

Teaching Statement

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Teaching mathematics is one of my passions in life; I find there is no greater satisfactions than watching a student have that Aha moment, where everything clicks and starts making sense. I consider every course I teach to be a growth experience for both the students and myself; as a result I have learned a lot about teaching and communicating math to many different types of students. Since entering the graduate program at Clemson, I have presented mathematics at conferences, workshops, as an instructor, and as an undergraduate research mentor during the summer Research Experience for Undergraduates (REU) held at Clemson. Since becoming a teacher of record in 2007, I have had the chance to help students appreciate mathematics, understand mathematics, and grow in their own academic pursuits. I have taught a wide variety of students, ranging from math and science majors in courses such as Calculus III to non-science majors in courses such as Business Calculus. I have been able to stand out as a teacher; I have been recognized for an excellence in teaching with awards from the Department of Mathematical Sciences, the College of Engineering and Science, and Clemson University.

I believe that each student has a unique way of learning and different obstacles to overcome; I think that it is important to work with students to help them overcome preconceived notations about their learning abilities. While teaching Business Calculus class for non-science majors, I noticed that many of my students felt they were bad at math. During this semester, I began to realize the importance in being able to teach math well in order to help my students believe that they could succeed in a math class. With such a large diversity in students it was important for me to learn how to explain things in several different ways; to accomplish this not only do I use several different examples and pictures but I also clarify concepts by explaining the same idea in another way.

I have learned that students need encouragement and guidance in order to succeed on their academic journey. I believe in creating a balance between demonstrating good study techniques and reinforcing my students sense of self-responsibility. We all like to think that once students get into college, they are adults prepared for the transition from high school learning to college learning. Even the most mature students, , students need guidance and good role models to show them how to survive in the world of academics, especially in their early years. One method I often use to accomplish this is by having in-class quizzes. This method helps students learn how to start studying early, shows students what information they need additional help on, and reinforces that coming to class helps gain a better understanding of the material.

I think that it is important to teach students how to think and problem solve on their own. I have learned that in order to succeed in math it is not enough to just watch someone else work example problems; this was not something new to me but it was reinforced when I taught Calculus I for math and science majors. At Clemson, Calculus I is taught in the Student-Centered Active Learning Environment for Undergraduates (SCALE-UP) format, which is a collaborative, hands-on, technology based, interactive learning environment. The format consists of shorter lectures with more in-class time for students to work through problems in groups; this allows for the students to both learn the material while at the same time teaching it others. Teaching in this format presented two challenges for me: first giving the student the appropriate amount of lecture to see definitions, theorems, and examples while not taking away from their own self discovery. The second challenge was learning to step back and ask leading questions instead of just showing them how to do the problem. After teaching Calculus I, I have incorporated a student centered method of teaching in both traditionally taught classes as well as SCALE-UP classes.

I have also learned the benefit of using technology in the classroom. In Fall 2010, I co-taught Calculus III in a SCALE-UP Maple based format. The ability to see the objects you are working with helps the

students gain insight to the mathematics behind a particular problem; for example, graphing a 3D region to see the symmetry helps students to see why they would set up the integral in spherical coordinates instead of cylindrical coordinates. I think it is important for math majors to feel comfortable using mathematical programming languages such as Maple, Matlab, and Sage. By incorporating these languages into early math classes such as Calculus, it will enable math majors to feel more confident when using these languages in higher-level classes and in research.

I think it is important for the students to actively participate during class. I am currently teaching Discrete Mathematics; this is the first time that the Mathematics Department has allowed a graduate student to teach a theory-based course for math majors. During lecture, we work proofs together as a class; I ask questions to get their minds moving and allow them to determine the direction the proofs take. I always ask the students making suggestions on steps for the proof to explain the reasoning behind their decision; this helps the students who were stuck understand the thought process to get to the next step. I find the biggest challenge in this class is finding the appropriate level to help the students who have questions without taking away the Aha! moment where they discover a deeper understanding of mathematics on their own. I have noticed that many of my students this semester are struggling with thinking about math in an abstract way. I encourage questions from my students and encourage them to come to office hours when they need additional help. I believe it is ok that a student doesn't immediately understand the material. I believe that is important to teach my students that struggling with math is a normal part of learning and that there are opportunities for them to get the needed help in order to gain a level of understanding for the material.

In Spring 2009, I won the College of Engineering and Science Graduate Student Teaching Award as well as the university wide Graduate Student Teaching award. These awards are given yearly to two graduate students who have excelled in their teaching abilities. As part of the nomination packet, I was required to get letters of recommendation from former students. As I began to get in touch with some of my former students, I had a chance to see how far they had come and get insight into some things that they learned in my class. I was proud to hear that many learned more than just math while taking my class; they learned new study habits and ways to succeed in other classes. Some of these insights to learning included: the importance of coming to class, paying attention in class, and studying early, the helpfulness of working extra problems and working old exams to prepare for an exam, and a new found belief that they can do well in a math class.

Aside from typical in-class teaching, I have had several other opportunities to teach outside the classroom. For two summers, I had the opportunity to mentor during a Research Experience for Undergraduates (REU). Both summers I had three undergraduate students and one advanced high school student working as a group. Each student in the group came in with a different level of understanding of mathematics based on the courses taken. It was essential to give each student something to work on that matched their current level of mathematical ability while pushing them to move to a new level of understanding. For most of these students, the REU was their first experience with mathematics research; it was important for me to help show these students what it is really like to do mathematics and develop a love for that. My group from Summer 2009 has published a paper based on our work and my group from Summer 2010 has a paper in preparation. Mentoring during the REU confirmed for me that mathematics is more than learning in a classroom and it is important that undergraduates get a sense of that as well.

To date, I have had a diverse collection of teaching experiences, which have helped mold my ideas of what it is to be a good teacher. Although most of the courses I have taught have been Calculus courses, I believe that Clemson has given me the experiences and education to feel confident teaching any course in a typical undergraduate curriculum as well as graduate courses in my field. My experiences have also given me confidence in my ability to mentor students in research and to express mathematical ideas to a wide audience. With every course that I teach, I want my students to come away from the class with an understanding of the material, not just an ability to perform on exams. I hope that during future teaching and mentoring experiences that I not only teach my students something about themselves but also that I learn something about myself that helps me continue to learn and grow as a teacher and mentor.