Chapter 14
Student Perceptions Regarding Clickers:
The Efficacy of Clicker Technologies

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ABSTRACT

This mixed-methods research study shows that the incorporation of real-time polling in an introductory Anthropology course (n = 107) taught in a large lecture class at a mid-size university can have a positive impact on students' perceptions of (1) satisfaction; (2) participation; and (3) whether the instructor was able to use the polling results effectively to gauge students' understanding. Independent sample t-test and ANOVA results indicated gender, race, and extroversion level were shown to have significant impacts on participation and understanding. Students did not show a significant preference for either of the two real-time polling systems (TopHat or TurningPoint) used in this study. This study shows how the incorporation of real-time polling in large, introductory, lecture classes can have a positive impact on students and has the potential to decrease the attrition rates and to improve student learning enrolled in these classes.

INTRODUCTION

Teaching introductory college courses can be challenging for instructors in higher education. Many students in introductory courses view these courses as a painful hurdle that must be cleared before being able to move on to more useful and interesting courses (Ulbig & Notman, 2012). In an effort to implement more active learning in an introductory Anthropology course, an instructor implemented real-time

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polling (clickers) into her class. To find the "best" real-time polling system, the instructor decided to implement two different polling systems (TopHat and TurningPoint Technologies) over four different terms to identify the system that had the best results. This research study evaluates the impact of the real-time polling systems on students' perceptions of their satisfaction and participation, and if the students believed the instructor was able to use the polling results to gauge students' level of understanding (hereafter referred to as "understanding"). It also examines if demographic characteristics such as gender or race, or personality traits such as extroversion, had an impact in these areas.

LITERATURE REVIEW

Theoretical Overview

Behaviorist learning theory was the primary paradigm in learning philosophy from the 1920s to 1950s (McLeod, 2013). Behaviorist learning theorists believe that learners' behaviors are directed by stimuli and are primarily concerned only with behaviors that are observable and measurable (Bransford, Brown, & Cocking, 2000). Leading developers of the behaviorist learning theory, including Skinner, Watson, and Thorndike, subscribed to the belief that students are blank slates, and the responsibility for disseminating the content comes from the instructor (Schmidt & Thomas, 2009). Behaviorist pedagogical approaches to instruction will thus be mostly teacher-centered or direct (lecture) where the instructor transmits the content to students, who are passive recipients of information (Richards & Velasquez, 2014). Teaching in a large lecture auditorium can easily be adapted for those subscribing to behaviorist learning theories as the instructor conducts didactic lectures to students then measures the results through examinations. The *2013-2014 Higher Education Research Institute (HERI) Faculty Survey* showed that more than half of faculty reported using lecture in all or most of their courses (Eagan et al., 2014).

The field of education began to undergo a significant change in thinking about human learning during the 1930s and 1940s by moving from behaviorism toward constructivism (Cooper, 1993). In contrast to the behaviorist theorists, the constructivist theory of learning posits that learners use their existing knowledge as a foundation for new knowledge (Bransford et al., 2000). Constructivists believe that students need to be at the center of the learning process and should be collaborators in the acquisition of knowledge (Scheurman, 1998; Von Glasersfeld, 1989). Constructivist pedagogical approaches to education will thus include active learning experiences where the instructor designs opportunities to measure students' depth and accuracy of understanding (Harris & Alexander, 1998).

Instructors subscribing to constructivist beliefs seek to design their classes with learner-controlled instructional activities (Duffy & Jonassen, 1992). Chi and Wylie (2014) developed the ICAP framework (Iterative, Constructive, Active, and Passive) taxonomy that differentiates the learner-controlled behaviors exhibited by students while engaged in learning. The lowest form of learner-controlled mode of engagements is passive, where students are receiving information without doing anything else such as listening to a lecture, reading a textbook, or watching a video. The next level of learner-controlled mode of engagement is active, where students will repeat or rehearse and take some sort of action on the material such as underlining or highlighting information. The third level of the taxonomy is constructive, where students are generating additional output products that go beyond course material such as drawing concept maps, taking notes in their own words, and comparing and contrasting knowledge. The highest