Teaching Statement

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Most of the graduate students at the University of Arizona mathematics department are assigned to teach the most basic level mathematics classes, such as College Algebra and Trigonometry in their first year. I have taught College Algebra for five semesters. The reason that we are assigned to teach these classes at the beginning of our graduate school careers is that they contain relatively easy content. However, for those with relatively little experience at the beginning of their graduate school careers these are the most difficult classes to teach. The reason is that these classes are taken primarily by freshmen of all majors who often have little motivation to learn mathematics and who simply want to get done with it so they can pursue their major without ever seeing math ever again. It was a great challenge for me making those students to love mathematics, change their vision about mathematics, and even make them requestion themselves why they hated math so much. I had the greatest experience with my college algebra students. Every semester I had so many students coming and thanking me for helping them to get over their math anxiety. They realized that once they had the right kind of instruction, the subject was not so hard after all. In my second semester teaching College Algebra, among 18 sections, my section got the highest score on the common final which is prepared by faculty members and given to all sections at the same time. The day I got the results, the amount of happiness I had, made me realize that academia is the perfect career for me. It made me feel like as I achieved the most important goal in my life.

Having this experience with College Algebra, I was toughened up enough to be successful as a teacher at any other college level mathematics class. In five and a half years at the University of Arizona as a graduate student, I have built a solid teaching experience. Other than College Algebra, I have independently taught undergraduate Precalculus, Calculus II, Linear Algebra and Differential Equations. I was fully responsible for these courses, from writing the syllabi and delivering lectures to writing exams, holding office hours and assigning grades. I also was the teaching assistant for the Abstract Algebra class and for the Mathematical Reasoning and Writing class.

In addition to teaching undergraduate courses, I?ve had several opportunities to assist other graduate students. I helped running a workshop designed to prepare incoming new graduate students for the first year courses for two summers. I developed the curriculum with faculty, and mentored the new students during the workshop, especially the group working on an algebra project on representation theory.

I believe that outreach programs help a department to become an integral part of the community by addressing its needs. For example, I helped organizing

a high school workshop on Cryptography in Spring 2004, and also gave a talk about cryptography in a language that high school students could understand. It was a great joy asking them to send some encrypted messages to aliens. That showed me not only how much knowledge they gained from the talk but also how creative the students can be if they are exposed to the right way of learning any subject about mathematics. I also was a counselor at a Summer Mathematics Camp for two weeks for mathematically talented middle school kids in Summer 2004. At the beginning of this semester, at the end of my first day of my Linear Algebra class, two young college kids were waiting for me. They had this nice smile on their face and asked me whether I remembered them. My way of teaching and interaction had stuck in their minds and four years later after they started college they have seen that I am teaching Linear Algebra and decided to enroll in my section. This summer I also took part in the Vigre Research Summer School on Computational Group Theory. This was an intensive summer school for a month where the students have to learn the needed background material in computational group theory and the programming language GAP. Then they were assigned some projects as groups. I closely worked with a group of four students whose project was in coding theory. I helped them understand their project papers and implement the ideas on their papers using GAP. It was a great joy for me being able to mentor an undergraduate project. I like to see teaching or communicating mathematics as a tool of gaining new knowledge and discovering new perspectives for the subject for myself. My mentoring experience in the undergraduate project, ?Language Competition?, with a group of four undergraduate students enrolled in Mathematical Modeling class was a great example for me being able to help students in an area that I am not an expert on.

In the Summer of 2006, I attended the 3rd International conference on Teaching Mathematics in Istanbul, Turkey. A colleague and I organized a panel session, called "What would you do?" which hosted nearly 200 people from all over the world. As two young woman instructors with three to four years of teaching experience at the college level, we filmed some of our real classroom scenes that were touching some classroom authority issues and math content issues. We stopped the video clips right before we had to take an action. We asked the audience what they would do if they were in our situation and discussed how we handled the situation. Every single clip started a long and hot conversation in the room. Having heard so many different opinions from mathematics instructors coming from such diverse backgrounds helped me a lot throughout my teaching career with my own teaching philosophy. These videos are now used at the mathematics department of the University of Arizona as part of the teaching orientation for the new incoming graduate students. The videos can be sent upon request.

