

# Chapter XLV

## A Formative Analysis of Interactive Classroom Communication Systems Used in Secondary School Classrooms

**Robin Kay**

*University of Ontario Institute of Technology, Canada*

### ABSTRACT

*Extensive research has been done on the use of Interactive Classroom Communication Systems (ICCS) in higher education, but not in secondary schools. This chapter provides a detailed overview of the benefits, challenges, and strategies observed when using ICCS in higher education. This overview is then used to analyze and interpret quantitative and qualitative data collected from 659 secondary school students. The main benefits that students identified for using ICCS were increased use of formative assessment, higher engagement and motivation, enhanced participation, and improved focus during class. Students were relatively neutral, though, with respect to whether ICCS improved class discussion or learning. The main challenges that students reported were increased stress and uncertainty of answers when ICCS were used in a formal test situation. Males were significantly more positive toward ICCS, as were students who had higher comfort levels with technology. When ICCS were used for formative assessment as opposed to formal tests, students were significantly more accepting. The chapter concludes with suggestions for educators and future research.*

### OVERVIEW AND HISTORY

Interactive Classroom Communication Systems (ICCS) allow students to respond to multiple

choice questions using a remote control device. After students click in their responses, the results are instantly aggregated and displayed in chart form, usually a histogram. Responses are often

anonymous but can be linked to specific students for evaluation purposes. A comprehensive review of the literature reveals no less than 26 different labels for ICCS including audience response systems (e.g., Caldwell, 2007), classroom response systems (e.g., Siau, et al., 2006), electronic voting systems (e.g., Simpson & Oliver, 2007), personal response systems (e.g., Brewer, 2004), clickers (e.g., Bergtrom, 2006) and zappers (e.g., d’Inverno, Davis, & White, 2003). The label “Interactive Classroom Communication Systems” was chosen for this chapter because the tool promotes “interactivity”, is used in a “classroom” setting, helps “communicate” information to both students and teachers, and is used most effectively within a “system” of thoughtful pedagogical learning strategies.

Judson and Sawada (2002) noted in a comprehensive review of early work on ICCS that student attitudes toward these systems in higher education was universally positive. However, the cost of using ICCS at that time was prohibitive. It was not until 1992 that the first popular ICCS became commercially available. A new generation of easier to use, affordable ICCS started gaining acceptance at universities in 1999 (Beatty, 2004). Several research reviews have been completed examining the use of ICCS (Caldwell, 2007; Fies & Marshall, 2006; Judson & Sawada, 2002), however all but one of the numerous papers reviewed (Penuel, Boscardin, Masyn & Crawford, 2006) focussed on higher education. Little is known about the use of ICCS in secondary schools.

The purpose of this chapter is to discuss the potential benefits, challenges, and strategies associated with using ICCS, then to present and evaluate the feedback and comments from 659 secondary school students who used ICCS over a period of one month.

## **BENEFITS TO USING ICCS**

### **General Student Attitudes**

Prior to 1992, student overall acceptance of ICCS was quite high (Judson & Sawada, 2002), although much of the evidence presented was anecdotal. A more recent analysis of student attitudes is consistent with previous results. There is considerable quantitative and qualitative evidence to suggest that higher education students have positive attitudes toward using ICCS (Caldwell, 2007; Carnaghan & Webb, 2006; Draper & Brown, 2004; Judson & Sawada, 2002; Kaleta & Joosten, 2007; Paschal, 2002; Poulis et al., 1998; Prezler, Dawe, Shuster, & Shuster, 2007; Reay, Bao, Li, Warnakulasooriya, & Baugh, 2005; Sharma, Khachan, Chan, & O’Byrne, 2005; Abate, Hidges, Stamatakis, & Wolak, 2004). However, it is critical to focus on specific benefits in order to truly understand whether ICCS is a viable tool in the classroom. The list of advantages that have been researched in higher education with respect to the use of ICCS include

1. Improving attendance;
2. Increasing participation and interaction;
3. Making participation anonymous;
4. Increasing student attention;
5. Enhancing student engagement;
6. Increasing class discussion;
7. Increasing the use effective formative assessment; and
8. Enhancing learning.

Each of these potential benefits will be discussed in detail.

### **Attendance**

ICCS have been introduced at universities to help address attendance problems. A number of

21 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/formative-analysis-interactive-classroom-communication/35947](http://www.igi-global.com/chapter/formative-analysis-interactive-classroom-communication/35947)

## Related Content

---

### Use and Perceptions of External Content Providers: A Teacher's Journey Through the Process

Jennifer Hahn (2008). *Videoconferencing Technology in K-12 Instruction: Best Practices and Trends* (pp. 90-103).

[www.irma-international.org/chapter/use-perceptions-external-content-providers/30780](http://www.irma-international.org/chapter/use-perceptions-external-content-providers/30780)

### A Statistical-Probabilistic Path

(2021). *Computer-Based Mathematics Education and the Use of MatCos Software in Primary and Secondary Schools* (pp. 467-489).

[www.irma-international.org/chapter/a-statistical-probabilistic-path/260140](http://www.irma-international.org/chapter/a-statistical-probabilistic-path/260140)

### Theory of Mind in Autistic Children: Multimedia Based Support

Tariq M. Khan (2011). *Technology Enhanced Learning for People with Disabilities: Approaches and Applications* (pp. 167-179).

[www.irma-international.org/chapter/theory-mind-autistic-children/45509](http://www.irma-international.org/chapter/theory-mind-autistic-children/45509)

### Demonstrating Learning with Computing: Sixth Grade

Catherine Schifter (2008). *Infusing Technology into the Classroom: Continuous Practice Improvement* (pp. 209-224).

[www.irma-international.org/chapter/demonstrating-learning-computing/23777](http://www.irma-international.org/chapter/demonstrating-learning-computing/23777)

### STEM Outreach with the Boe-Bot®

Ronda K. Cole (2012). *Robots in K-12 Education: A New Technology for Learning* (pp. 245-265).

[www.irma-international.org/chapter/stem-outreach-boe-bot/63418](http://www.irma-international.org/chapter/stem-outreach-boe-bot/63418)