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Teaching statement

As I reflect on some of the most memorable and impactful courses from my time as a student, two common themes emerge: they were all taught by outstanding educators who 1) intentionally engaged the students in their classrooms in learning and 2) built rapport with their students. My teaching philosophy reflects these core tenets and has been shaped by a wide array of teaching experiences for a diverse collection of students. Below, I summarize my teaching experience and provide specific scenarios in which these two core tenets were realized.

My initial exposure to teaching began during my undergraduate experience and continued during my graduate program. As an undergraduate student, I worked in the Mathematics and Statistics Learning Center, where I tutored various courses, from M121: College Algebra to M273: Calculus III to M221: Linear Algebra to STAT217: Intermediate Statistical Concepts. During this time, I also served as a teaching assistant for STAT216: Introduction to Statistics, where I facilitated lectures, met with students during office hours, and assisted students during labs. As a graduate student, I had the opportunity to be the lead instructor of the introductory and intermediate statistics courses at Montana State, where my responsibilities included creating course materials, holding office hours, and leading lectures.

As the latter half of my doctoral work transitioned towards research positions, I stayed engaged with teaching by serving as the teaching assistant for STAT411/511: Methods for Data Analysis, the undergraduate capstone data analysis course. As a teaching assistant for STAT411/511, my responsibilities included writing and leading labs, holding office hours, and contributing lectures periodically. Finally, while working as a student contractor with the USGS during the end of my doctorate, I was invited to contribute guest lectures in STAT421/521: Probability Theory and STAT408: Statistical Computing and Graphics Analysis.

Active learning

Throughout these teaching experiences, I sought to keep the students actively engaged in learning statistics. How I accomplished this engagement differed depending on the class, but generally relied upon flipping the classroom such that the students were expected to learn by actively participating rather than passively listening to my lecture. As the lead instructor of the introductory statistics course, active learning typically manifested by reserving a portion of the class for the students to work in small groups on a lab. A typical 50-minute class period would begin with approximately 10 minutes of lecture, during which I would field questions and introduce the day's topic. Following that introduction, students would work on a lab assignment in small groups for approximately 30 minutes as I moved around the room, visiting with groups individually. The class would conclude with a summary of the concepts discussed that day, and groups would have the opportunity to share what they learned. While this structure may be foreign to students initially, it was generally well-received. For example, two students from the introductory statistics class in the Spring 2017 semester left the following feedback on course evaluations: "I like the format, and how he taught the course. Was helpful and explained concepts clearly," and "The format was good and Christian always seemed to know what he was talking about." Another student remarked in the Fall 2017 semester that "group work made class fun and easy to ask for help."

As I became the lead instructor of the intermediate statistics course, my implementation of active learning strategies changed to accommodate the denser course material. While I still utilized the flipped classroom structure, I typically did so in a different manner. Rather than allowing the class to work in groups for the majority of the class period, I encouraged students to interact with each other for shorter periods throughout the class. One example of this type of active learning is the so-called "think-pair-share" strategy, in which I would first pose a question and encourage students to think about it individually. Then, after a minute or two, I would invite students to pair with nearby students and share their thoughts on the problem. This type of active learning was advantageous with the more advanced material as it allowed me the opportunity to guide the class discussion's direction.

When invited to guest lecture on statistical power for the undergraduate and graduate level mathematical statistics course, I implemented a flipped classroom structure again. To aid in our exploration of statistical power, I constructed an `R` Shiny web application that showed the implied distribution of the sample statistic under the null and alternative hypotheses for a wide variety of sample statistics and population distributions; a paper describing the web application and its

implementation in class is published in *Technology Innovations in Statistics Education*. Both class periods were structured as a guided activity, allowing students to collaborate when interacting with the web application; students again had generally positive feedback for the structure of the class period and web application. Specific student comments are provided in the paper.

