Teaching Statement

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Throughout my undergraduate and graduate education, I have had the ability to closely interact with statistics courses as a teaching assistant. As I served as a teaching assistant and then later instructor of record (links for these courses can be found at `burrisk.github.io`) for introductory statistics courses at both Wheaton College and Duke University, I got a feel for student perspectives on statistics and knowledge gaps. In particular, the courses that I taught at Duke had around 24 students each. These experiences, along with my experience in acquiring the Certificate for College Teaching, has shaped my core educational philosophy. As such, in my courses, I aim to introduce statistical computing and data analysis alongside theory. From this, I hope students gain practical programming skills, data intuition, and the mathematical background necessary for more advanced study.

For obtaining jobs in both industry and academia alike, the ability to code has never been more important. Within the first week, students in all of my courses begin programming in R, a pillar of modern statistical computing. R is a perfect gateway into programming for those with little computational background; students encounter core computer science concepts such as data structures and methods, all while trying to answer real-world questions with data. More advanced students can become more efficient programmers by working with big data and can hone additional skills, such as model selection and data visualization. As such, I assign weekly data analysis problem sets to be completed in R. These problem sets are designed to reinforce understanding of lecture material and develop statistical computing ability.

The purpose of statistics, especially at the introductory level, is to teach students how to work with data and make inferences based upon the data. As such, data analysis is a critical staple of each of my courses. Most labs use real data, suitable for exploration of a concept discussed in lecture. However, others have students simulate their own data under varying assumptions. Even graduate students can benefit from numerical experimentation in their own research. In addition, I assign a varying number of significant data analysis projects, depending on the size and level of the course. This gives students flexibility to use all tools and skills they have learned, rather than using a method that I specify.

Methods of conducting data analysis are based on a foundation of probability theory and assist in making inferences about the true state of the world. Any quantitative-based research or decision relies heavily on distributional assumptions and hypothesis testing of those assumptions. Therefore, it is essential for students to master core statistical concepts such as the Central Limit Theorem, confidence intervals, and likelihood so that they can make valid inferences in future work. In introducing these important ideas, I draw from application to motivate the theory and illustrate with simulation.

In my lectures, I try to ensure that students stay engaged with the material by including both interactive and assessment components. Scattered throughout each lecture, I give related quiz questions that comprise a portion of their grade. These quiz questions are merely to make sure students are paying attention to the lecture. In addition, each week, I give weekly quizzes that cover the material covered in the previous week. Both forms of assessment keep students up-to-date on the material and give students an idea of what they need to study before the exams. There's nothing worse than not knowing how you're doing in the class and having no idea what you're expected to know before the exam. As a teacher, I have clear expectations and give my students the information they need to succeed in my course. Moreover, having interactive in-class games and simulations make the class more fun for students and illustrate lecture concepts in a concrete way. For example, in illustrating the binomial distribution, I might give each student a penny and ask him/her to flip the coin ten times and record how many times it comes up heads. I then aggregate the results from each student in the class and compare with the theoretical results implied by a Binomial(10,0.5) distribution.

I believe that teaching statistics with both a computational and mathematical emphasis gives students additional perspective in how to work with data. In the process, I do my best to make my course accessible and stimulating for students of all backgrounds and hope to impart a love of learning and passion for statistics. Ultimately, I plan to establish a dynamic classroom environment that fosters collaboration, creativity, and skill acquisition.