Enhancing Student Learning with Online Classroom Polling: An Investigation in Undergraduate Economics Classes

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Abstract

This study investigates the impact of web-based student response system (SRS), specifically Poll Everywhere, on student success across undergraduate economics classes. By analyzing the data from four economics courses over multiple semesters, we provide robust evidence of the positive relationship between poll participation and academic performance. Using Pearson correlation analysis and OLS regression, our results demonstrate that higher participation in classroom polls leads to improved final grades. The strongest correlation was observed in Intermediate Macroeconomic Theory I and Money and Banking. Regression results confirm that a 1-point increase in Poll Everywhere marks predicts an average 0.33-point increase in final grades across 100- to 300-level courses, and a 0.25-point increase in 400-level courses. When controlling for class levels, the positive effects of poll participation remain consistent, reaffirming its significant role in enhancing student success. Thus, this study underscores the importance of inclusive, low-stakes polling to transform passive learning into active engagement.

Introduction

Classroom polling, a notable advancement of digital technologies, has emerged as an important tool for enhancing students' engagement in higher education. In web-based SRS, students participate in polls using various devices, such as cell phones, laptops, and tablets. The web-based SRS platforms support a range of question types, such as MCQs, short-answer, and open-ended questions, with the questions appearing on the projector and students' screens.

While all forms of SRS have proven effective in enhancing students' learning and success compared to traditional teaching, the link between web-based SRS and student success remains unexplored. We fill this gap by investigating the effect of web-based SRS on student success in all levels of undergraduate economics classes.

Methods and Materials

This study examines the impact of in-class polling on students' learning across four undergraduate economics courses at the University of Alberta.

A three-step analytical approach was employed:

1.Pearson correlation coefficient

a. The Pearson correlation coefficient was used to measure the strength of the relationship between Poll Everywhere marks and final grades for each individual class.

b. A visual analysis was conducted by plotting scatterplots.

2.Ordinary Least Squares (OLS) regression analysis:

$$Final\ Grade_i = \beta_0 + \beta_1\ Poll\ Marks_i + \varepsilon_i$$

Extended regression with class-level controls:

To account for differences across class levels, we extended our regression by including class-level dummy variables.

$$Final\ Grade_i = \beta_0 + \beta_1\ Poll\ Marks_i + \gamma\ Class\ level_i + \varepsilon_i$$

Table 1: Course information

Course level	Course Code	Course title	Total students
100	ECON102	Introduction to Macroeoconomics	79
200	ECON282	Intermediate Macroeconomic Theory I	134
300	ECON341	Money and Banking	181
400	ECON422	International payments	37

Table 2: Pearson correlation analysis

Term / year	ECON 102	ECON 282	ECON 341	ECON 422
Winter 2022	-	-	0.63 ; 0.64	0.56
Spring 2022	-	-	0.57	
Fall 2022	-	0.63 ; 0.65	-	-
Winter 2023	-	-	0.50	0.53
Fall 2023	-	0.66	-	-
Winter 2024	-	-	0.63	-
Spring 2024	0.58	0.51	-	-

Results

ECON102 (Introduction to Macroeconomics): Poll Everywhere marks have a 0.3-point increase in final grades.

ECON282 (Intermediate Macroeconomic Theory I): Poll marks have a 0.36-point increase on final grades for every additional point.

ECON341 (Money and Banking): A 1-unit increase in Poll Everywhere marks results in a 0.33-point increases in final grades, holding all else constant, showing a moderate positive impact of Poll Everywhere marks on final grades.

ECON422 (International payments). While the coefficient is smaller at 0.25, the effect remains statistically significant. Column 5 shows the regression results for all class combined. Across all courses, a 1-point increase in Poll Everywhere marks leads to an average 0.33-point increase in final grades, holding other variables constant

Figure 2: Course-level link between in-class polling and final grades

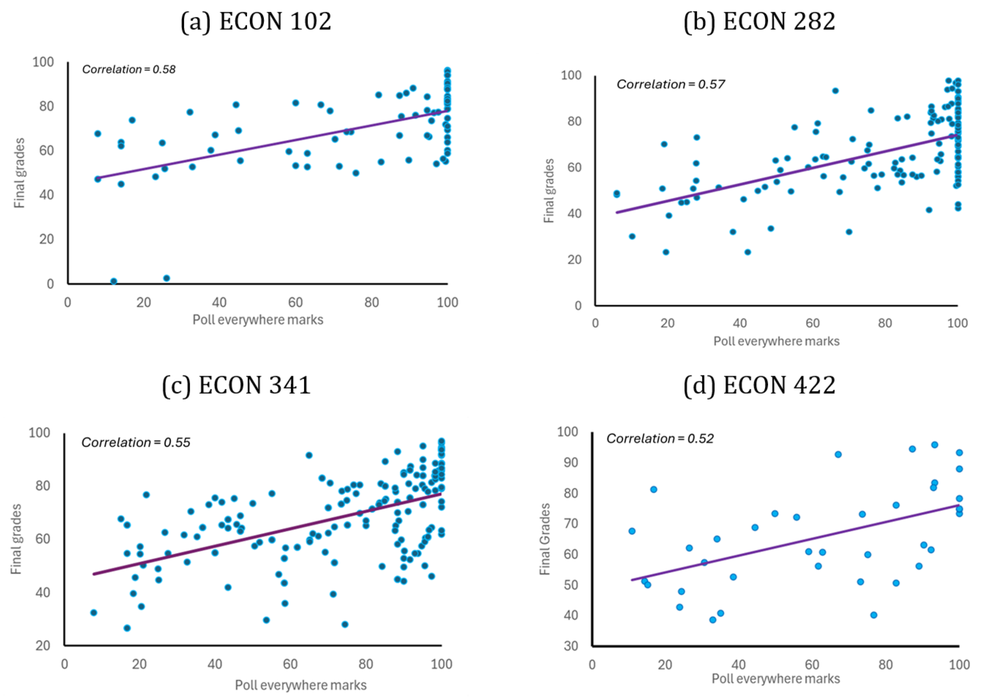

Table 3: OLS regression results by class level and all classes combined

Dependent variable: Final grades	(1) ECON 102	(2) ECON 282	(3) ECON 341	(4) ECON 422	(5) All classes
Poll Marks	0.33	0.36	0.33	0.25	0.33
	(0.05)	(0.04)	(0.04)	(0.07)	(0.023)
Constant	44.99	38.48	44.31	49.49	44.90
	(3.95)	(3.73)	(2.88)	(5.18)	(2.2)
Class-level dummies	No	No	No	No	Yes

Discussion

Poll Everywhere marks have a moderate positive and statistically significant effect on final grades.

Across all courses, a 1-point increase in poll everywhere marks leads to a 0.33 - point increase in final grades.

These findings underscore the value of integrating in-class polling as a tool to enhance engagement and academic success.

Conclusions

By analyzing data from four courses across multiple semesters, we demonstrated a positive relationship between poll participation and final grades.

Pearson correlation analysis showed a consistent positive correlation between Poll Everywhere marks and final grades.

The effects of poll participation remained consistent, with a 0.33-point increase in final grades across all courses combined.

Inclusive, low-stakes polling promote active learning and student engagement.

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