Clickers in the classroom: The use of student response systems in teaching psychology

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Student response systems (SRSs) have been used in a number of disciplines in higher education and, generally, the literature reports this technology leading to very positive outcomes for student engagement and learning. Learning outcomes are particularly enhanced if the technology is used to promote higher order cognitive skills. Here, we discuss some benefits and identify some challenges involved, and suggest how pedagogical action research can usefully address these challenges. Pedagogical action research is concerned with reflection on current teaching practice, future objectives in terms of refining practice, and assessment of outcomes for both student and instructor. We suggest ways in which action research can provide fruitful and important data that, in turn, can lead to improved outcomes for instructors and students.

Keywords: Student response systems; clickers; pedagogical action research; teaching psychology; higher education; student-centred; interactive learning.

The growing ubiquity of technology in the classroom has brought us a long way from the traditional 'chalk and talk' paradigm. Technology is an integral part of university life and, whilst most psychology departments use PowerPoint, virtual learning environments, intranet and online databases, there are other, more innovative technologies that can be useful in the learning environment.

A student response system (SRS) enables students to respond to questions on a screen, by using remote control devices ('clickers') to make individual responses. Responses are transmitted to a receiver and instantly collated, summarised and presented in the form of a histogram on-screen, allowing a snapshot of students' responses to each question. SRSs have been widely used in education since 2003 (Kay & LeSage, 2009) and have many benefits that address current directions in pedagogical practice. The literature on attention, for example, has demonstrated a general pattern in students' ability to focus, with an observed decline in concentration after 20 minutes of a lecture (Johnstone & Percival, 1976; Mittendorf & Kalish, 1996). Introducing an SRS session into a lecture has been suggested to be an effective method of reducing fatigue and regaining students' attention, and past research has reported that students are more focused in class when using SRSs, and attention is more sustained (e.g. Bergstrom, 2006; Burnstein & Lederman, 2001; Caldwell, 2007).

Moreover, the psychology literature asserts that deep level, rather than surface level processing facilitates learning (Craik & Lockhart, 1972; Marton & Säljö, 1976). This principle is reinforced by later research (e.g. Biggs, 1999; Cohen, 1991; Prosser & Trigwell, 1998) that considers class participation to be of key importance in the interaction between teacher and student, leading to the current emphasis on student-centred learning, student involvement and active class participation. From this perspective, use of this technology can be seen as beneficial for higher order cognitive skills, particularly when encouraging independent thinking. For example, Gauci et al. (2009) posed vignettes that required students to consider dilemmas, and to engage in thoughtful peer-to-peer discussion before using clickers to submit their answers from a choice of possible actions. This engagement with problem-solving and critical skills is thought to promote deep learning (e.g. Krathwohl, 2002). Psychology is somewhat unique as a discipline in that it that encompasses not only specific knowledge but also a discursive epistemological approach, in which debate and critique are imperative, hence there are many opportunities for using clickers to their best advantage in the classroom. However, Gauci et al. (ibid.) noted that lack of experience with clickers led some instructors to set simple multiple choice questions, which engender a more surface-level engagement with the material.

SRSs have made a qualitative difference to the learning experience by allowing the instructor to place questions strategically throughout the lecture so as to assess misconceptions and enable revisiting of topics if necessary (Beatty, 2004; Draper & Brown, 2004). In this regard, the technology provides a valuable sense of immediacy and spontaneity

to any lecture session. This leads to increased motivation, for both students and instructors (Liu & Stengel, 2011). A competent and experienced teacher will be able to react quickly to student responses. Nonetheless, many instructors will feel uncomfortable doing this, preferring not to deviate from a well-planned lesson.

The present authors discuss our experience of using SRSs in teaching psychology. Thus far, we have used SRSs for teaching research methods, cognitive neuropsychology and biological psychology, which are all subjects that rely on specific factual information, scientific methodology and research. We have used SRSs in various settings, including small classes (20 students or fewer), large classes (more than 200 students) in a lecture theatre and as an 'ice-breaker' activity for new students at an induction day. Typically, a quiz might comprise around 20 multiple-choice questions and take around 20 minutes (or up to an hour if there is ongoing discussion about each question and the responses to it). We had some very brief instruction on how to use the technology, and found it to be user-friendly and we quickly learned how to run quizzes. However, there have been a few occasions when we were challenged by the technology, resulting in students becoming bored and frustrated, and leading to some sense of anxiety for the lecturer in subsequent classes.

It seems, therefore, that the use of clickers in the classroom can potentially be of enormous benefit, but that there are some disadvantages, namely: (1)that lack of experience can lead to a reticence on the part of the instructor to use SRSs for anything more challenging to students than multiple choice questions; (2) that less experienced instructors feel uncomfortable in using clickers on an ad hoc basis, preferring instead not to deviate from a pre-planned lesson; and (3) that using an unfamiliar technology can lead to anxiety for instructors. All three issues serve to limit the possible learning opportunities for students.

These issues can usefully be explored by an iterative process such as action research. Experiences of both instructors and students provide valuable data from which to move forward in terms of identifying shortfalls in the use of SRSs and can lead to effective solutions. It may be that a simple training programme for instructors, together with ideas on how to promote the use of higher order cognitive skills with SRSs could be piloted, and followed up by further evaluation of both instructor and student experiences. It is this iterative and continually developing process that characterizes pedagogical action research and can lead to effective solutions in the classroom.

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