In all of my undergraduate classes, I have incorporated technology. For example in my Linear Algebra class, I assign homework problems and projects which require my students to use Matlab. To make them believe in the need of technology, I talk about my own research where I have to work with 500000 by 500000 matrices and convince them there is no way to attack most of the real life problems or any math research problems involving such matrices by hand. In my Calculus class, I used an online homework system (WebAssign). I would like to improve my strategies for building on the strengths of this resource and to minimize its weaknesses. Through these teaching experiences, I realized that

technology can be a powerful teaching tool when properly applied.

I have developed a wealth of teaching experience from young children to graduate level students. I have also developed the ability to help with undergraduate research projects. I would like to become involved in any outreach programs a department may be running. I believe that these credentials, coupled with my enthusiasm in teaching, will make me a valuable addition to your department.

1 Teaching Philosophy

I believe that most of the college students can accomplish anything provided they have the desire, the confidence and the necessary assistance. As an instructor, my goal has been always to provide the necessary assistance a student needs in order to build the desire and confidence to succeed.

To fuel the desire of a student, I think the most important thing is to point out where and why the material I am teaching is useful and relevant. I achieve this through a number of different steps. The first and the most important goal is, independently what you are teaching, you have to get to know your audience is. Knowing the audience means knowing their majors, their interests and their math backgrounds. I believe that a thorough understanding can be gained through personal contact. For this reason, I encourage my students to come to my office hours where I can spend some one on one time with them.

I work hard to build rapport with and amongst my students by being open and approachable. I encourage active participation instead of mute notetaking. Creating an environment in which students are comfortable allows them to ask questions, take risks and explore ideas through discussion. Encouraging them to present solutions to problems on board as if they were the teacher of the class is very important for me. By explaining each step in detail, they find their misunderstanding and make the appropriate adjustments to arrive at the correct solution. Arriving at the correct conclusion themselves makes them realize that they have the ownership of knowledge and that increases their confidence in their mathematical abilities.

Since I view practice as the keystone to a students' learning, I try to incorporate class group activities. I believe mathematics can be understood better if communicated better. In my experience many students gain a better understanding of the subject if they are interacting with each other and are engaged in problem solving.

In every classroom, there are students with different levels of math background. It is my biggest priority to make the subject clear for as many students as I can and make sure nobody is left behind. As a graduate student I know how it feels once you feel lost in a class. Not having the desire to follow the lecture because you feel lost is a cheap way of missing the taught material. Therefore I feel it is the instructors' job to minimize the chances for this to happen. That can be done by detecting and filling the gaps in students' prior math knowledge. It is important to find the balance so that you do not bore the good students but also make the weaker ones part of the class. Therefore I always make sure that my students get the needed help outside of the class, and I work hard to encourage them for getting this help.

I believe that it is of great importance to make my students understand that

I am not just teaching them a given set of rules. Emphasizing that everything I teach has an origin, a reason and an application in many other disciplines is necessary. I believe that it is also important to convince my students that learning math will not just make them knowledgeable about the subject but will train them for becoming better analytical and critical thinkers and great problem solvers. Once they realize that those are very important skills to have, independently of the choice of the career that they will be choosing, they start to look at math from a different perspective. That is why always I tell my students that mathematics is the best investment for themselves.

I see teaching as a fundamental tool of being a good mathematician; my job is not just to gain knowledge but to know how to share it at any level. As a teacher, approachability, patience and flexibility are the products of my genuine interest in students and the learning process. I have developed this philosophy toward teaching since becoming an instructor. The success I think is reflected in the gratitude of the students I have taught. I am also encouraged by the fact that many students followed me through a number of different courses because they enjoyed my method of teaching. Some of my students even decided to pursue a major in mathematics as a direct consequence of my teaching. My teaching style has even earned me an Outstanding Teaching Assistant award from the University of Arizona, Mathematics department. I do believe there is always room for any instructor to improve their teaching style. However, there are some people who are naturally gifted teachers. Based on the feedback that I have got from my students, from my supervisors and from my own experiences within the last six years, I believe that I am a natural and, following this philosophy, I will continue to make a valuable contribution to educating students in mathematics.