

dB-SERC Lunch Summary – Kehui Chen, Using student response systems to improve teaching and learning in intro stats courses, November 9, 2015

Dr. Kehui Chen is currently teaching an introductory statistics course in which clickers are being implemented. The clickers are a way to have better communication between the students and the instructor and also are used as data generation activities to illustrate statistics principles.

Some of the comments and suggestions from the lunch attendees:

Dr. Chen mentioned that clickers do not have the advantage of inputting numerical values – students can only answer A, B, C, D, E....

- One lunch attendee mentioned that for each multiple choice answer, a numerical range could be shown and students select the range which includes their answer, e.g., A. 0-5 B. 6-10 C. 11-15 D. 16-20 E. 21-25.
- Another lunch attendee mentioned that the software “Learning Catalytics” allows students to respond with numerical values. They use their smartphones to answer questions via a Learning Catalytics app.

Dr. Chen discussed that the data generation clicker questions are answered by students individually since each student acts as a part of the population.

- It was suggested that after the data generation activities, students answer a question about what they learned from the data generation activity and share with their neighbor. If a student is shy, their neighbor could share their answer with the class, especially if it has insightful questions and comments.
- After the data generation activity, there could also be follow up application questions that students discuss with a peer and answer via a clicker. This would help students transfer their learning to different contexts.

Dr. Chen showed how students learn about hypothesis testing – students first compute a statistical value for a particular population, e.g., a z-score. Then, they click in a 1 or a 0 if they obtained a particular z-score. The null hypothesis is that all students computed the correct z-score, with 95% confidence. The data then shows that the class must reject the null hypothesis – indicating that not all the students computed the correct z-score.

- Attendees were very enthused about this activity because it allows for a teachable moment. Students go through cognitive conflict (“Did I compute the z-score correctly? I thought I did...”). They are “hooked” – primed to learn how to compute the z-score correctly. Then the instructor can use this conflict to help them with z-scores. Perhaps they talk to a neighbor and discuss how they did it and redo the hypothesis test.

Dr. Chen also discussed the use of random number tables. It was mentioned that perhaps students do not trust the random number table, or maybe the students do not connect the random number table to their common sense understanding of statistics.

- It was suggested that students could create their own random number table in recitation rolling a ten sided dice. This may help them connect their common sense ideas to statistics.
- Attendees also suggested that students think about when a particular set of data would NOT be a random number table and contrast the cases.