

TEACHING STATEMENT

My goal in teaching is to instill self-confidence in students and foster their desire to learn. I believe that mathematics can be understood and not just memorized, provided that it is delivered in a clear and effective manner. As an instructor, this belief has always been a motivating force in how I structure and focus my teaching.

So far, I have interacted with students of diverse backgrounds in a variety of contexts (College Algebra, Brief Calculus, Pre-Calculus, Calculus I-III, Differential Equations, Linear Algebra, Probability, Graduate Analysis, Graduate Algebra). And there are many other courses that I am capable of teaching, such as Statistics and Mathematical Modeling. Admittedly, I have had successes and failures, but I am constantly learning to be a better teacher. I summarize my teaching philosophies as follows.

Know your audience. I started teaching the first semester in grad school. It was a College Algebra class consisting of 35 students, most of whom were college freshmen. Drawing on my own experience as a top student in math, I incorporated derivation of many important theorems into my lecture, thinking that this would facilitate students' understanding. It did not work as well as anticipated and students were baffled, inquiring whether they could just remember the theorems. It was at that time when I realized that teaching should always be learning-oriented. A thoughtful lecture for Calculus students may be of little value to college freshmen struggling through algebra content. The first and most important thing is to help students understand why the material being taught is useful and relevant, thus arousing their curiosity to explore the unknown. I adjusted my teaching methods afterwards, putting more emphasis on applications, and it worked much better.

Have faith in your students. I was assigned to teach Calculus I in Spring 2009. At the end of the first class, a girl approached me, nervously telling me that she barely passed Pre-Calculus and asking for my idea whether she would possibly succeed in a Calculus class. "It will be a lot of work. Are you ready for the challenge?" "Yes, I so much want to prove myself." "Then go for it!" And she did. She came to every one of my office hours that semester for extra help, and I detected many gaps in her prior knowledge. For example, I discovered that the reason she was having a hard time solving trigonometric equations was because she had never learned about the inverse trigonometric functions. To fill in these gaps, we would go over the background material again and again till she fully absorbed the knowledge into her head. With this great effort, at the end of the semester, she passed the course with a good grade and tearfully thanked me for the faith I had in her, "I would be failing without you!"

Preparation plays a key role. Because of my good academic performance, in Fall 2008, I was selected to be a Super TA for Graduate Analysis. And my main duties were to run problem sessions to help resolve students' questions. It was no easy task. Students tended to have all sorts of needs, homework problems, additional exercises, vague concepts... It was my priority to accommodate as many students as possible and the balance was not easy to keep. At the beginning of every problem session, I would suggest a list of problems, and then we would choose some of them to discuss. I found that students were not only interested in how to work the problems out, but were also eager to know how to come up with the ideas in the first place. And they would constantly request a more detailed explanation of certain steps. The efficiency and effectiveness of the sessions depended largely on my preparation. I spent a great amount of time doing every problem in their textbook, marking the most important ones, and pondering over how to motivate the solutions. It was an unforgettable experience, and with the help of my students I grew as a teacher along the way.

Challenges of teaching a large class. I started my postdoc at UT in Fall 2010, and my first class there was Advanced Calculus for Applications I, aka Differential Equations, a 120-student lecture course. Having had 4 years of teaching experience in higher education, I did not find the large class size daunting at the beginning, but it soon turned out to be a whole new challenge for me. Many of the teaching

skills I used in my previous small classes at Arizona could not be directly carried over, and personal interaction with my students became much more difficult. Gradually, however, I have developed a variety of new ways to personalize my lecture delivery and keep my large audience engaged: I post lecture outlines on Blackboard early so that students could spend class time focusing on filling in details and making connections between ideas; I give students advance study questions to help them prepare for class assignments; I have makeup quizzes and exams available to accommodate special circumstances students might have; I send out weekly email reminders of homework due dates and upcoming class activities. One of the techniques that I find particularly useful for getting students to participate in class is where I purposely make a mistake while doing an example, and ask my students “Anything wrong here?” I would then allow them 1 minute or so to discuss their opinion with a neighbor before bringing the class back together. It works like wonders!

Teamwork brings out the best. I team-taught Integral Calculus with 4 other instructors in Fall 2011. We still designed our lectures independently, but we shared resource materials and planned our curriculum together. We met and exchanged emails frequently to discuss the concepts to be covered during the following week of classes and to present ways of teaching and assessing these concepts. Integral Calculus is a tough course for many students. Formulas introduced in this class are fairly general, and students need to truly understand what they are learning in order to succeed. We strive to provide them with challenging assignments, yet we do not want to intimidate them or bombard them with a too heavy homework load. We put together our best effort by taking turns creating the first draft of weekly homework from the Quest database. We then relayed it to every member of the team for constructive feedback. This is one of the most enriching teaching experiences I have ever had. Teamwork is indeed a better way to work.

Carry the torch forward. I have also taken on more service and mentoring responsibilities. In my previous position as an instructor at UT, I provided advice and training for 8 graduate TAs as they prepared for discussion sessions for students. As anxious beginners, TAs tended to expect their task to be as specific as possible. For example, “What should be emphasized?” “What examples should I use?” I offered them general guidelines and suggestions, but drawing on my own early teaching experiences, I believe it would be more beneficial if TAs learned to develop original and effective methods on their own. So instead of directly giving them a list of problems to cover during the discussion session, I showed them statistics related to each homework, and told them to focus on the harder problems and review background material that might be the source of the difficulty. It alleviated their anxiety and at the same time helped them achieve a measure of independence and self-fulfillment in their jobs. This semester at Brown, I serve as the course head for Linear Algebra and my main duties include designing a common syllabus and mentoring beginning instructors. I received a lot of support and encouragement when I started teaching and it is so wonderful to be on the opposite side of this process. I communicate with my mentees regularly and offer them feedback and alternate teaching strategies. Though I am a somewhat veteran teacher, this also gives me the added bonus of a shared learning experience.

It is so rewarding being a teacher. I am delighted that some students followed me through a number of different courses because they enjoyed my method of teaching. And my happiness was beyond words when my students came to me at the end of the semester, thanking me for my help. “You’re a role model to me.” “You have been my favorite teacher in college so far.” “Without you, I wouldn’t have done this well.” “You’re the best math teacher I’ve ever had!”

The great mathematician Poisson had a famous quote, “Life is good for only two things, discovering mathematics and teaching mathematics.” And this is exactly what I want to do with my life.