

Interactive Response Systems Technology Project

Background

When I last taught and took college-level mathematics courses in the early 1980s, the only equipment used in the mathematics classroom was chalkboards. Whiteboards were nonexistent and no mathematics professors taught with overhead transparencies. That is not to say that I have no experience with technology with regards to teaching. As a 30-year computer professional, I used many different types of technology to “transfer skills” to other people. As my children entered middle school, I learned about calculators being used to teach mathematics, but until taking Algebra in the Math Classroom, I had not used a graphing calculator. As a computer professional, I witnessed the transformative power technology and the Internet brought to many industries and I believe technology and the Internet have and will continue to transform Education, though at a much slower pace due to the drag politics and religion place on our nation’s educational systems. I believe teachers need to embrace emerging technologies to help them become more efficient and effective teachers and to engage their students and improve student learning.

I had no prior knowledge of “clickers” in Education. My mental image was of the noisemakers used by animal trainers. However, after I researched the technology, I discovered that clickers are wireless classroom voting or polling systems. I have participated in online polls before, usually during webinars by speakers needing information from their remote attendees. The use of polling in webinars is fairly limited and rarely if ever is used to foster discussions between attendees. As I began to read articles about the use of clickers in mathematics classrooms, I quickly gleaned that technologically speaking, clickers are fairly simple data entry devices similar to garage door openers. Clickers are just one piece of an interactive response system, which also includes computer software to manage question lists and polling results. Participant responses can be displayed or not. Polling data can be stored and tools are provided for later analysis and transfer to other educational systems. But the most intriguing and important aspect of clickers uncovered in my research is the selection and timing of questions and the choice of responses. Teachers need to thoughtfully write questions and associated responses, decide whether or not the responses will be shared with the class, and whether or not the students will remain anonymous in their responses. It is the teacher’s pedagogical decisions about when and how she will incorporate clickers into her lessons that determines the clickers’ effectiveness in enhancing student learning.

The instructional module below is directed at teachers. Though they will learn about the components and installation steps of a TurningPoint 5 system using ResponseCard NXTs, and PresenterCard in their classroom, the most important goal for them to achieve is to understand how interactive response systems can be used to motivate and engage their students and improve student learning

outcomes. The teachers need to also have an appreciation for the following statistics:

- 93% of students say voting makes class more fun
- 90% of students say voting helps them engage in the material
- 84% of students say voting helps them learn

However, when students perceive that voting is being used primarily for the teacher's benefit, i.e., attendance, quickly grading quizzes, etc., they are more likely to **resent clickers** (McGivney-Burelle, J. & Stewart A. 2013).

Resources

The following articles, blog posts, presentations, and websites address the pedagogical uses of interactive response systems technology (clickers) in the classroom.

Bruff, E. (n.d.) Clickers and Classroom Dynamics. Retrieved on June 24, 2013 from <http://www.nea.org/home/34690.htm>.

- Provides a general discussion of clickers' uses and benefits in the general classroom.

Cline, K. and Zullo, H. (2011). Creating Discussions with Clickers and Classroom Voting. Retrieved on June 24, 2013 from http://www.maa.org/pubs/FOCUSJune-July11_clickers.html.

- Discusses the beneficial use of clickers in the mathematics classroom to motivate students to work in groups to solve problems and talk about math during class. The authors discuss the challenges of developing good discussion questions.

MathQUEST/MathVote. (n.d.) Resources for Clickers and Classroom Voting in Collegiate Mathematics. Retrieved on June 24, 2013 from <http://mathquest.carroll.edu>.

- A website full of resources and question lists for Algebra and college level mathematics.

McGivney-Burelle, J. and Stewart A. (2013). Teaching with Classroom Voting and Clickers. Retrieved on June 24, 2013 from http://sections.maa.org/mddcva/MeetingFiles/Spring2013Meeting/TalkSlides/McGivney-Burelle_Stewart.pdf.

- A presentation from a Mathematics Association of America meeting that discusses the benefits of classroom voting, provides sample questions, and discusses what effects student perception and acceptance of clickers.

Popelka, S.R. (2010). Now We're Really Clicking! *Mathematics Teacher*. 104(4). pp. 290-295.

- This was the first article I read about using clickers in the classroom, which lead me to understand that the real issues about using the technology is not with the technology itself but the pedagogical philosophy and decisions teachers make when using them.

Talbert, R. (2012). Encountering abstraction with clickers. Retrieved on June 24, 2013 from

<http://chronicle.com/blognetwork/castingoutnines/2012/02/27/encountering-abstraction-with-clickers/>.

- This article explains the importance of giving the students an “I don’t know” response choice when using clickers to teach abstract concepts. In the accompanying online presentation, Talbert discusses the benefits of Peer-Instruction on student learning and how clickers and the type of questions facilitate Peer-Instruction.

Resources for Installing and Using the Turning Technologies TurningPoint 5 System

Turning Technologies. (2012). TurningPoint Quick Start Guide. Can be retrieved from <http://turningtechnologies.com/pdf/UserGuides/QuickStartGuide-5.2.pdf>

- I used the Quick Start Guide to lead me through the product installation steps.

Turning Technologies online tutorial and documents can be retrieved from <http://turningtechnologies.com/training-support/new-turningpoint-training>

- I watched many of the tutorials while referring to the online documents before launching the Dashboard software. I referred to the tutorials as needed when attempting to use the Dashboard functions for the first time.

Turning Technologies Users Guides can be retrieved from <http://turningtechnologies.com/user-guides>

- I skimmed the users guide to become familiar with the documents.

Instructional Module

- I. Discuss pedagogical uses, resources, and best practices for using clickers in the classroom. While demonstrating anywhere polling using a set of sample questions, review Resources section on the One-Page Reference Guide. Students will also get to experience different question types. Discuss how **conceptual questions foster Peer Instruction. Peer Instruction has been proven to improve student learning of ALL students.**
- II. Discuss ResponseWare app. Though earlier reviews have been positive, more recent student reviews have been poor.
- III. Installation steps.
 - a. Installation of PC software
 - b. Setting channel
 - c. Setting PresenterCard Device ID
- IV. Setting up Participant List(s) (integration with Blackboard)
- V. Overview of the TurningPoint 5 Dashboard
 - a. Polling: PowerPoint, Anywhere, Self-paced
 - b. Content: Question lists, PowerPoint, Import
 - c. Manage: Participant Lists, Session Results
 - d. Integration with Blackboard and other systems.
- VI. Creating polling content
 - a. Question List – all types of questions and options
 - b. PowerPoint – both with or without question list
 - c. Import to/export from TurningPoint5 question lists
- VII. Demonstrate Polling
 - a. PowerPoint
 - b. Self-Paced – requires student have access to questions outside of TurningPoint dashboard
- VIII. Demonstrate Manage tab. If not done so already, point out the research cited that if students perceive that voting is being used primarily for the teacher's benefit, i.e., attendance, grading quizzes, then they are likely to resent clickers. You must use it to help the students, not just you!