that calling out attendance is an ideal way to familiarize themselves with students' faces. So, while SRS possesses many positive attributes such as helping students stay on-task in class, become more accountable for their learning, coupled with the added incentive for instant assessment, it does run the potential risk of reducing the all-important human interaction of teachers and students. Therefore, teachers adopting SRS as a learning tool must seek additional ways to humanize classroom learning so students will feel less like a mere contestant on a game show. Instead, an SRS approach that encompasses more focused student involvement is now seen as a significant improvement

from earlier approaches.

While many educators reluctantly choose to use simple true/false or multiple-choice questions, a more intuitive model espoused by Eric Mazur at Harvard University offers opportunities for deeper learning with SRS. Mazur showed 10 years of continuous improvement in the pretest/posttest gains by successive classes of students on the Force Concept Inventory using his Peer Instruction pedagogy (Crouch & Mazur, 2001; Fagen, Crouch, & Mazur, 2002; Mazur, 1997). This ability for SRS to promote group activity through discussion, reasoning, and peer instruction is a positive way to stimulate critical thinking and provide a deeper educational experience for university students. Perhaps more importantly, this represents a shift away from the game show aspect of SRS into a realm of higher learning more indicative of a university classroom.

System Costs and Options

Many commercial companies sell both the handheld devices and the software to tabulate student responses in real-time. In North America, a student response system device or clicker typically costs between $20 and $40. Here in Japan, there are a variety of vendors that supply audience response systems to the education market. Results of an online search yielded the following companies: Fine Woods, Chieru, Kimura Information Technology, Interwrite, and Keepad. Each of these companies has clicker rentals and purchase options via their websites. Although I have yet to submit a formal request from any of these vendors, we can likely assume that the clicker cost is in the same range as North America. Therefore, for a large lecture class consisting of approximately 200 students—with an estimate price of 5,000 yen per unit—the cost of purchasing an SRS would be in the vicinity of 1,000,000 yen. A university department can elect to share the SRS device among different classes to better utilize its proliferation and justify the purchase or rental cost. For instance, if an SRS system were adopted by five different classes per semester for 30 classes per year, then the actual cost would equal 1,000,000 yen divided by 150 yearly class meetings. This would equate to 6,667 yen per class for adopting SRS on an annual basis. However, extrapolating the rollout of SRS and the clicker in class for five continuous years and the annual cost per class would fall to a much more cost effective level of 1,333 yen per class. Using this longer-term cost-benefit analysis makes SRS technology much more appealing and justifiable from an administrative standpoint.

In recent years, some universities have experimented with incorporating mobile phone devices using applications to function in the role of the clicker. Cruz e Costa et al (2008) developed a Java based MIDlet application to run on students' phones which were then used to answer questions during class. Although the results from this study in Finland seem promising

and cost effective, I would hesitate from embarking on a similar venture at our academic environment. Permitting students to keep a mobile phone in their hands or on their desks is—in this educator's opinion—a recipe for disaster. Students will view it as an opportunity to send and receive text messages throughout the class and subsequently wander off task. Designating smart phones as in class learning tool may sound good in theory, but they would more likely defeat the purpose of introducing clickers as a better way to engage and encourage learning.

The low-tech alternative

Integrating student responses and opinions during language class remains an ongoing pedagogical challenge for teachers. Shimizu and Pellowe (2010) acknowledged that budgetary constraints often curtail implementation of full-scale student response systems for many schools. As a result, they developed a very basic handheld device that serves a similar function to its high-tech counterpart. Their product called captur.me is a two-sided handheld narrow paddle with answers on either end using the letters A~D with each letter designated by a color and shape. The idea is nearly the same as an electronic clicker except students are expected to raise the paddle with their answer choice when asked by the teacher during class. In this manner, the teacher can easily distinguish between correct and incorrect answers by scanning the classroom for student responses. Students that fail to hold up the paddle to the teacher's questions can be identified almost immediately. Figure 1 shows an example of the captu.me response card.

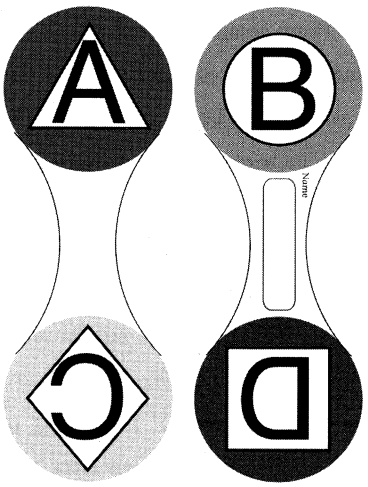

Figure 1: Two-sided response card

Conclusion

The clear-cut benefits for implementation of student response systems have been discussed throughout this paper. As a two-year member of the university faculty development committee, I am now part of a sub-committee in charge of developing a student survey gaining feedback on the continuous problem of chatting in class. Apparently, this is a common complaint expressed by students on the university-wide survey given each year. While there are many approaches to curtail this problem in class - and it would likely vary by department and faculty member—one could portend that this annoying problem would be less of a learning hindrance

if our university decided to utilize student response systems into larger lecture classes. Once in place, students would quickly realize that their attendance, participation, and answers would be recorded. This technological does of reality would likely make many students more accountable, increase motivation since clickers are often perceived as high-tech (read: cool), and could even lead to better interaction and focused discussion among classmates.

The challenge regarding this technology is to convince professors that SRS as a teaching tool is something worth pursuing and making an integral part of their classes. One bottleneck will be persuading educators to slow down the pace of lecture material so in-class questions and responses using clickers—as well as possible group work—will receive adequate time for classroom discussion. Regardless of any pitfalls, the interactive and technologically savvy advantages of SRS seem to far outweigh the current model of a teacher-fronted or unilateral lecturing method. Today, an ever-increasing number of top universities around the globe are investing in student response systems for large classes. Perhaps it is time to acknowledge that the future is now and we need to click on the start button for more classroom interactivity.

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