Teaching Statement

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As an instructor of applied statistics for social scientists, I face a polarized audience. Increasingly, students start their program with considerable experience in mathematical thinking, statistics, and statistical programming. Still, many start with an appreciation for data analysis, but come from educational and career paths designed to explicitly avoid math.

My approach to keep both audiences engaged within one term is to unify math, statistics, and coding as the task of acquiring a new language. A single course will not teach students everything they need to know to become fluent, but it can give enough tools to facilitate future learning in a direction that is beneficial to students regardless of their background and career goals. For some, this may mean engaging directly with data and code or even creating new methodologies. For others, the goal may be just to communicate productively with scholarship drawing on quantitative findings or data analysts at the workplace.

To accommodate this diversity, I design courses with two principles in mind. First, students need flexibility to engage with the course on their own terms and focus on the content they find useful. For example, the flipped classroom lab sessions in my course on data analysis for public opinion and policy at McMaster asked students to evaluate a research design, suggest alternatives or modifications, and to evaluate its statistical properties through coding and writing. Some students may propose increasing the sample size, sampling from a different underlying population, or changing the assignment of treatment conditions. This allows students to pursue the tasks that suit their interests and gives the instructor freedom to reward creativity and effort over correctness.

The flexibility principle also applies to the problem sets in my graduate introductory methods course, where contract grading allows me to reward learning even when students get stuck with coding. I place equal value on reasoning why something did not work and how it should look had the code worked properly as I do on producing working code. This reduces anxiety around finding the right answers, and encourages creativity and collaboration.

The second principle is accountability, which is necessary to keep everyone on task while allowing flexibility. This means agreeing on an overarching theme that every single course activity must relate to. For example, early on my data analysis for public opinion and policy course, I introduce the bias-variance tradeoff as a principle to choose among alternative research designs. So, while students are free to propose any modification to an existing research design that they deem appropriate, they are also required to identify the explicit or implicit costs associated with their proposal. They must consider, for instance, that a representative sample is more expensive

than a convenience sample, or that implementing a block-randomized experiment may require access to variables that cannot be measured easily.

Similarly, the overarching theme in my graduate probability and statistics course is how assumptions shape the inferences that we can credibly draw from data. I emphasize how we need to make unrealistic assumptions, even if minimal, to enable statistical inference, and that we need to hold ourselves accountable to those assumptions when evaluating the appropriateness of a statistical procedure.

Flexibility and accountability also help in preventing instances of discrimination in the learning process. Through flexibility, students are invited to add value to the course by bringing their own perspective, knowledge, or experiences. In turn, accountability sets the scope for the type of contributions of interventions that are admissible. From this perspective, a racist remark is unacceptable not because someone disagrees with it, but because it is beyond the scope of the vocabulary we aim to build.

Teaching experience

At Northwestern, I am the central person statistics courses in the department. I teach the first course in the graduate methods sequence, focusing on probability and statistical inference. I also lead the math camp for incoming political science and sociology students, and run the year-long R workshop that introduces cutting-edge statistical computing practices. Later this year, I will teach the undergrad level introduction to research methods in political science, a course that teaches political science majors to become informed consumers of applied statistics. I will also teach a seminar on design-based causal inference and machine learning methods for evidence-based policy-making.

Before joining Northwestern, I taught data analysis for public policy and public opinion at McMaster, with emphasis on experimental the use of applied statistics to make credible policy recommendations. The goal of this course is to give students hands-on experience in designing quantitative research projects in an area relevant to academia, policy, or industry.

At Tulane, I taught an undergrad senior course on the challenges that developing democracies face from the perspective of evidence-based policy making. This course overviews the main challenges in the path to democratic consolidation around the world, proposed solutions to these challenges, and how governments, researchers, and civil society organizations use data to evaluate these solutions. The previous version focused primarily design-based causal inference, but future versions will also feature data science and machine learning.

In my time as a PhD student at Illinois, I taught statistics and research methods. In the 2020-2021 academic year, I was the graduate methods teaching assistant in our department. My duties involved advising PhD students taking courses in the quantitative methods sequence, as well as mentoring undergraduates enrolled in the senior honors thesis program. I also served as a teaching assistant for Jake Bowers' introduction to data analysis for political science majors. This course focuses on flipped classroom learning, letting students engage with the course material on

their own time and using lecture time to work as a group on problem sets and research projects. I have also contributed as a math camp instructor for three consecutive years, introducing statistical programming in R to incoming graduate students in our department. I also had experience teaching substantive courses using online and hybrid formats.

Teaching to these diverse audiences made me aware of the importance of promoting out-of classroom learning experiences. I organized a reading group on computational social science at Illinois that met regularly in the Summer and Fall of 2017. I started a a collaborative project in which graduate students share cheatsheets introducing their fellows to new methodological tools. I have also enjoyed the experience of mentoring an undergraduate research assistant, using the opportunity to help both of us learn text analysis. In the future, I plan to facilitate and institutionalize similar learning experiences in every aspect of my work.

Teaching interests

I am prepared to teach courses on probability and statistical inference, statistical computing, linear models, design-based causal inference, machine learning, and computational social science. You can find copies of current and future syllabi in my website.