Teaching Statement

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Evidence-based research and decision-making are of vital importance for society to function well for everyone, advancing our medical treatment, public health interventions, and technology, and improving our understanding of the world in which we live. Increasing the numbers and competence of biostatisticians into the realm of public health, academia, pharmacy, etc. is foundational to this. From this lens, teaching becomes a top priority for myself as a faculty member in the Department of Biostatistics.

There is a plethora of paradigms and methods of effective teaching, and it is important for everyone who in some capacity acts as a teacher to find such a paradigm and set of methods that are effective for her/him/them. The way that I believe works best for me can be described through four components, whose details are given below:

1. Cooperative learning;
2. Make it challenging;
3. Go deep, but make it real; and
4. Never lose sight of the big picture.

Cooperative learning

Attempts at cooperative learning go back as far as the early 1900's [3], and have better outcomes for students than competitive learning environments [2]. Stressful environments, too, have negative impacts on learning [4], while studies have shown that "students learn better when they perceive the classroom environment more positively" [1, p.907]. I believe it to be of paramount importance to provide a safe space in the classroom, a place where it is known that the students and I are all working together for everyone's benefit. I attempt to accomplish this by a few mechanisms. First, I make sure students know that I am willing to meet with students outside of class as they need ("I appreciate all your time and effort in the course and willingness to provide help outside of the class. It is clear you care about your students." -student evaluation (SE)). Second, I try to treat students with respect and patience ("Dan was extremely patient, helpful and co-operative. Thanks for being more than an instructor!" -SE), and building strong rapport with the students ("I appreciate how Dan is understanding. Dan was the only instructor I reached out to about my grandfather's passing. Not just because I knew Dan would empathize, but also I felt like I could approach Dan... I feel that I can approach him about topics like family and social constructs." -SE; "The professor is very approachable both in and outside class and went above and beyond to explain concepts/help with problems." -SE). Third, I try to make it a safe place to ask questions ("Students feel comfortable asking questions which made the presentation more of a discussion, which is a really good thing" -peer evaluation (PE); "Great job fielding (and fostering!) questions. Very interactive class, which is wonderful to see." -PE; "It was obvious that students feel comfortable asking questions" -PE; "Dan's willingness to answer questions and make sure students understand concepts is excellent. He did

an awesome job answering questions." -SE; "The professors willingness to re-explain concepts without any hesitation." -SE; "The instructor was always very open to students asking questions and patient when providing answers." -SE; "I also thought that the course was structured and conducted in such a way that welcomed questions and comments on course material which fostered a positive and productive learning environment." -SE).

Make it challenging

Once students feel safe and that they are not alone, I feel it is important to push students to reach their maximum potential. This might not be effective if the students felt isolated and/or competitive, but in a safe, collaborative environment, students know that despite the challenges, they can receive the help they need to be able to achieve. One student evaluation captured the synergy of cooperative learning with being challenged, saying, "I want you to know that I thoroughly enjoyed this class, the topics and yourself. I enjoyed the personality that you brought to this class and how you kept a welcoming classroom for us incoming students. It was hard at first when I got here to make new friends and I attained one from this class because of your strong suggestions to work on the HW's with someone else. If I were lucky enough to get you as a research advisor I would gladly accept in a heart beat as I know you would push me academically to the place where I want to be. I hope to take another one of your classes in the future!"

Further, I try very hard to set a pace that is specific to the group of students in front of me ("I think the pace that we went at for lectures was good. There was plenty of time to ask questions and slow down if needed" -SE; "I really appreciated that Dan was very good about slowing down the pace of the course instead of flying through a bunch of material everyday and overwhelming us. He also was very good about pausing frequently throughout the lecture periods giving space for us to ask questions" -SE; "Sometimes it felt like a big jump from methods 1 but I think you did a good job of guiding us through and going at our pace." -SE).

As one student put it amusingly, "I had a great time and I think very highly of professor Sewell! Certainly is one of those professors you have a love/hate relationship with because they push you to learn which can be very uncomfortable at times... but that is what we are here for!" Other students describe my goals perfectly: "I found this class to be extremely challenging at times, but I also felt that it elevated my skills and abilities;" and "I really liked this class and definitely challenged me to be a much better statistician." Indeed, I can't state my aim any better.

