Transformation of Large Lecture Class with the Aid of Technology

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Introduction

For large lecture courses, which take place in traditional auditorium style rooms, engaging students and evaluating teaching effectiveness in real time can be a difficult task. Presented here are some modern approaches for teaching statistical inference that can transform the traditional large lecture class into a more personal and engaging space for students. The methods presented are low cost or free for both instructors and students and do not require a change in the physical space of the classroom. Focus is on three strategies to transform a large lecture classroom:

1. The promotion of class participation by use of online applications.
2. Personalization of course materials to reach students outside of the classroom.
3. Real-time evaluation of student learning and teaching effectiveness.

The methods presented were implemented in an introductory statistics course with 100 students enrolled; the majority of the students were non-majors.

Personalization of Course Materials to Reach Students Outside of the Classroom

It can be difficult for instructors to make a personal connection with students in a large lecture classroom. Further students feel uneasy to ask questions when confused about the material. QR codes have been used in introductory statistics classes to provide extra examples for students in a self-managed learning environment (Yusof, 2012) and as a way to take attendance (Masalha, 2014). QR codes can also be used to embed instructional videos in lecture notes so that students can review the examples from the lecture.

Three things are needed for the implementation:

• An instructional video

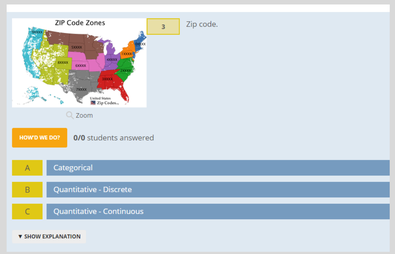
•QR Code Generator, for example: https://www.qrstuff.com/

•A QR code reader, for example, lighting QR https://play.google.com/store/apps/details?id=com.application_4u.qrcode.barcode.scanner.reader.flashlight&hl=en_US

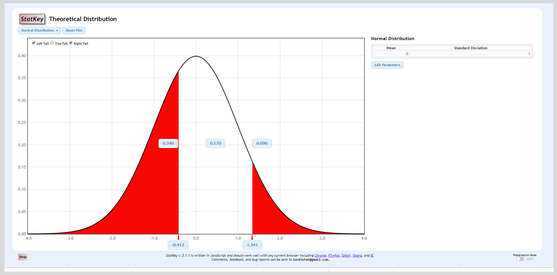
The QR codes link to videos of the instructor with the hope that students feel a more personal connection to the instructor and in turn feel more comfortable interacting with the instructor in the classroom. Additionally, the personalized videos have advantages over other video sources such as YouTube or Kahn Academy in that there is no need to worry about notational or other differences between the videos and course materials. Examples of the personalized videos can be viewed by scanning the QR codes below.

The Promotion of Class Participation by Use of Online Applications

Students sometimes feel intimidated to participate in large lectures. The use of classroom applications such as Socrative© have previously been discussed as a way to increase exam scores in a statistics course (Balta, 2016). Here it was used as a tool to motivate class participation. Discussions of the use of Socrative© in other disciplines (Guarascio, 2017 and Lim 2017) suggest that students respond positively to the use of classroom applications to promote participation.



Additionally, online applets, such as StatKey (Morgan, 2014), were used to aid in classroom activities. Students can participate using their cell phones or laptops.



Real-Time Evaluation of Student Learning and Teaching Effectiveness

The real-time evaluation of student learning and teaching effectiveness can be difficult in large lecture classes. The use of classroom applications is not only able to promote participation in large lecture courses but also provides instructors with a way to evaluate student understanding in real-time. Socrative© provides instructors with a way to conduct real time evaluation of students. There are multiple types of evaluations that can be conducted via Socrative© such as current attendance, multiple choice questions, and short answer responses.

Student Feedback

Students were asked on the year-end course evaluations: “Did you use the videos linked in the notes? If so did you find them useful?” Majority of the students who used the videos fund them useful. Below are some of the responses.

- “Yes, if I wasn't able to grasp the concept of the material in class I was able to go back and watch the videos step by step.”
- “I used some of them and I found them to be very useful when I was having trouble remembering exactly how to do something.”
- “Yes not every time but the ones I watched were very helpful!! Especially when you were working on homework.”
- “I did a few times and thought they were very helpful. Even when I didn't use them I really appreciated having that option.”
- “I did, but I didn't think they helped that much. I would have liked to see maybe some different tips to help solve problems.”

Concluding Thoughts

- The use of embedded instructional videos was a success and, other than the time to create the videos, had no real negative aspects.
- The use of online applications was in largely a success; the only negative was need to encourage students to stay off cell phones/laptops when not in use.

Citations

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