

Teaching Statement

Christopher R. H. Hanusa

As a teaching assistant at the University of Washington, I have interacted with undergraduates in many ways. I worked four quarters as a quiz section leader of freshman calculus and three quarters as the grader/aide for the discrete mathematical modeling course. This quarter, I have had the opportunity to teach my own section of Linear Algebra, which required that I organize the structure, create the tests, and take full responsibility for the students' learning. My student-centered teaching methods helped me earn the UW Mathematics Department's Excellence in Teaching Award for 2003–2004.

I have also been awarded a VIGRE Fellowship for the coming Winter and Spring quarters. I will be making the Graduate Combinatorics Seminar more accessible to interested undergraduates and to non-combinatorialists by holding a pre-seminar where either the speaker or I will present the background material needed to understand the seminar.

One of my goals as a teacher is to get the students interested in math. Most students in a lower level class are taking the class to go on and take more advanced classes in another discipline. This type of student always seems to say "I've never been very good at math" because they have not learned how to think mathematically or understand math's greater consequences. When I have met these students in my calculus quiz sections, I use a mix of enthusiasm, examples, and encouragement to try to show them just how beautiful and exciting math can be.

The best way to help quash the fear of math that we see at the university is to start young. This past year, I co-organized a Math Olympiad Program at a local public school. Each Thursday afternoon, a group of 25 fourth and fifth graders stayed after school with our team of two graduate students and two undergraduates. We worked on math problems with a common theme and they had a great time learning math with friends.

Being not averse to math is one thing; wanting to do research in math is another. I was fortunate enough to be exposed to research mathematics at an early stage in my undergraduate career at Harvey Mudd College. One day I went to a mathematics seminar presented by Jennifer Quinn of Occidental College. Professor Quinn presented joint work with Harvey Mudd's Arthur Benjamin on Combinatorial Interpretations of Fibonacci Numbers. I saw a pair of equations that I had seen when I was learning number theory and pointed this relationship out to her. My suggestion led to a journal article and to my own senior thesis in combinatorics. This experience emphasizes how much a seminar that students can understand is beneficial to advancing a department's draw on students.

I have had some excellent role models for my mathematics teaching. In high school, I had a linear algebra teacher who taught me the song "Row by Column" (set to the tune of "Oh My Darling Clementine"), which helped me master the art of multiplying matrices. I taught this song to my students in linear algebra this fall and they seemed to enjoy it.

Two of the inspirational professors that I had at Harvey Mudd were Arthur Benjamin and Ran Libeskind-Hadas. Professor Benjamin has an extraordinary mental calculation capacity, which he uses to his advantage in his teaching. For example, he regularly memorizes the names of forty or more students on the first day of class. The environment of belonging that this fosters, combined with his enthusiasm in presenting discrete math, helped keep us interested and excited about coming to class every day. Professor Ran, as we liked to call him, always brought to class his sense of humor and eagerness for us to understand what he was teaching. He made sure that we were learning by asking questions in class and by holding copious office hours that were frequented by most of the class. Professor Ran made all his students feel important, and he made learning fun and easy.

The main characteristics that were shared by all these role models is that they had enthusiasm for their subject and truly cared about their students' learning. These are characteristics that I have tried to adopt. It is important that I do not just teach my students how to get the right answer. I also need to explain the reasoning behind the math so that my students truly understand the material. Rote calculations that are not used frequently are easily forgotten. True understanding is not.

I feel that I am at my best in office hours. One-on-one contact really allows me to assess whether the students understand the subjects that I am trying to teach them.. My philosophy in office hours is that when a student asks a question, I answer their question with a question. I try to guide my students to the solution by showing them what they already know. I always try to make sure to give my students enough time for office hours and I think that an open door policy works best to foster an environment of “I want to help you learn!”

In class, I focus on keeping the students engaged. The most important thing I can do is make sure there is always a reference point in what they are learning. Another good way to keep the class engaged is by using worksheets. Worksheets give students a chance to work in groups on relevant exercises in front of me, so that I can see where they are having problems and adapt my lectures to cover areas that they seem to be missing. I also try to keep the students interested by giving them examples from my research during the class. For example, when I talk to my Linear Algebra students about my research into different types of matrices, I can see that they perk up and listen to what I have to say. One final technique that I use is one that was employed by my undergraduate advisor, Professor Francis Su. At the beginning of each class, he presented a “Fun Fact” about some interesting mathematical tidbit. Even if it did not pertain to calculus, it gave us more perspective about the greater fun in mathematics. It made us want to get to class on time, even for the early classes, and it put us in a mood to absorb the day’s material more readily.

One way that I can help students learn more efficiently is by incorporating technology into my teaching. The University of Washington has developed a useful set of “Catalyst tools” including class e-mail lists, an online discussion board, quick polls, and anonymous feedback e-mail. These help me keep in touch with the students and let the students give me feedback on the course. Most importantly, they let the students interact outside of class even if they would not normally be able to meet in person. I set up a webpage with the course information so that it would be easily accessible to the students at all times.¹ In addition to fielding questions in office hours, I have answered many questions over email. I find that these advances in technology have had a positive impact on learning.

I also try not to just be a teacher of mathematics. As an instructor, I am in the position to have a positive impact on my students’ academic lives. Many of them have not learned time management skills or test-taking strategies. These are areas that I try to address in my classes. For example, I try to convince my students to come to my office hours one or two days before the homework is due. Hopefully, what I show my students allows them to succeed in other courses as well.

I want to end this teaching statement with the views of some of my previous students who, in their instructor evaluations, made me proud that I achieved my goals.

“Explanations by the TA were very clear and concise. That had to be the best part, I really felt like I learned something.”

–First Quarter Calculus, Fall 2001

“Chris would help with concepts, not just homework problems, which I really appreciated. I can tell you enjoy math and that made it much more interesting to learn from you.”

–Second Quarter Calculus, Winter 2002

“Thank you for the extra time outside class you are willing to devote to your students. The one-on-one help was great.”

–Second Quarter Calculus, Winter 2002

“I liked the way you didn’t give me the answers and made me actually learn the material.”

–Second Quarter Calculus, Winter 2003

“I hope you’re planning on being a teacher, cuz if you can explain this stuff and understand my problem over email... well, that says something.”

–Second Quarter Calculus, Winter 2003

¹The course webpage that I set up for my class can be found at <http://www.math.washington.edu/~chanusa/math308/>.