Go deep, but make it real

While there is some debate regarding the spectrum of depth vs. breadth, in the discipline of statistics, I believe strongly that going deeper is usually- although not always- better, for two reasons. First, there are always more topics than can be covered in one course, or even in an entire program, and if students only are able to know the things we teach them, then my feeling is that we'll have failed in preparing them for a successful career. Second, and which is really the other side of the same coin, is that by learning the fundamentals at a deep level, the students ought to be able to learn new methods throughout their career. To put it quaintly, I don't want to "give a man a fish" ("Definitely could be harder at times but I felt instructor really cared about making us understand the deeper aspects of statistical concepts and challenged us to think critically" -SE; "Learning concepts in depth." -SE,

regarding what was most useful for their learning).

However, being able to relate these foundations to the real world is not only non-trivial for biostatisticians-in-training, but also imperative to attain an understanding of these foundations in the first place. That is, application and implementation are a core part of the learning process. Towards this, I try to incorporate my own research and other real research questions/data into our discussions and labs ("It was helpful to give the hemoglobin, favorite shoe brand, and the other survey example to illustrate the theoretical content in a more applied example." -PE; "The lectures were the most helpful, especially the many illustrations of the theory with data" -SE"; "Overall very interesting course. Consistently working through examples for each topic was a helpful instructional method." -SE; "The instructor was consistent in showing examples that he had done in class, and the HW gave the students an opportunity for independent practice." -SE). I also include plenty of labs, where students can see and practice how to implement the methods we learn in class. One student evaluation described the lab very well: "I thought that the R sessions were the most helpful for this course as it really allowed me to understand real world application. Going through these R applications in class and on my own really allowed me to digest the material in other ways then looking at how to just do everything mathematically." Labs are consistently among the most commonly mentioned aspect that is most useful to the students' learning. In addition to this, I always assign a class project in which students are paired (fostering cooperative learning) and tasked with learning and applying a new but related topic. This, too, is often mentioned as an aspect most useful to students' learning, and one student summed it up well with, "Project was a big learning lesson to implement concepts learned in class."

Never lose sight of the big picture

I try to ensure that students always have a big picture of what we have learned, what we plan to learn, and how what we are currently learning fits into this broader picture. When covering challenging material, it is very easy to get lost in the details, and so I make a conscientious effort to not let the students lose sight of what we are trying to accomplish ("I thought Dan did a really nice job with always bringing the conversation back to a core question/technique." -SE; "The instructor emphasized the most important notions and made sure we never lose sight of the 'big picture'" -SE; "I really loved the discussions Dan had during the classes which helped us build an intuition about the models before we got into the math." -SE). Most class lectures begin with me describing a big picture view, providing not just a review of what we have learned recently but the context in which the day's lecture content fits in ("Professor always started class by giving an overview of where we have been which was super helpful in conceptualizing how all of the material fits together." -SE).

Evidence of Teaching Quality

As evidence of quality of teaching, I have received the College of Public Health Faculty Teaching Award (2022), and was twice the Provost Award for Teaching Excellence College of Public Health Nominee (2022, 2023). In student evaluations, I have received average scores of 5.71, 5.43, 5.46, and 5.56 out of 6 for BIOS 5710, 5720, 6810, and 7600 respectively. In student evaluations I have received comments such as "Professor Sewell is an excellent instructor," "Excellent professor, thanks for a great semester!" "It was one of my best course." etc. In addition to classroom teaching, I have also advised four Master's preceptorships, two PhD

students to completion of their degree, and am currently supervising four others.

References

[1] Jeffrey P Dorman, Jill M Aldridge, and Barry J Fraser. Using students' assessment of classroom environment to develop a typology of secondary school classrooms. *International Education Journal*, 7(7):906–915, 2006.

[2] E.B. Kolawole. Effects of competitive and cooperative learning strategies on academic performance of nigerian students in mathematics. *Educational Research and Reviews*, 3(1):33, 2008.

[3] M. Lee Manning and Robert Lucking. The what, why, and how of cooperative learning. *The Social Studies*, 82(3):120–124, 1991.

[4] Susanne Vogel and Lars Schwabe. Learning and memory under stress: implications for the classroom. *npj Science of Learning*, 1(1):16011, 2016.