

TEACHING STATEMENT

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One day in the fall of 1998, while teaching a mathematics content course for prospective elementary teachers for the first time, I found myself struggling with a question posed by a student. The students had been working in groups with manipulatives to solve a division problem: “Juana wants to make pillows and has $5\frac{3}{4}$ yards of fabric. Each pillow uses $\frac{1}{2}$ yard of fabric. How many pillows can she make?” Using the manipulatives, the students had found an answer, but using the standard algorithm, they had found a different answer. I solved the problem using both methods and found that, indeed, there appeared to be two answers. Which was correct? This was an unanticipated predicament! Perplexed, I opened the issue to the class for discussion. We spent the following 15 minutes throwing out ideas and arguments. Students spontaneously came to the board to explain their ideas to their classmates. We finally resolved the issue together, and in the process had a wonderful discussion about mathematics. As a result, the students and I developed a newfound respect for both elementary mathematics and cooperative learning. This deep level of understanding about division of fractions would not have occurred without the carefully constructed classroom environment that exemplifies my beliefs about the teaching and learning of mathematics.

Foundational to my teaching philosophy is a belief that mathematical knowledge and understanding are constructed both socially (in the classroom setting with the teacher and the other students) and individually (as the student makes sense of the concepts on her own). Undergraduate mathematics students face the considerable task of striking a balance between developing an intuitive understanding of mathematical concepts and a sense of where these concepts fit in to the formal structure of mathematics. I believe that instructors can help them to achieve this balance by providing opportunities to explore mathematical concepts in a constructive manner, while also helping them learn how to interpret formal mathematical writing. That is, I believe that it is important to recognize that the way mathematical concepts are learned can be very different from the way that mathematics is formally presented in textbooks; one should be cognizant of the inherent conceptual difficulties for students.

Mathematics is a subject that can be intimidating for many students. As a teacher, I try to help ease this tension by being open and available to students for help, and by being empathetic to the difficulty that the students are experiencing. In order to encourage all students to participate in class activities, I plan courses in such a way that students are active in the learning process. Students’ learning styles vary and I believe that teachers should design classroom activities to accommodate these different styles - all students will benefit from seeing mathematics presented in a variety of ways. I work hard to establish a safe, open, cooperative environment from the first day of class; research has established that most students learn best in such an environment. Throughout my years teaching at the University of Arizona, students’ evaluations of my teaching have been extremely positive. Many noted that my approachability as an instructor and responsiveness to students were major factors in their success in the course.

In my teaching experiences with secondary and undergraduate students, I have found that providing students with opportunities to reflect upon their own thinking processes has a profound impact on their learning of mathematics; I have since learned that research supports this idea as well. I have been successful at promoting such reflection through the use of class discussions, written assignments, and meetings with individual students, as well as by modeling this behavior myself. I believe that modeling enthusiasm for mathematics and excitement for learning can help encourage students to become lifelong learners, and that one can promote critical thinking and reasoning by

modeling these behaviors in class. Learning to teach is an ongoing process, and I attempt to review and assess my own teaching through a variety of resources.

A major goal of undergraduate education is for students to come to assume responsibility for their own learning and in the process become lifelong learners. In my experience, many students have not developed this sense of responsibility in high school and must be guided by their college teachers to develop the skills necessary to become independent learners. I strongly believe that teachers and students should have high expectations for each other, and should communicate their expectations frequently. Students should be encouraged to provide constructive feedback on classroom activities and assignments; I find that this helps me not only to improve my teaching skills, but also to foster this sense of responsibility in the students.

As a graduate teaching assistant at the University of Arizona, I have had the opportunity to teach a variety of courses. I have taught finite mathematics for business majors, topics courses for liberal arts majors, reform-oriented pre-calculus for science and engineering majors, and mathematics content courses for pre-service elementary and secondary teachers. In each case, I was solely responsible for the teaching and assessment of up to 35 students. I also had the opportunity to serve as an assistant for junior-level courses in number theory and introductory analysis. In these cases, I conducted problem-solving sessions outside of class, held office hours, worked individually with many students, and lectured when the instructor was absent. I also co-taught a graduate course on research in mathematics education with Marta Civil. Together we planned the syllabus, chose appropriate readings, designed assignments, and led class discussions.

Prior to attending the University of Arizona, I spent two and a half years teaching mathematics at an inner city high school in Tucson, AZ. During this time, I taught a great variety of courses, from remedial arithmetic to pre-calculus. In addition, I taught an algebra class in Spanish and worked one-on-one with immigrant students whose English proficiency was limited. These experiences left me with the indelible impression that communication between secondary and post-secondary mathematics educators is crucial to the success of our shared students. In addition, I have a perspective on high school mathematics teaching that is probably uncommon among college mathematics faculty; I view this perspective as one of my greatest strengths.

I regard conceptual understanding in mathematics to be at least as important as the development of computational skills, and so I believe that my teaching philosophy is aligned with reform-oriented mathematics programs and textbooks. I agree with leading teacher educators that future mathematics teachers not only must study a broad spectrum of mathematical topics, but also need to develop a slightly different level of understanding from that of the typical mathematics major. That is, it is not enough for teachers to be able to *do* school mathematics; teachers must be aware of the overall structure of mathematics, where the topics they will be teaching fit into this “big picture”, and how these topics can be presented to children. I teach mathematics content courses with this perspective on understanding in mind, and am particularly interested in developing an abstract algebra course for pre-service teachers with the goal of developing a deep understanding of the algebraic structure upon which the high school algebra they will soon teach is founded. In addition to teaching the typical entry-level courses (calculus, etc.), I am also interested in developing and teaching mathematics courses specially designed for liberal arts majors, content courses for pre-service elementary and secondary teachers, and graduate-level content courses for teachers pursuing master’s degrees in education.