

TEACHING STATEMENT

RAY BAI

1. PREVIOUS EXPERIENCE AND TEACHING PHILOSOPHY

Knowledge of statistics is very important for the study of many different disciplines. My basic teaching philosophy for effective instruction of statistics is simple: to encourage active learning by ensuring that students stay engaged with the material. To facilitate this active learning, I take four main approaches: 1) sufficiently motivating the study of statistics depending on whom I am teaching, 2) providing guided notes to students, 3) ensuring the students practice their skills consistently, and 4) emphasizing conceptual understanding, in addition to relaying the mathematical procedures and technical details.

As a PhD student in the Department of Statistics at the University of Florida, I had the pleasure to teach my own course, STA3024: Introduction to Statistics II. In this course, I taught mainly undergraduate students in the life, social, and health sciences. These students needed to take this course for their major, but almost none of them had any intention of studying statistics beyond my course. Based on this, I presented many examples in lecture and in my homework assignments of applications of the material to neuroscience, sociology, psychology, biology, and public health. This helped the students to understand why statistics was important to their majors and possibly to their future careers. On the other hand, if I had taught an advanced undergraduate probability or statistical theory course for undergraduates, I would have also provided a few real-world applications (maybe from engineering, finance, or computer science) to motivate the advanced theory and mathematics I would have taught them.

I am also a big proponent of the use of guided notes, or outlines of partially filled in notes which the students then fill in when they come to lecture. For my STA3024 course, I prepared a course notes packet for the entire semester which was made available to the students before the semester began. I believe that using this skeletal notes method promotes more interactive learning. First, providing part of the notes (such as wordy definitions, complicated formulas, or numeric information) allows lectures to stay on topic and to move more efficiently. Additionally, students have greater opportunities to listen to the instructor and to ask questions, rather than scrambling to copy down the instructor's notes word-for-word. Often times, students are so busy writing they fail to listen to what the instructor says so that the content can be interpreted. Using guided notes alleviates some of these problems.

Third, I am a big believer that mathematics and statistics are not spectator sports and that they can only be mastered through continuous practice. Accordingly, for STA3024, I prepared a total of seven homework sets by modifying some problems from the textbook and examples I had found online. These problem sets consisted of both computational problems and conceptual questions. The problems mimicked a lot of the examples that we had done gone over in lecture. Additionally, every one of these problem sets contained at least one data analysis problem where students had to input a real dataset into the Minitab statistical software and interpret the computer output. This allowed them to put their data analysis skills to good use and to demonstrate their grasp of the material, rather than simply plugging in numbers into equations.

Finally, I believe that conceptual understanding must be stressed in any statistics course. Often times, one can get lost in technical details and miss the "big picture." In elementary statistics classes, students can sometimes resort to very rote learning methods where they simply learn to plug in numbers into a formula without going deeper into the material.

For this reason, I always asked conceptual questions on the homework and on exams. For example, when we covered analysis of variance (ANOVA), the students had to demonstrate to me that they understood the notion of family confidence and why we need to make an adjustment like Tukey or Bonferroni to control the family-wise error. When I covered multiple linear regression, students had to understand the difference between confidence intervals and prediction intervals and grasp various nuances of significance tests (e.g. that multiple t-tests with large p-values suggested multicollinearity between the predictors).

Using the four methods I have described above, I found that many students in my class responded very well and remained actively engaged with the material. They seemed to appreciate the effort I put into creating a guided notes packet for them, and in my end-of-semester student evaluations, the students noted that they really liked the organization of the course and the real-world examples that I had presented. These guided notes received such a positive response that my notes packet is now used by many statistics instructors to teach the course STA3024 at the University of Florida.

Because of my teaching efforts, **I received the Anderson Faculty Scholars Award for teaching in November 2016**. I was very honored to receive this award, and it confirmed to me that the aforementioned methods which I employed in my classroom were essential to being a good statistics instructor.

2. FUTURE TEACHING

The course that I taught as a PhD student (STA3024) was a large lecture class with over 200 students. Thus, I am very comfortable teaching introductory courses with many students and using classroom technology. I am also prepared to teach smaller, upper division statistics courses, both theory (e.g. probability, mathematical statistics) and applied courses (e.g., applied regression, statistical computing, etc.).

Finally, I am prepared to teach special topics courses based on my research areas, such as high-dimensional statistical modeling for “big data,” nonparametric/semiparametric regression models, and Bayesian methodology. In these courses, I would require students to complete a final class project.

Regardless of which courses I end up teaching, I hope to apply my teaching philosophy outlined earlier to my future classes.