Statement of Teaching Philosophy
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My primary goal as an instructor is to help my students develop a strong statistical intuition and the ability to confidently and concisely communicate about their thought process. These are skills that make an excellent statistician, but also an excellent scientist or informed citizen.

I think that intuition makes the difference between frustration and appreciation in statistics. In the courses I struggled with in graduate school, I found that I did not understand why things worked the way they did and was frequently surprised by the results I got. Once I was able to develop an intuition that helped me bridge the gap between the theory and applications, I was able to enjoy working through problems and I got excited when results went against my expectations, because that meant I may have found something meaningful, or at least discovered an opportunity to learn and modify my intuition to help me in the future.

For example, I want an introductory student to be able to read a problem with example values and know that they expect a fairly small p-value. If they end up getting a large p-value, I want them stop and check their work. They should make sure they used tables, their calculator, and formulas correctly. It's possible that their intuition was incorrect, so reviewing these concrete steps will help them feel more confident in their answer.

Once students have begun to build their intuition, I like to introduce problems that are surprising and may go against expectations that students may have. Simpson's paradox is one of my favorite concepts for this. For these challenging problems, students benefit greatly from having a developed statistical intuition and the confidence to apply it, even against what they may think is "common sense." This allows them to explain not only that the results are surprising, but why the results are surprising. I want students to feel excited when something goes against their intuition - surprising results are either wrong, or potentially valuable scientific discoveries. This holds true across most disciplines, but I feel that statistics provides a concrete, quantitative context to introduce this lesson.

Visualization and simulation are important tools for building statistical intuition. It can be challenging for students to look at a formula and understand it, even if they practice using it. Luckily, visualizations are already the norm in statistics education. We can use histograms and scatterplots to get a quick glimpse at our data. I teach introductory students about the normal distribution, also referring to it as the "bell curve" to help students remember the shape of the probability distribution function. The empirical rule is a valuable tool for helping students understand what a normal distribution means, especially when combined with a visual. I encourage students to draw a bell curve and label several values. When lecturing or answering questions, I draw the distribution to demonstrate this practice and show the value of visualizing to clarifying problems.

"Why?" is a very important question to ask early statistics students. When students ask me questions about their work, such as in office hours, I ask them "why?" at nearly every step. I hope that this is a practice that they adopt and use on their own. At first, they find this frustrating and become nervous when work they thought was correct is questioned. However, I have seen

that over time this helps student build confidence in their work, and when they can explain exactly why their work is correct, they can work much more quickly, confidently, and accurately on formal assessments such as exams.

Students from many different disciplinary backgrounds are required to take statistics classes, so it is important to keep the class interesting and relevant to everyone. I use examples from the news and as many other contexts as I can think of. Contrasting these examples can be educational also: a p-value of .05 is appropriate for most psychology experiments, but not for a high-stakes medical trial.

I also use a variety of activities and assessments to help address a variety of learning styles and ensure that the concepts are sticking. In class, I lecture, show simulations, have students work on problems using pen and paper, and ask them to replicate their findings using computer software. For homework, they complete similar problems, again using both pen and paper and computer software. I provide pre-recorded instructional videos for using computer software, practicing concepts using simulation applets, and reviewing or previewing concepts from class. I feel that a large bank of resources for practice is very valuable for students, since experience is an important tool for building any kind of intuition.

I often use the word “teaching” synonymously with “communication.” As a statistician, I have the opportunity to consult on research and collaborate with graduate students and faculty. I see my role in these interactions as very similar to my role as an instructor: it’s my job to help the people I’m working with understand what the appropriate statistical technique are, why we should use them, how they work, and what results we might expect from them. I hope to instill in my students a similar ability to think and communicate about statistics.