

PROMOTING GAME-LIKE CLASSROOM ENVIRONMENT: THE USE OF CLICKERS IN TEACHING, LEARNING, AND ASSESSMENT

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ABSTRACT

Recent studies show that students at all education levels learn best when classrooms promote participatory activities that re-enforce the material being presented by educators (Mayer & Johnson, 2010; Rieber & Noah, 2008; Wang, 2008). Activities such as quiz-game-like questioning or other game-like simulations engage students, make them more attentive during a class, and provide ways a teacher can gain valuable feedback for assessing student learning. Classroom response systems such as clickers are one way to promote teaching, learning, and assessment in an interactive environment. Clickers are becoming more and more popular in American colleges and universities. Some U.S. higher education institutions even require their students to purchase and carry their personal clickers between classes. This paper will discuss clicker technology and how it is being used in the classroom for teaching, learning, and assessment in the United States. The paper will review the research done on classroom response systems, its effectiveness as an instructional technology, how the teaching faculty and students view it, and direction for its future development. The targeted audience includes classroom faculty who are interested in enhancing their teaching by trying new instructional technologies. Clickers from TurningPoint will be used for examples.

KEYWORDS

Clickers, Response cards, Classroom response systems, Assessment, Evaluation, Instructional technologies, Audience response systems

INTRODUCTION

The use of classroom response systems is becoming a popular and successful educational tool to increase student attentiveness and participation. The technology enhances the classroom experience by using game-like activities to create an interactive environment that promotes student discussions with teachers and fellow students, and re-enforces the material presented, an environment in which students seem to learn best (Mayer & Johnson, 2010; Rieber & Noah, 2008; Wang 2008). In addition to promoting student engagement, the activities provide educators with immediate student feedback on how well material is being understood, enabling teachers to adjust their presentation to address the difficult learning areas. Student responses also enable educators to identify students who need additional help, and track student development over several classes.

There have been numerous studies of the effectiveness of classroom response systems. The majority of the studies show a marked improvement in student attentiveness, participation, enthusiasm, and achievement (Bunce, Flens & Neiles, 2010; Keller *et al.*, 2007). A few study results have raised questions concerning whether these learning levels are retained over time (Liu, Gettig & Fjortoft, 2010).

All classroom response systems are similar in their use and technology. This paper will focus on setting up and using the TurningPoint Technologies' clicker's response system first marketed in 2002. It is currently used by over 700 colleges and universities.

Clicker Technology

A typical classroom response system includes three components: a clicker or respond card, a receiver or responder, and the proprietary software. A clicker looks like a TV remote control. The receiver goes into the USB port on the instructor's computer. See Figure 1 for a graph of a clicker and receiver. The software must be installed on the instructor's workstation as well.



Figure 1. A Clicker and receiver.

A clicker works in a similar way to a gaming system that most young students grew up using. Its buttons display numbers 1 to 9 and letters A to I. The numbers and letters represent choices that students click when answering questions. Each clicker has a unique hardware device number listed on its back. Pressing a button on clicker will send a signal to the receiver that plugs into the USB port on the instructor's computer. The clicker's unique number is broadcast along with the user's response which enables the receiver to identify which clicker is sending out data. The receiver will register the responses in the clicker software. In turn the clicker software will collect and store the answers that it receives and display the results in graphics on the screen of the instructor's computer. The software also tabulates the responses for statistical reporting and analysis that can be extracted later. If a classroom is equipped with a big projector screen, the whole class can see the responses instantly in graphical and percentage representations.

Each clicker is configured to use a particular channel which can be easily changed if there is an unexpected conflict. All the students in the same class and physical classroom must use the same channel, especially if other classrooms are nearby. Students in an adjacent classroom should use a different channel. If two clickers are on the same channel in two classrooms within 240 feet from each other, their signals may end up registering in the wrong receiver.

TurningPoint clicker software can be downloaded for free from the TurningPoint Web site (<http://www.turningtechnologies.com/>). There are two types of clicker software, one that works within Microsoft PowerPoint and one that works independently. The Microsoft PowerPoint software must first be installed before being used. The installing process contains on-screen directions that are easy to follow. An icon will be created on the desktop after the installation. Clicking on the icon will start Microsoft PowerPoint with the clicker program available as a tab on the top menu bar. Clicking on the tab will display the clicker menu. See Figure 2 for the clicker menu in PowerPoint. In either type of clicker programs, the instructor needs to inform the system of the type of participants that will be sending responses. A pull-down menu is accessible in the clicker software that displays choices such as "Auto", "Anonymous", or a participant list. See Figure 2 for a snapshot of the pull down menu with three participant modes. The numbers "18", "20" to "23" are participant lists with 18 to 23 students in each. The clicker program's Participant Wizard allows the instructor to create a participant list for any number of students with an assortment of customized fields.