Main article

# A quasi-experimental assessment of interactive student response systems on student confidence, effort, and course performance

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## ARTICLE INFO

## ABSTRACT

The interactive student response system (SRS), commonly referred to as 'clickers,' is an alternative learning method that has the potential to improve student course (i.e., quiz/examination) performance. Prior SRS studies both within accounting and other academic disciplines have found conflicting results as to its influence on student course performance. This quasi-experimental study re-examines the relationship between the use of an SRS and course performance. We also investigate how using SRS influences student confidence and time spent studying outside of class. Unlike prior SRS related studies, we tested both our SRS class and our control class (with no SRS) in the same academic semester with the same instructor to provide a higher degree of experimental control. Through doing so, we compared the benefit of immediate feedback achieved by SRS to the delayed feedback of traditional assessment formats. Higher in-class performance on multiple-choice quiz items was found for students using SRS versus those who did not use SRS; however, no significant differences in examination performance or overall course performance were noted between the two groups. Students using SRS reported being more confident in their abilities and spent less time preparing for the course outside of class, while maintaining similar overall course performance when compared to

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those who did not use the SRS. We conclude our study by providing areas of meaningful future research related to the use of SRS.

## 1. Introduction

Educators and researchers have devoted extensive efforts to achieve a better understanding of the educational process and improve student performance. Advances in technology provide new and inno-vative means of potentially improving the course performance of students. Consistent with prior liter-ature, we define course performance as the scores attained by students during the assessment phases of a class (Caldwell, 2007; Kay & LeSage, 2009; MacArthur & Jones, 2008). The interactive student re-sponse system (SRS) represents an advanced technique for assessing student course performance. In its most generic form, SRS is a polling device that gives instructors the ability to instantaneously gather student responses to one or a series of multiple-choice/open-ended questions related to the course material.[3] SRS responses provide instructors with immediate feedback regarding student understanding of the material presented. The primary purpose of SRS is to provide educators with a simple way to re-ceive regular feedback on what, how much, and how well their students comprehend the course material (Angelo, 1991; Cottell, 1991; Eisenbach, Golich, & Curry, 1998). SRS also allows instructors to immediately alter class content to emphasize topics or subject matter the students do not fully understand. Moreover, students are provided with immediate feedback regarding their own comprehension of the course mate-rial. While SRS technology has the potential to improve the educational process, little is known about how SRS affects student course performance as measured by in-class quizzes and examinations.

Four recent studies (Carnaghan & Webb, 2007; Edmonds & Edmonds, 2008; Mula & Kavanagh, 2009; Segovia, 2008) examined the impact of SRS on course performance (proxied by exam scores) in introductory accounting courses. Carnaghan and Webb (2007) and Mula and Kavanagh (2009) found SRS did not improve course performance. In contrast, Edmonds and Edmonds (2008) and Sego-via (2008) claimed SRS significantly improved student performance. The research on the use of click-ers in the classroom in other academic disciplines has generated similar mixed results of either a positive or no influence on course performance, as measured by exam scores (Caldwell, 2007; Kay & LeSage, 2009; MacArthur & Jones, 2008). These conflicting findings raise concerns about the benefit of SRS on course performance in higher education, and specifically in accounting. The diversity in re-search findings may stem from research designs in the extant literature failing to compare SRS envi-ronments to appropriate non-SRS environments (Fies & Marshall, 2006).

The purpose of this study is to further assess the relationship between SRS and student course per-formance by comparing in-class quiz and exam results from students using clickers to those subjected to a more traditional classroom environment (i.e., without clickers). In addition, we examine the influ-ence of the timing of feedback, which can be accelerated with SRS, on student confidence in quiz/exam performance and the amount of effort exerted outside of class.

We designed a quasi-experiment to examine the relationship between SRSs and student course performance. One class used SRS and another class did not use SRS. We found students using SRSs scored significantly higher on in-class quizzes than those who did not use SRSs. Although overall course performance was no different between those using SRS and those not using SRS, the SRS group reported a higher level of confidence and less time spent studying outside of class. We believe our re-sults have the potential to provide insight into how accounting educators may integrate SRSs in their classrooms to enhance student course performance and their learning experience.

We contribute to the accounting literature by providing further evidence on the relationship be-tween SRS and student performance. Moreover, we go beyond the mere examination of the potential gain in course performance from using clickers and investigate how the individual characteristics of

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[3] Using an SRS, students can submit their responses via a handheld clicker, laptop, or smart-phone. The instructor's receiving device, either web-based or wireless, instantaneously captures the students' responses. After polling is closed for each question, the instructor has the option to display the distribution of students' responses and indicate the correct answer.