

dB-SERC Lunch Discussion Summary

August 21, 2015

Topic: Improving teaching and learning in large-enrollment introductory statistics classes through student response systems

Presenters: Dr. Nancy Pfenning and Dr. Kehui Chen

Are clickers worthwhile?

Clickers can

- 1) Improve communication between the instructor and students
- 2) Provide opportunities for data generating activities
- 3) Provide data for case studies (using real data)

Introductory statistics is taken by a large group of students with varying educational backgrounds (majors include psychology, pre pharmacy, and business). Thus, communication is needed between instructor and students. Instructors can monitor student learning, and students have appropriate expectations for the level of understanding.

Challenges

- Large class size
 - Students can't gauge self and peer understanding
 - Lack frequent quizzes to monitor student learning
- Statistics courses traditionally focus only on data analysis, but not the process of gathering and cleaning the data
- There is a missing link for students with probability and sampling distributions

Clickers can address all of these challenges

- Give surveys on student background and short quizzes
- Administer attitude surveys/students can monitor their progress
- Ask concept questions in class
- Students can work with sampling distributions and see how patterns evolve via clickers
- Students can think about inference, confidence intervals, p-values
- Case studies – students can do group data analysis using a real data set generated by the students via clickers

Suggestions/comments

- Give points for answering clicker questions
- Possibly give bonus points for answering clicker questions (80% for trying, 100% for getting it right)
- Clicker questions also promote student attendance – 50% attendance in physics classes without clickers, 80% when clickers were incorporated into class
- Students can individually answer the question first, then discuss the question with their peers. It is possible that even if both students answered the question incorrectly, they can converge on the right answer.
- It is very important for students to ARTICULATE why the answer to the clicker question is correct/incorrect when discussing with their peers
- Usually, students are assigned to a clicker (but during the first week, when students are adding/dropping classes, no need to assign clickers yet)
- What about cell phone or laptops used as clickers? This may be more cost effective, but students may become disengaged because they are texting, surfing the internet, checking email, etc.
- How much time to clickers take up? Do they detract from the time spent on lecture? Majority of instructors who have used clickers said that clickers did not take up time from in class lectures
- When to give feedback/show histogram of student responses? Showing the histogram may bias students to switch to the wrong answer
- What types of sequences of clicker questions should you ask? Depending on your goals, maybe you want to give an abstract question first then application questions, or perhaps give an easier question first and then a difficult question?

