Teaching Statement

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My teaching philosophy begins with a simple question: *What does this course look like from a student's perspective?* I aim to understand students' backgrounds and goals, clarify the specific takeaways I want for them, and design instruction that helps them reach those outcomes.

I learned this perspective first as a student. In the first semester of my master's program, I took regression while coming from a biology background. Two weeks into the course, we were discussing the sampling distribution of the OLS estimator, yet I had not formally seen the definition of expectation, which came later in a probability course I was taking in parallel. That experience reminds me how easy it is, after years of learning, researching and applying statistics, to forget the challenges posed by a first statistics course. Hence, as an instructor, I try to temporarily forget my advanced training, and step into the shoes of novice learners.

How can I make this concrete? I use two complementary routes: *top-down* (making abstract ideas concrete) and *bottom-up* (connecting practice back to concepts).

I. Top-down: making abstract mathematics understandable

Statistics can feel opaque with rich notation and few intuitions, especially to students with non-statistics backgrounds. Therefore, when introducing new concepts and notation, I pair them with specific examples and make explicit translations from symbols to numbers in real-world applications. Early in the semester when I first taught Introduction to the Practice of Statistics (STAT 1450) to non-majors, I presented the sample mean and variance with both formulas and data examples, such as Big Ten application fees. After the class, a student asked, "What are the x_i?", which called my attention to not treating any notation as obvious: I needed to write explicitly that x_i denotes application fee for each university i (or sample i). Moving forward, I always paired notation with plain-language labels and a visible mapping between them.

Later in the semester, we started to introduce more theoretical ideas such as population versus sample, weak law of large numbers, sampling distributions and central limit theorem. These topics are abstract but important, since they lay the foundation for constructing confidence interval and testing statistical hypotheses. To make these intimidating theories more friendly and accessible, I used simple and intuitive demonstrations, e.g., coin flip webpage or short simulations in `R` to show empirical convergence and approximate normality. These translate statistical terminologies (math language) to real-life scenarios and pictures (human language).

However, what has been learned in class only starts to click when students understand how to apply the concepts to problem-solving. To encourage this, I resist "spoiling" answers when discussing homework. Instead, I point students to the relevant definitions or procedures in the lecture notes and show them how the problem fits into that framework. As a teaching assistant, not knowing the instructor's exact presentation of the material made this harder; as an instructor, I intentionally reference similar examples from slides and the textbook to teach students not just to get an answer but to find the right tools.

II. Bottom-up: connecting implementation and real problems back to concepts

Students often struggle to recognize which concept applies in a word problem or a coding task. For instance, distinguishing a z-test from a t-test depends on whether the population standard deviation is known. Even though students manage to memorize this difference, it may not always be clear to them when the problem has a lot of words and numbers. Similar misunderstanding shows up when considering a sample mean versus a population mean. I notice these confusions when grading exams, where common mistakes show up repeatedly. Therefore, after each midterm exam, I write a short summary and revisit key concepts from class, e.g., explicitly tying the z-test and t-test back to their respective assumptions and conditions. This closes the loop between assessment and instruction.

I had a similar experience when teaching recitations for Introduction to Statistical Inference for Data Analytics (STAT 3202). In this class, many students are new to coding. I have seen their confusion between sample size and Monte Carlo replicates. To help with these, I briefly reviewed the concepts from the textbook before live-coding and tried to keep coding variables consistent with the symbols in the notes, e.g., `n` versus `B`. This deepens the connections between keyboard (implementation) and textbook (concepts). In general, connections that are natural to experts may be much less obvious for learners. Making those links explicit is part of the lesson.

Apart from building connections between theory and practice, telling real-world stories itself is enjoyable for both students and the instructor. Therefore, I always enjoy teaching regression and experimental design, as they are tied to both fruitful scientific questions and daily life scenarios—the example we used for simple linear regression involved data on eating breakfast and college GPA. In that class, a statistician chose to put "association versus causality" aside and savored the moment of discovering a positive correlation together with the students. Towards the end, I emphasized that association *does not* imply causation, which may have broken a few students' hearts who planned to eat more breakfast.

Courses I would like to teach in the future

With comprehensive teaching and research experience, I am prepared to teach a range of undergraduate courses, including introductory statistics and data analysis, probability, statistical inference, regression and linear models, introductory statistical learning, etc. At the graduate level, I can contribute to courses in nonparametric statistics, statistical learning, functional data analysis, and special topics related to distribution-free methods and conformal prediction. I am happy to tailor content based on overall curriculum while maintaining clear learning objectives and inclusive pedagogy. I look forward to bringing a student-centered, understanding- and intuition-driven teaching philosophy to the classroom and the broader learning community.