

Teaching Statement

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Every teacher has heard a student say “I’m just not good at math.” To these students, mathematics is a talent they were born without. They have given up on math, and they take courses merely out of obligation. Most, however, can recall a time when they enjoyed learning math and felt confident about their abilities. Enjoyment, confidence, and skill reinforce each other. We all enjoy challenges when we believe we can rise to meet them, and surmounting one challenge gives us confidence for the next. As students lose their sense of mathematics as frightening and mysterious, they become more comfortable and flexible in their use of mathematics.

I encourage this process in the classroom by showing students that they can readily acquire mathematical skills. Accordingly, I teach by giving students many chances to try out what they have learned. I do not believe that mathematics can be taught solely through lectures, any more than cooking can be taught solely by observing chefs. Like any other skill, mathematics is best learned through practice and correction.

I have observed students succeed through this method of instruction. My teaching mentor, Susan Parker, coached me through several semesters teaching calculus and precalculus, with an emphasis on in-class exercises and on-going feedback. Precalculus students were required to read ahead of the lectures, and were given quick reading quizzes at the start of each class. These were one or two questions each, perhaps directly lifted from an example in the textbook. Knowing that my students had read the chapter freed me to devote more class time to work on examples and exercises.

I was also an in-class teaching assistant for two semesters with Ruth Charney for an experimental, lecture-free course, similar to a science lab, for undergraduate students in the Education Program. We placed students into groups of three or four and gave them themed sets of problems to investigate. For homework, they wrote up their findings. Besides grading their reports, my role was to observe groups, nudging them if they became discouraged, redirecting or rephrasing their questions if they had any. The intent was to impose as little direction as was necessary, so that students saw themselves, rather than us, as the source of answers.

I used these experiences in designing and teaching four sections of preparatory mathematics for the Transitional Year Program at Brandeis, teaching two sections of calculus at Wellesley College, and working with the Education Program at Brandeis. I saw how students gained confidence when they could demonstrate what they learned, and how they could teach each other when given problems to solve. I learned the importance of tracking each student's progress, and the effect social dynamics inside and outside the classroom can have on their ability to learn. Despite the differences in the structure of these courses, the most essential instruction took place when students worked on problems, discovered what they could do, and asked for help with what they could not yet do. In each, the students drove their own learning.

Teaching, like mathematics, is a skill that improves through practice and study, and I will continue to experiment with my methods. I have learned to watch students in the classroom and adapt my instruction to them, and to gather feedback before the end of the term. I have also learned the value of collaborating with other instructors and studying their teaching methods. Together, these interactions tell me how to improve my teaching and test whether I am doing the most I can for my students.

A secondary goal of mine is to develop course-specific digital media for use outside the classroom. A good textbook and a diverse set of supporting materials allow students to learn more outside of class, and to spend less time in on lectures. In the long term, interactive, rich-media texts may show numerous benefits over physical textbooks, but such innovations are useful only if they are designed and used with care. I hope to learn from students what materials will best encourage their understanding of mathematics, and then to create such materials as part of the process of maintaining a course.

Third, I am eager to extend my teaching methods to upper level classes. My own experience in advanced math classes suggests that many courses have room for a more engaging method of instruction, such as student-led explorations of proofs and techniques to seminar-style student presentations, and that students who feel a closer connection to the material are more likely to continue studying mathematics.

The job of a mathematician is to promote the familiarity and understanding of mathematics, so as a teacher I must remove whatever obstacles keep my students from enjoying and using math. I will continually work to create the most comfortable and encouraging environment for students to learn.