Teaching Statement

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When I teach a course, I imagine that I am learning the material for the first time. By exploring the subject all over again, I reconnect with my passion for mathematics. I break the topic at hand down into main ideas, and I ask myself questions like "Why is this a natural thing to define?" and "What is the bigger picture here?" I ask similar questions to guide lectures, class discussions, assignments and even exams. I encourage students to follow my lead and break the material down for themselves. I find if I am enthusiastic and encouraging, this encourages my students to enjoy the learning process as much as I do.

There is a big difference between breaking a concept down into simple steps and trying to convince students that the concept is simple. If a difficult concept is simplified for class discussion, I emphasize the need for students to digest it on their own. Big ideas take time to settle in, and acknowledging the work needed for greater understanding cultivates respect for mathematics itself. At the beginning of each course, I tell my students what I expect of them. I listen to their ideas and encourage class discussion. I expect my students to respect one another, and this respect in the classroom builds trust, which nurtures learning.

In our culture, there is a widespread belief that one is born either with or without an ability to learn math. This attitude could lead any student to doubt themselves, but I believe that members of underrepresented groups are especially affected. Even those students for whom math comes easily will need to combine their talent with hard work and determination. Regardless of my students' attitudes towards math, I emphasize that success will come only with sincere effort on their part.

From my experience, students with friends in the classroom will be more likely to succeed. They can work on homework together, talk through difficult concepts and are more likely to feel included in class. Students of underrepresented groups are less likely to experience this advantage. Thoughtfully constructed group work in the classroom can help this problem by causing students to view one another as additional resources. They can turn to each other to solve the problems I assign from the textbook as well as the additional problems I put together that require a bit more thought and explanation. The students may present these homework problems on the board and/or write solutions clearly to hand in to me. Having diverse assignments facilitates each students success.

As a Teaching Assistant for the honors inquiry-based Differential Calculus class at the University of California, Santa Barbara, I have gained experience editing projects that

are designed to teach students entirely new concepts. In an inquiry-based course, class time is spent on group work, student presentations and class discussion as opposed to a traditional lecture. Students discover major concepts by working on problems rather than reading from a textbook. My experience with this class has given me new ideas on how to incorporate this type of learning into any classroom.

When assigning a project centered around inquiry, it is important to tell students that this class may not be what they are used to. Otherwise, it is easy for students to get discouraged when they dont know the answers immediately. I emphasize that while hard work is required, students are not alone. They have partners and all the topics are discussed as a class. Part of this class is to help students learn how to communicate math – a skill that is often not emphasized in traditional lecture-based courses.

Inquiry-based learning works best in a small classroom. For a large lecture class, student presentations, class discussion and group work can easily be held in the recitation or discussion section of the class under the management of the Teaching Assistant. Additionally, lectures to large groups of students can be led to feel like class discussions. When I lectured a Business Calculus course of 140 students, I asked the students questions to move the lecture forward. These questions help students be present and attentive during class.

Another way to encourage communication among students is to create an online environment in which the students can communicate electronically. For example, when I taught a Differential Calculus with 40 students, I created an online forum with Gauchospace[1] in which students could collectively review material for each midterm. Each student typed three review questions using LaTeX. Then students would add solutions and correct one anothers work.

During my summers as an undergraduate student, I worked for Shodor Education Foundation[2] where I learned about the developmental side of teaching. I created websites detailing lesson plans for interactive classes for middle-school students. I also programmed educational applets, including a java applet that allowed students to see how a graph changes as the values in the equation change. In addition, I taught my first class. I led middle-school students through a non-euclidean geometry lesson in an inquiry-based style. From these early experiences, I learned that I love teaching, and they encouraged me to tutor and lead discussion sections as a java lab Teaching Assistant throughout my undergraduate education at North Carolina State University.

I have been a Teaching Assistant for the majority of my time in graduate school at UC Santa Barbara. In this position, I can be a student and teacher simultaneously. Running my own discussion sections allows me to experiment with different teaching methods and develop my own teaching style. Furthermore, as a Teaching Assistant I could observe different teaching styles from behind the scenes. When I had the opportunity to be the instructor of record, I had a range of experiences to draw from.

[1] Gauchospace is an online course management system used at UC Santa Barbara

[2] The Shodor Education Foundation is nonprofit company focused on improving the use of technology in teaching math and science

Part of being a teacher is being a mentor to students. From being a good role model to guiding a student through an independent research project, mentoring is an important part of being a teacher. For example, I once had a student interested in learning more about math who wasnt sure where to begin. We talked after class during my office hours and eventually agreed that I would help him work through Sutherlands book *Introduction to Metric and Topological Spaces* based on his interest in analysis and abstraction. We met weekly, and I introduced him to professors in our math department. We talked about applying to graduate school, and I was more than willing to give him advice on the subject.

Mentoring goes beyond the classroom. That is why I have participated in various outreach programs. I taught calculus for the SIMS program[3], and I met with several of my students during the following year. They had a few math questions and felt more comfortable asking me than their current professor. Additionally, I have attended many events where graduate students speak with undergraduate math majors. At UC Santa Barbara, we had lunches with female undergraduates once a month. I also volunteered to speak with undergraduates about graduate school at the Pacific Coast Undergraduate Mathematics Conference at Loyola Marymount University.

As a teacher, I recognize that I influence my students in subtle ways. That is why I approach every class with vigor and passion. I demonstrate how to wrestle through a difficult or unfamiliar problem. I listen to my students ideas and respect their intelligence. I maintain my leadership in the class and keep us on track. I operate under the assumption that positive attitudes are highly contagious, and I am excited to continue my journey in becoming a better professor.

[3]The Summer Institute in Mathematics and Science (SIMS) program is a 2-week science and math intensive residential program for incoming freshmen at UC Santa Barbara designed to promote success for underrepresented groups and first-generation college students