

# Chapter 7

## Do Your Classes Click?

### Interactive Remotes Foster Effective Pedagogy

**Linda L. Forbringer**  
*Southern Illinois University Edwardsville*

#### ABSTRACT

*This chapter describes a study that examined the use of interactive remotes (clickers) in teacher education courses. In previous studies, interactive technology has been shown to increase student interest, participation, and learning in a variety of other disciplines. This study replicated those findings with pre-service and practicing teachers, but also investigated the clickers' effects on teachers' developing understanding of three evidence-based pedagogical practices: (1) active participation, (2) providing students with opportunities for frequent review and feedback, and (3) using formative assessment to guide instructional decisions. Results were overwhelmingly positive. Participants reported that using the technology developed their understanding of the targeted pedagogical practices, and this growth was reflected in their discussion of effective pedagogy after having used the interactive remotes. The chapter includes a review of the supporting pedagogical foundations, a discussion of the limitations of the current study and implications for further research.*

#### INTRODUCTION

In a climate of shrinking resources and increasing accountability, teacher educators are challenged to develop competent teachers quickly and efficiently. Today's teachers must have the content knowledge and pedagogical expertise to help their students master increasingly rigorous content standards measured by controversial high stakes tests, as well as the ability to integrate technology into instruction. Shrinking budgets and external pres-

ures force universities to educate teachers quickly with limited resources, so strategies that can help teachers develop multiple skills simultaneously are especially valuable. Clicker technology has the potential to do just that.

Clickers are hand-held keypads that students use to respond to questions posed by the instructor (Bruff, 2009). The clickers transmit the responses to the instructor's computer via infrared or radio frequency signals, and the system software aggregates the data. The teacher can then display

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the aggregated responses as a bar graph showing either the number or percentage of students who selected each response option. All forms of the technology allow students to respond to multiple choice, true/false and rating questions, and some also permit numeric or text responses. The resulting histogram can spark discussion, help students recognize when they need to review information, and facilitate on-the-spot revisions to instruction. The technology is known by a variety of names, including student response systems, audience response systems, personal response systems, classroom communication systems, group response systems, electronic voting systems, and others. Several versions of hand-held remotes are available for use in the classroom, including systems to use with presentations, interactive white boards, and apps (Bruff, 2009).

Clickers have the potential to help educators develop three pedagogical practices that have been demonstrated to increase achievement outcomes among kindergarten through twelfth grade students: (1) promoting active participation (see for example Heward et al., 1996), (2) providing ongoing review and feedback (see for example Black & Wiliam, 1998b; Pashler et al., 2007), and (3) using formative assessment to guide instruction (see for example National Council of Teachers of Mathematics [NCTM], 2007; Wiliam, Lee, Harrison & Black, 2004). Interactive remotes integrate all three of these instructional strategies. The clicker questions provide ongoing review of course content. Learners are active participants when they respond to clicker questions, and the graph of their responses and ensuing discussion provides immediate feedback. In addition, the aggregated responses provide formative feedback that allows the instructor to refine instruction. When teacher educators model a strategy and their students have first-hand experience with its benefits, and when students then have the opportunity to evaluate how those benefits improved their own learning, the likelihood increases that candidates will use the strategy later in their own teaching (Albion, 2003;

Center for Educational Research and Innovation [CERI], 1998; Loucks-Horsely, Hewson, Love & Stiles, 1998; Steketee, 2005).

This chapter shares the results of a preliminary study conducted in undergraduate and graduate teacher education courses in a mid-western university. In previous studies, interactive remotes have increased student interest, participation and learning in college-level courses in a variety of disciplines (Bruff, 2009). This study sought to replicate those findings in teacher education courses and also to investigate the effects of using interactive remotes on participants' developing understanding of the evidence-based pedagogical practices listed above: (1) fostering active participation, (2) providing frequent review and feedback and (3) using formative assessment to inform instruction. It also investigated how using clickers affected participants' desire to use interactive technology in their own teaching.

After reading this chapter, teacher educators will be able to describe how

- (1) Incorporating interactive remotes into teacher education classes can increase pre-service and practicing teachers' appreciation of interactive remotes and increase the probability that these individuals will use the technology in their own classrooms, and
- (2) Clickers can deepen pre-service and practicing teachers' understanding of the value of the targeted pedagogical practices including active participation, frequent review and feedback, and using formative assessment to guide instructional decisions.

## **BACKGROUND**

College instructors began experimenting with electronic response systems in science courses in the 1960's (Judson & Sawada, 2002). The technology has steadily advanced, and reviewers of the research on interactive remotes report that

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