

Teaching Statement

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Background

I have had a desire to teach mathematics for as long as I can remember. I came home from second grade and taught multiplication to my 4-year old brothers. My undergraduate program was in the combined field of mathematics and math education. Thus I was simultaneously submerged in the study of abstract mathematics, along with the study of how to communicate mathematics to young people. Though I did not pursue a career in secondary education, my experience in studying education has stayed with me and has shaped my views about teaching.

I am struck by the dichotomy of preparation for educators at the secondary level as compared to preparation for educators at the collegiate level. As an undergraduate preparing for secondary teaching, I felt that far too much time and effort was spent examining issues peripheral to the material of mathematics. When I instead chose to focus my studies on the mathematics itself, I found the opposite extreme. In advanced undergraduate and graduate study, I was taught by too many faculty who expertly commanded the material, but seemed disinterested in presenting it effectively to non-experts. It is not uncommon to hear from fellow grad students or faculty the phrase, "I have to teach." I *want* to teach. Of course it is hard work, but there is something very rewarding about thinking back to what it was like when I first learned a concept, explaining it by highlighting precisely the most difficult parts, and seeing the "light turn on" in my students.

It was clear to me immediately from my first day as a graduate Teaching Assistant—instructing College Algebra—that the college level was where I wanted to teach. I have relished the dual role of studying research-level mathematics while at the same time teaching mathematics to undergraduates. We are always told that the number one priority is progress toward the degree, and that teaching comes second. In recent years, however, I have noticed that I am itching to dive headfirst into my teaching. I am looking forward to structuring courses, planning lessons that go significantly beyond the book, and being available to my students to a level that is difficult for a graduate student to achieve because of time limitation pressures.

Experiences

One of the opportunities I have had as a graduate student was to be the Teaching Assistant Coordinator for two semesters. My job was to visit the courses of first-semester teaching assistants and give them constructive feedback on their teaching effectiveness. I very much enjoyed using my experience to help guide the new teachers, many of whom never had been up in front of a class before. It was rewarding to make a return visit to each class and see that many of the TAs had significantly improved by implementing some of my suggestions.

I also had the opportunity to be a Workshop Instructor for the Emerging Scholars Program (ESP) at UIC. Students work in groups for two hours twice a week to solve thought-provoking problems related to the topics of a math course they are taking concurrently. Unlike many courses where students work routine problems and can check their answers in the back of the book, this program is designed to mimic how researchers do mathematics: everyone works together in groups on difficult problems, but nobody knows the answer. This encourages a depth of understanding and a focus on the process as opposed to just getting the right answer. The first major challenge for the instructor is to develop problems that push the students, yet are not so difficult that the students need extensive help from the instructor to solve them. The second major challenge is to help a group that is stuck to get on track without explaining how to solve the problem. It was a joy to motivate students to think deeply and to create their own clever solutions.

Currently, I am enjoying the best teaching experience of my career. I am a lecturer for Applied Linear Algebra. Very few graduate students get this opportunity, and I am glad that I accepted the challenge to teach this course. Over the years as a TA, I have been jotting down ideas I'd like to try "when I'm a professor." This fall, I have been able to utilize many of these ideas, including giving group projects and quizzes, giving basic reading quizzes to ensure that the students are keeping up with reading the text, and using lecture slides and making them available to students online. I have required that each student "adopt" one section of the text by making a full homework key for the class and presenting a problem from the section to the class. This gives the students ownership of the material, motivates them to be extra prepared, and helps develop their ability to communicate mathematics. I invite you to view my interactive web syllabus at <http://www.math.uic.edu/~grizzard/Teaching/Syllabus.html>. My students have responded by working hard and digging deeper to understand many of the concepts. This in turn has created an exciting teaching experience for me.

Philosophy

The crux of my teaching philosophy is well-expressed by the phrase, "Mathematics is not a spectator sport." Math classes too often turn into a situation where only one person is talking the entire time and everyone else is furiously and often mindlessly writing down what is being said. As TA coordinator, I explained to new TAs that simply "covering" material by lecturing on it does not mean that students are understanding it. My philosophy of teaching is to shift the burden of the material from the teacher to the students as much as possible.

One way to accomplish this is by implementing group work. I was first exposed to this idea in my undergraduate math education curriculum, but did not get a chance to use it effectively until participating in the Emerging Scholars Program. This type of program has had a great deal of success at campuses around the nation, and I witnessed this success firsthand for many semesters. With the burden on themselves rather than on the instructor to explain it to them, the students as a whole grasp concepts and reasoning to a greater depth than they do during the traditional lecture. After working together to

solve the problems, students also have to communicate their ideas to others, which solidifies their understanding. Additionally, knowing that they will be regularly working with peers does provide some extra motivation for students to come to class prepared. As TA Coordinator, I encouraged the new TAs to do group work for portions of their classes. I believe this is ideal for a situation where students are getting a lecture apart from the group work setting.

As a current lecturer, I can see some of the limitations of group work, particularly with the time constraints of a course that meets only three hours per week. I make sure to keep students thinking and working during lecture by having them fill in steps, work at their seats, and answer questions in class. Even when lecturing, I want to get as much feedback and interaction as possible. Still, I have found that some concepts can best be learned or solidified in groups by a well-crafted worksheet or project.

In my undergraduate math education curriculum, I learned the value of reflecting upon my teaching experiences. I have noticed that this tool is underutilized by many instructors at the college level. I frequently take time to look back on what has gone right and what did not go well in my teaching, and make adjustments accordingly. About six weeks into each semester, I distribute and collect a form to solicit anonymous feedback from students. This reflection has helped me continue to improve and grow as an educator.

I expect my students also to use the idea of reflecting on past work, particularly for exams. Every time students turn in an exam, I give them the solutions with a reflection assignment that is due the day the exams will be returned. The reflection assignment is to rework the entire exam and explain what they remember they got wrong and what they got right originally. They are asked to give a predicted score for their exam. It is interesting how close students' predictions are to their actual scores, for those who put serious effort into the reflection assignment. This helps improve metacognition, which has been shown to improve future performance.

I can see myself developing courses with creative ideas such as group work, projects, and seminars as a major part of the curriculum. I am excited about this possibility as I take the next step in my career.

Conclusion

My career path has alternated between focusing on the study of mathematics and the teaching of mathematics. It is now converging to an ideal position combining my knowledge of mathematics with my love for teaching in the college setting. Effective teaching is a major focus for my career, and perhaps the most important component of my profession. I look forward to this opportunity.