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Teaching Statement

Statistics, at its core, is about communication. Ultimately, my job as a collaborative statistician is to convey a message from data to colleagues and stakeholders. My primary goal in teaching is to train my students to engage in this process of communication: to understand how to glean knowledge from data and share that knowledge effectively.

At the University of Michigan (U-M), I served as a lab instructor for introductory and upper-level undergraduate statistics courses, and as a grader for a master's-level first applied regression course. Lab sections met for 80 minutes weekly and enrolled 30-50 students each. Most of my experience is with U-M's large introductory undergraduate statistics course, which routinely enrolled between 1500 and 2000 students per semester. I also spent two summers as a teaching assistant in the Summer Program in Quantitative Methodology sponsored by the Inter-university Consortium for Political and Social Research, an eight-week “statistics bootcamp” for researchers from around the world. As a postdoctoral fellow at Johns Hopkins, I am co-teaching a seminar on statistical methods for mental health research focused on the promises and pitfalls of prediction models in health and medical settings. The seminar is designed as an eight-week journal club for masters and doctoral students across a range of fields: each week, students read one or more papers and then my co-instructor and I facilitate a 1-hour discussion.

My pedagogy focuses on developing and leveraging students' statistical intuition, rather than teaching a suite of procedures, so they are better equipped to enter a rapidly changing world of data science. My goals are primarily to help students form solid conceptual understanding that they can translate into research, future careers, or further statistics education. To do this, I engage students in their own knowledge-building through active learning techniques, judiciously incorporate technology, and use low-stakes assessments encouraging trial and error.

Active Learning

Actively engaging students in statistics is a key goal of my teaching: by designing structured experiences with statistical concepts, I support my students in generating their own knowledge and honing their statistical intuitions. Centering my classroom around student engagement takes me out of the spotlight and lets students grapple with big statistical ideas. My focus on group work recasts me as a guide rather than an arbiter of correctness, one aim of which is reducing students' dependence on arguments from authority.

When lecturing, I pose questions to the entire classroom using tools such as iClicker or PollEverywhere, which let students answer individually and quasi-anonymously. I then use their responses not only to tailor my instruction in real-time, but also as a starting point for think-pair-share discussions. In an introductory class, those discussions are meant to highlight the gray areas in statistics and emphasize that there is not necessarily a right or wrong answer. In a data mining course, for example, I encouraged discussion of predictive power versus interpretability, and used this to introduce ideas in data ethics.

Technology

I focus on using technology in ways that make learning statistics hands-on. R Shiny apps or the Rossman/Chance Applets can help introductory students visualize traditionally challenging ideas like sampling from distributions or the central limit theorem, making them more accessible and concrete.

My lab assignments are entirely in R Markdown to provide built-in demos and exposition, and to allow students to focus on critical thinking rather than collation of output and answers. While most of my experience is with R, my assignments are language-agnostic and could easily be translated to iPython notebooks, for instance.

As a graduate student, I co-developed with faculty colleagues a new set of labs for U-M's introductory statistics course. The labs use RStudio Cloud and R Markdown documents to provide guided experience with common data analytic tasks. The emphasis is not on coding; instead, I focus on R as a tool and teach programming concepts as needed. The labs also invite students to "dive deeper" and think about where the data came from and what questions it can and cannot be used to answer.

Successfully integrating technology into the classroom is often the most challenging part of teaching. In a very large introductory course, students have dramatically diverse backgrounds with technology, and so I have learned to anticipate and design around students' varying computing needs: I always expect the unexpected.

Holistic and Low-Stakes Assessment

While high-stakes summative assessments such as exams are useful for gauging knowledge acquisition, I prefer to focus on less stressful, more holistic approaches when possible. As a graduate student instructor, I supported shifting grade weight away from exams and towards writing assignments and data analysis projects. This both gives me a better sense of a student's understanding and allows the student creative freedom to engage in statistics through a topic that is of particular interest to them. I also prefer to grade on a mix of completion and correctness, which I find encourages students to take more risks in their thinking.

Outside of graded assignments, I gauge student progress using no-stakes formative assessments. In labs, I asked students to complete "minute papers" to identify something they learned in class that day, as well as something they struggled with. The lab projects I designed also encouraged students to document their thinking and asked them to pre-register their intuition before starting a task, then re-evaluate their initial answers after completing it. In practice, this has worked quite well, though it is a challenge for students to not go back and change a "wrong" initial answer.

Past Performance and Next Steps

My teaching evaluations were consistently above average for courses at Michigan, and I was frequently described as the best graduate student instructor students had at U-M. I am committed to continuously improving my teaching and completed U-M's professional development certificate in college-level teaching in April 2021. I am also trying to use Python more in my day-to-day tasks to better serve a variety of curricular needs.

I am comfortable teaching almost any undergraduate-level course in statistics, though I have a slight preference for more applied courses that allow me to integrate hands-on data-analytic activities into the classroom. At the graduate level, I again would enjoy teaching applied courses but would also be comfortable with a sequence on inference. I am particularly interested in the ethical issues that arise in applied statistical work: I would enjoy teaching or developing an ethics course for data scientists, or a seminar on ethical issues in (bio)statistics. I am dedicated to helping students of all levels hone their statistical intuitions, better make sense of complexity, and prepare to make a positive impact on our increasingly data-driven world.