



ELSEVIER

Contents lists available at ScienceDirect

International Review of Economics Education

journal homepage: www.elsevier.com/locate/iree



Iclickers and student performance

Tanga McDaniel Mohr*

Department of Economics, Appalachian State University, Boone, NC 28608, United States

ARTICLE INFO

Article history:

Available online 14 October 2013

JEL classification:

A22

M21

Keywords:

Exam performance

Personal response system

Participation

ABSTRACT

We ask if students using the iclicker classroom response system to answer graded questions perform better on exams than students asked the same ungraded questions without the iclicker. Students using iclickers averaged 3–4 percentage points higher and had a higher proportion of grades in the range B+ to A. However, based on the sample of students who allowed us to access their academic records, the differences are not significant controlling for academic and demographic variables.

© 2013 Published by Elsevier Ltd.

1. Introduction

Classroom response systems such as the iclicker are popular on many college campuses, and discussion about their desirability as an instructional tool is mostly positive.¹ These small remotes give professors feedback about student understanding during the lecture by allowing students to anonymously ‘vote’ on answers to multiple choice questions. The economics education literature discusses how various classroom response systems engage students (e.g., Elliott, 2003 and Salemi, 2009), improve attendance (e.g., Annala et al., 2008) and foster peer instruction (e.g., Smith et al., 2009 and Ghosh and Renna, 2009). In economics few have performed controlled studies to determine if using iclickers improves student exam performance.²

There is a rich literature on personal response systems in other disciplines. For example, Bruff (2009) provides case studies showing how iclickers promote class discussion (e.g., communication studies, biology and language instruction), foster peer instruction (e.g., physics), and uncover

* Tel.: +1 828 262 2037.

E-mail address: mohrtm1@appstate.edu.

¹ Fies and Marshall (2006), and Ghosh and Renna (2009) provide reviews of the literature, Salemi (2009) provides an excellent description of classroom response systems and Shapiro (2009) describes the iclicker specifically.

² Johnson and Robson (2008) is an exception. They find insignificant differences in exam performance between classes using or not using iclickers in mid-sized introductory economics classes.

misconceptions (e.g., chemistry and psychology). Studies addressing the effects of iclicker use on exam performance find mixed results. For instance, [Morling et al. \(2008\)](#) find small but significant improvements in exam scores for students using iclickers in large introductory psychology classes, but these students did not self-report feeling more engaged in class than students who did not use iclickers.³ [FitzPatrick et al. \(2011\)](#) studied multiple sections of health science classes covering freshman level to senior level courses. While student feedback was positive on iclicker use, students using the iclicker did not perform uniformly better on exams than those students not using them. The authors find improved exam and quiz grades for iclicker students in *some* classes and on *some* course content.

Iclickers can affect student scores in at least two ways when their classroom use determines part of the course grade. In addition to directly affecting students' performance by improving their focus, the iclicker might have an indirect effect by increasing attendance.⁴ [Annala et al. \(2008\)](#) find mixed evidence on these effects. In their study, classroom use of personal response systems in large introductory microeconomics classes resulted in improved attendance, and survey feedback from students suggested the response systems "helped them to focus on material they found difficult," ([Annala et al., p. 60](#)). Yet, the authors did not find an improvement in final exam scores when comparing students who used the clickers for in-class quizzes to students who took online quizzes.

Likewise, [Shapiro \(2009\)](#) found similar attendance in large (200 students) psychology classes using iclickers versus classes exposed to pop quizzes, and each of these methods of quizzing students produced significantly higher attendance (approximately 18% higher) than in class pop quizzes graded as extra credit. Moreover, she provides some evidence that the learning benefit of iclickers is more direct than indirect. While attendance was indistinguishable for the clicker and (graded) pop-quiz classes, students using the clicker performed better on factual and conceptual exam questions that were linked to factual clicker question used in class. According to Shapiro "[S]tudents' test performance demonstrated greater retention and comprehension of information targeted by [personal response system] questions" (p. 20).⁵

Exams are just one measure of students' understanding, but exams remain the primary method of evaluation in many medium and large classes. As noted by [Ball et al. \(2006\)](#) student grades are "the metric that students and universities use to evaluate performance," (p. 442). Thus, it is worth asking if students' exam scores improve as a result of clicker use. Our study addresses this question using a controlled study of 6 sections of business and economic statistics classes. The primary assumption we test is that students in the iclicker classes have a higher average exam score. Higher scores might be attributed to more active participation. Because of the level of consistency between our 'control' and 'clicker' classes, we expect the difference in average grades to be small, however. In addition to average grades we look at the distribution of grades to see if students in the iclicker classes have a higher proportion of average exam scores in the B+ to A range.

2. Methodology

In many universities, business and economic statistics is a required course for all College of Business majors, so classes contain a broad cross-section of students. At our university these classes typically have 25–70 students, and instruction follows a traditional lecture format without smaller sized lab sessions/tutorials.⁶ One important difference between medium and very large classes is that students in smaller classes are less likely to bring friends' iclickers to class and answer questions on their behalf.⁷ In classes with 30–60 students, it is easy enough to walk around and catch students who are doing so.

³ [Morling et al. \(2008\)](#) report they used clickers minimally and the students' answers were graded as extra credit.

⁴ We would like to thank an anonymous referee for suggesting this distinction.

⁵ The studies by [Annala et al. \(2008\)](#), [FitzPatrick et al. \(2011\)](#), [Morling et al. \(2008\)](#) and [Shapiro \(2009\)](#) do not control for students' GPA or SAT scores.

⁶ Many professors use 'smart boards', power points and in-class questions, but the style of lecture is not far removed from talk and chalk.

⁷ This has been a criticism of iclicker use in large classes (see [Zou, 2011](#) for a discussion).

Download English Version:

<https://daneshyari.com/en/article/357515>

Download Persian Version:

<https://daneshyari.com/article/357515>

[Daneshyari.com](https://daneshyari.com)