Building rapport

While it is important to engage students actively in learning the material, it is equally important to establish rapport with students so that they feel comfortable asking questions and safe in the classroom. In my experience, there are several effective ways to establish rapport with students, including: building an inclusive classroom, being highly available, being knowledgeable and prepared for class, and being genuinely excited about the course material. A few examples of how I build an inclusive classroom include: inviting students to specify their pronouns at the start of the semester, building diverse collections of students for group work, intentionally selecting data for use in class that do not alienate members of the class, and creating a space where students are comfortable asking questions. The other strategies for building rapport (availability, knowledge/preparation, excitement) are easy to do and self-explanatory in their implementation. Still, they are typically the topics students notice on their course evaluations and can heavily impact their experience in class. Below, I provide a subset of student evaluation comments from multiple semesters related to these points; all evaluations are available upon request.

- Christian did a fantastic job of teaching this class. Mastery of course material was obvious, but he tried hard to stimulate one's interest for statistics. He was always available for assistance as well. Thanks for an awesome semester Christian, I really enjoyed this class, which is saying something because I don't really like math at all. You're a great teacher, keep it up.
- Christian was a very kind and caring instructor. He was always available and willing to help everyone. Overall was great to work with.
- Professor seemed excited about stats so class was not boring. Professor always available when help was needed. Thanks!
- Amazing teacher! He was very helpful + responsive to any questions we had throughout the semester. Christian is definitely an asset to the MSU stats department.
- Mr. Stratton is a great instructor. He is extremely helpful and clear in his presentations. He gives excellent and timely feedback and obviously puts a lot of effort into teaching this course.
- Great instructor for this course, he knew his material very well and knew how to teach it to us. He went out of his way to make reviews and prepare us for homework and tests. Really enjoyed learnings stats from him and would recommend him to my peers taking 216 in the future. Put in a lot of effort and was always helpful and understanding.
- I appreciate your knowledge of the material and your willingness to help anytime.
- Christian is a great teacher who clearly loves stats and is very concerned with students understanding of the material.
- I don't quite like stats, but I didn't hate coming to class because Christian was always excited to be there and made a difficult subject learnable by breaking it up into bite size pieces.
- You genuinely cared about all of us and our understanding of statistics. You were enthusiastic (even when we weren't) and you went above and beyond for us even when you didn't have to. You have been the best TA I've had so far in my college career. It was a pleasure to learn statistics from you Christian!
- Christan was one of the best teachers I've ever had. He was always available and actually was very helpful. He never made me feel stupid for asking a questions, which I've never had with a teacher before. He understood statistics very well and knew how to teach it to make sense. I would not have an A in stats if Christian wasn't my teacher.
- Instructor was awesome, very educated in the subject. Knows how to adapt to your learning style to make it easier for you to understand the subject at hand. Would love to take another class taught by this instructor!

When building rapport, it is also important to acknowledge that not all students are the same and that there is no one-size-fits-all recipe for successful instruction. In order to adapt my teaching style to celebrate these differences, I frequently administer mid-semester evaluations to my students. In these evaluations, I ask for feedback on the course structure and invite students to discuss parts of the class that are going well and parts that are not. During the Spring 2018 semester, feedback from the mid-semester evaluations was overwhelmingly against the lab-style format. As a result, I switched my instruction style towards guided activities and think-pair-share opportunities. The student evaluations spoke very positively about the change, for example:

- The change in the way the class was taught at the end of the semester worked much better
- Class went well. Breaking activities into group work and coming back together as a class was okay. Working as a class went better.
- Didn't learn that much from the group work but when taught up front/asked for help things become more clear.
- I thought that the course was very well known and explained well, I liked the flexibility you had with what teaching methods worked better. Overall, a good stats TA.

While it can be difficult to change teaching style midway through the semester, willingness to do so can vastly improve the quality of instruction for the students. By providing opportunities for students to provide feedback on the structure of the course and acting on that feedback, students feel heard and ultimately are more engaged in the classroom.

As I now transition from post-doctoral researcher to a member of the faculty, I am excited by the opportunity to continue teaching, and am particularly excited for the chance to teach [**COURSES**]. Additionally, I would be happy to bring new courses to the department that are not listed on the online course registry, including: [**CHECK THESE AREN'T OFFERED/THERE IS A GRAD PROGRAM**] an undergraduate course in Bayesian statistics, a course in statistical methodology for environmental and ecological data, or a course on statistical programming and Markov Chain Monte Carlo techniques. If given the chance to become faculty at [**SCHOOL**], I look forward to contributing my teaching philosophy to the department and continuing to learn additional ways to be an effective professor.