

Teaching Statement

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1. Teaching Experience

Teaching is an integral part of my life, as well as that of a university. It is a career path that has the potential to be frustrating, but also very rewarding. The joy of students succeeding or even just gaining an appreciation for mathematics is what drives me to become a better instructor. I have been fortunate enough to have taught hundreds of students at various levels between South Dakota State University (SDSU), Black Hills State University (BHSU), and Colorado State University (CSU). Each institution and student has afforded me the opportunity to foster a productive and cooperative learning environment while implementing modern teaching techniques.

I have taught a variety of courses ranging from Basic Algebra to Calculus to Matlab and Maple programming (a more detailed list of classes taught may be found in my curriculum vitae). The number of students enrolled in each of my courses has varied greatly as well. The smallest class consisted of 10 students and my largest class had 220 students. Teaching such a wide variety of students and courses has taught me to adapt my teaching style and methodology depending upon the needs of the students. These experiences have fostered my ability to reach students of varied levels of math aptitude. In part, the variety of teaching modality and techniques that I have implemented has resulted in my being nominated for and receiving teaching awards. It is important to be versatile when it comes to instruction in order to create a positive, inclusive environment, and my teaching philosophy reflects that.

2. Teaching Philosophy

Teaching is a give-and-take relationship. I believe an effective classroom includes extensive interaction between the students and the teacher, both in and out of the classroom. Therefore, a typical day in my class is not comprised primarily of lecture. Rather, I am flexible in my instruction and I adapt to the needs of my students, having discussions and group collaboration often. I expect students to come to class with questions and to share them with their peers and myself. Class typically ends with a summary of what has been covered, as well as some information on what is to come. This design allows for students to truly become active learners. This design also helps me, as a teacher, to understand how my students think and what material or concepts I will give the most focus. I believe the driving force behind this approach is that I teach for the academic achievement of my students. I teach to make life-long learners and problem-solvers, as well as students with an increased confidence in their math abilities.

I realize that each course is different, as well as each student. Thus, this pedagogical technique allows for adaptation in the classroom based on the demographics of a course. For example, I have taught two Calculus II courses, one with 35 students and another with 100 students. The smaller class allows for more student-teacher interaction, whereas the larger class encourages lectures. Thus, with 100 students, it takes more work to make students feel comfortable to ask questions and interact with one another. One way of doing this is to constantly encourage questions: purposefully creating pause times and allowing students to formulate their thoughts and questions. I also like to create worksheets. My worksheets are designed in a way that encourages students to communicate and interact with their peers. For such a teaching method to work, it is important to have an

awareness of the needs and levels of your audience, as this impacts implementation.

At BHSU, I taught three different courses: Basic, Intermediate, and College Algebra. These courses are typically comprised of students who take the course to satisfy a general education requirement. These students typically don't have an issue asking questions or talking to their peers. The two-fold issue with students in these levels is getting them to focus specifically on concepts/topics with which they struggle and then learn how to ask appropriate questions. One technique I implement is having them help write an exam question. This process helps the students focus on what they need help with and to prepare for exams, but it is also an important motivational tool. Why do they need to ask the right questions? This question stems from needing the necessary motivation. I believe that knowing the students' backgrounds and academic needs is important, no matter what course I am teaching. By knowing what interests them, I can prepare pertinent lectures and questions. The key to student success, especially for lower level math courses, is to make the course as relevant as possible, while creating one-on-one and small group instruction opportunities.

3. Curriculum Development

Another means of making courses applicable to the students is to make sure the courses are designed with the students' needs and abilities in mind. At BHSU, I was fortunate to take part in a course redesign. The redesign led to pass rates increasing significantly without compromising the material. (BHSU is currently working on an article stating the specific results.) At CSU, we have a large number of foreign students. A significant number of them have already taken a course equivalent to Calculus I prior to coming to CSU, but we had no way of determining the correct placement for them. I helped create a placement exam for them to take during the first week of class to determine if they should remain in Calculus I or move on to Calculus II. If it would be useful to the department, I would be inclined to continue with such endeavors.

At CSU, I was also afforded the opportunity to collaborate with the Calculus I course coordinator and an Education Professor. We wanted to analyze the demographics of over 1,000 students that had taken Calculus I over a three year time span. This included obtaining students' high school information from the registrar's office and class surveys, as well as analyzing Calculus I exam scores. We also had access to one semester's physical exams, and I was able to devise a grading scheme to help determine their algebraic abilities. Then, we examined any correlations these factors had with students' final grades. While this investigation is ongoing among multiple institutions, it helped me uncover data about my students. Knowing students' strengths and weaknesses helps me to become a better instructor.

I also believe it is important to communicate and interact with colleagues about education. It is important to be flexible as a teacher. By communicating and interacting, I can see what is working for them and try to implement effective and proven techniques. Communication with colleagues also includes attending educational conferences and reading and discussing current educational research literature with them. My colleagues, of all experience levels, contribute directly and indirectly to my goals of growth and self-improvement with my instructional skills.

4. Mathematical Outreach

Besides working with my own students, I also think it is important to do outreach. I have worked with a wide variety of children, from elementary levels to high school students in a gamut of venues. This interest was sparked while at SDSU. The College of Engineering partnered with IBM to offer

a one day workshop called GEMS, Girls in Engineering, Math, and Science. The workshop was designed to expose high school females to an array of future possibilities in these three fields. The segment that the girls especially enjoyed was programming a robot in order to make it go through a maze. The excitement the girls, and even their high school teachers, had when they were able to get their robot through the maze was inspiring. I would like to continue with such outreach, as I think it is important to show children that math can be fun and there are plenty of jobs that use math. These students could possibly be our future students and math professors, so I think it is worth investing time in outreach programs like GEMS. I also believe it is important to assist elementary and secondary teachers in the area surrounding the university. In doing so, we ensure that students who want to go to college are prepared and know what to expect, thus making their transition to college that much more inviting and predictable.