

Teaching with Clickers

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Reasons I decided to use a Student Response System (SRS)

- Student Engagement
 - Requires all students to formulate an answer to questions posed
- Classroom Assessment
 - Immediate feedback for the instructor
 - Students can see how peers answered
- Collecting Data for Class Examples
- Classroom Management
 - Administering (and scoring!) Quizzes

Features of Most Clicker Software (I use TurningPoint)

- Demographic questions
 - Data from demographic questions can be used to create group comparisons
- “Data-Slicing”
 - Responses from two different questions can be cross tabulated
- Responses can be scored
- Data can be easily exported
- How do clickers work?

Collecting Class Data

- Survey students
 - Easy with categorical variables
 - Some numerical variables easy
 - Some additional numerical variables with a bit of work
 - Some simple analysis within TurningPoint
 - Data in a form that is easy to export and bring into a statistics software package for analysis
 - Quick, paperless, and no data entry time

Quizzes

- Quiz questions can be embedded in the class presentation.
- You can decide which questions are “scored” and the point value of each question.

Reports

- TurningPoint Outline
- Response data export (easy to modify, save, and import into stat package)
- Graded Participant Responses (quiz scoring)
- Demographic comparisons (tables and graphs)
- Data by question
- Many others...

So, clickers are “interesting”, but...

- What do students think about using clickers?
- Is there evidence that using clickers lead to improved student learning?

Clicker Research

- Clicker related research
- My “experiment”

Clicker Related Research

Recommended reference:

Clickers in the Classroom, Douglas Duncan, 2005.

Horowitz: Mid 80's. Study of IBM managers in training classes with early clicker prototypes found improved attention span and improved participation with clickers.

Clickers and Active Learning

Growing body of research documenting that pedagogies that actively engage students are more effective than lectures. Clickers are one way of creating and maintaining engagement.

Clickers Used with Peer Instruction

Eric Mazur, Physics

Found 10% better performance on the Physics Force Inventory exam in sections that used clickers as a way of facilitating peer instruction.

Student and Instructor Opinion

University of Mass.: Students reported that clicker use improved class enjoyment.

University of Colorado (Trees & Jackson): Survey of 1500 students found that students liked feedback in large classes and felt engaged.

University of Colorado (Trees & Jackson): Instructor survey documented enthusiastic instructor response.

My "experiment"

- Two sections of Stat 217
TTh 2 – 4 (No clickers) & TTh 5 – 7 (Clickers)
- Students primarily social science and kinesiology majors
- 49 students in no clicker section, 44 students in clicker section
- Clicker section: Quizzes using clickers and some additional clicker questions.
Non-clicker section: Paper quizzes, same additional questions posed

Typical Student Comments

- "It was really easy to use and we could talk about the correct answers immediately."
- "Oh my, they're great."
- "I liked them overall, and I think that they helped me pay attention more in class, because I knew I would have to respond eventually."
- "Consider using them as part of the midterm exams." "Using them for exams would be cool."
- They were fun to use and make you feel like you are on "Who Wants to Be a Millionaire."
- They were interesting. Good to know immediately if your answer was right."

Only one concern expressed (2 students):

- "They were fun. They made me nervous at the beginning. I felt pressure to answer quickly when I saw others clicking in."

Student Behavior and Performance

Attendance

Number of missed quizzes and labs per student:

	n	Mean	Std. Dev.
Without clickers:	49	1.67	0.39
With clickers:	44	1.05	0.26
P-value:	.095		

Student Behavior and Performance Attendance

Proportion of students with at least one missed quiz or lab:

	n	Proportion
Without clickers:	49	.59
With clickers:	44	.41

P-value: .039

Student Behavior and Performance Final Exam

	n	Mean	Std. Dev.
Without clickers:	49	68	19.14
With clickers:	44	73	13.87

P-value: .079

Student Behavior and Performance Overall Course

	n	Mean	Std. Dev.
Without clickers:	49	81.0	15.8
With clickers:	44	84.7	8.1

P-value: .077

Student Behavior and Performance Quiz Total

	n	Mean	Std. Dev.
Without clickers:	49	79	19.45
With clickers:	44	90	12.27

P-value: .001

Student Opinion

Did you enjoy using clickers in Stat 217?

Yes	89%
No	7%
Neutral	4%

Student Opinion

Did you find the immediate feedback on quiz questions helpful?

Yes	93%
Usually	4%
Yes and No	4%

Student Opinion

Do you think that the clicker quiz questions influenced your class attendance?

Yes	68%
No	25%
Neutral	7%

Student Opinion

Would you recommend that I continue or discontinue the use of clickers in Stat 217?

Continue	100%
Discontinue	0%