Teaching Philosophy

One of the most formative experiences I associate with my current identity as a teacher occurred as a graduate student. During the first few semesters in graduate school, I struggled academically for the first time in my college career. I felt overwhelmed in my courses and it seemed that no amount of hard work or effort would provide relief. Fortunately for me, it was the effort and kindness of another who intervened and reversed my course. In an act for which I am thankful to this day, one of my professors pulled me aside after class one day to talk about my (lack of) progress in his class. We discussed my situation, how I felt about it, and what we could do to reverse my current course. He responded by offering me an opportunity: I could improve my grade in his class if I agreed to participate in an oral exam in which he could ask me about any material we had covered in the class, to be administered in two weeks. He assured me that I was indeed capable of succeeding in this class and this was my opportunity to prove it. Indeed, bolstered by this professor’s confidence in me, I made it my mission to take advantage of this extra opportunity I had been given. I made several visits to the professor’s office to ask questions – something I had been hesitant to do just days before – and immersed myself in the material. As a result, I performed quite well on the oral exam and was able to translate my newfound confidence into the academic success I sought. I still marvel at my dramatic turnaround in the aftermath of such a routine event: a conversation between a teacher and his student. The truth, though, is that, while the event may have been routine to an outside observer, it was anything but routine to me. This experience demonstrated to me a fact that stands at the fore of my teaching philosophy: a teacher’s relationship with his students is as important as the material he is teaching.

Another important lesson borne out of my abrupt academic turnaround was my approach to learning mathematics. The course I credit with piquing my interest in mathematics – high school geometry – featured a Socratic, student-centric classroom environment. While I was in the midst of re-forging my mathematical identity by studying for the oral exam, I found it helpful to approach the material in a method similar to what first stimulated my interest so many years prior. That is, I began to focus on how theory is borne out in examples and ask “how might I have seen this result for myself?” Contrary to the presentation of mathematics in many textbooks which state general results and then specific examples, I found myself learning the material as if I was discovering it on my own: I would start with examples and see how they might shape the resultant general theory. In this way, I was able to motivate the fundamental ideas and provide myself with some context and justification for the mathematics – something that I had been missing previously. I found it to be a very powerful learning tool, and it changed the way I see mathematics; not as a set of ready-made theorems and definitions handed down from on high, but rather as an activity done by actual human beings. Almost without notice, I began to integrate a similar overall approach into my teaching and lesson plans. My goal became to utilize this method to dissolve the mental barriers that many students erect between themselves and mathematics; for them to see mathematics not as a series of endless formulas and mindless algorithms, but rather as a beautiful, accessible arrangement of patterns discovered and practiced by actual people, people just like them.

In addition to placing my relationship with my students and my own example-driven approach to mathematics at the core of my teaching practices, I also bring enthusiasm and
patience to the classroom. My primary goal in this regard is to convey my authentic (hopefully contagious) enthusiasm for mathematics. After all, if I seriously hope to enable my students to break down any perceived barriers between themselves and the material I wish for them to learn, the best way to do this is to be living proof that this is possible. Realistically speaking, however, there are hordes of students who do not share my interest in the subject and may not be receptive to such an approach; this underscores the merit and necessity of a vast amount of patience to complement any classroom style. Fortunately, my patience is largely a consequence of my own experience and thus is naturally present in my interactions with students. As a student myself, I am constantly reminded of and humbled by the difficulty inherent in learning mathematics. This, I believe, begets a sympathetic, supportive brand of patience which I always bring to the classroom.

Teaching Experience and Reception

The bulk of my teaching experience comes from my work as a graduate assistant in the mathematics department at the University of Oklahoma (OU), where I have served in this capacity for six years (both as the instructor of record and as an assistant). I also taught three summers for the Sooner Upward Bound high school program, which seeks to provide an intensive college-preparatory curriculum for promising minority students. Furthermore, I serve as an adjunct faculty member at Oklahoma State University in Oklahoma City (and have for the past 4 years), where I teach not only traditional and nontraditional students in a classroom setting but also have extensive experience designing and teaching online courses. From these experiences, I have gained familiarity with many diverse groups of students and learning environments.

My teaching has been received very favorably by my students and by the departments in which I teach. Indeed, my student evaluations attest that my efforts to promote an enthusiastic and student-centered learning environment were noticed and appreciated. In 2010, I received the Harold Huneke Graduate Teaching Award, given by the mathematics department at OU for excellence in teaching by a graduate student. The following year in 2011, I was awarded the Harold Huneke Graduate Scholarship by the OU mathematics department for excellence in teaching and mathematics education research. Furthermore, I have received the department’s certificate of endorsement for dedication to undergraduate teaching.

Relation to Research and Future Plans

As a mathematics education researcher, my research and teaching philosophies are inextricably linked, and thus a complete picture of my identity as a teacher can not be formed without briefly discussing relevant parts of my research and how it pertains to my teaching and interactions with students. For the first four years of my graduate career in mathematics, I was a student in the traditional, pure mathematics Ph.D. program in the mathematics department. However, as I immersed myself in my research topic at the time (representation of algebraic integers by binary quadratic forms), I made two discoveries unrelated to my research topic. First, I found that what I liked most about my research in pure mathematics were the opportunities I was given to present it to other people. In other words, my favorite part of my
research was showing and teaching what I had discovered to my colleagues in seminars and research discussions. This led me to my second discovery: my love of teaching mathematics surpassed my desire to be a pure research mathematician. Shortly after this realization, I decided to dedicate more of my time towards teaching, and consequently I enrolled in the Ph.D. option in the mathematics department for Research in Undergraduate Mathematics Education (RUME). Together, my mathematics coursework (58 hours) and educational research coursework (32 hours) have given me extensive experience with mathematical content areas as well as effective methods for conveying them to students. This diverse mathematical background allows me to knowledgeably teach an extensive array of mathematics courses that are offered at the university level and allows me to frequently draw on my knowledge as an educational researcher in order to improve my teaching.

When I started exploring possible topics for my dissertation, I saw that my personal example-driven approach to mathematics learning was akin to the instructional design theory of Realistic Mathematics Education, an approach to mathematics teaching and learning that centers on the heuristic of guided reinvention. Briefly, guided reinvention is a teaching method by which students harness their informal understandings of a subject and are able to transform it into more formal, powerful methods of mathematical thinking. That my teaching beliefs so closely mirror the underlying constructs of my research is no accident: I believe in the capability of the learning method I am researching. Moreover, my experience in conducting my dissertation study has undoubtedly made me a better teacher. In this way, the analytical eye I have developed as a researcher informs and improves my teaching.

I additionally wanted to incorporate some aspect of my previous research in pure mathematics, located in the general content area of abstract algebra. Accordingly, my dissertation research project entails developing an instructional theory for definitions and results related to rings, integral domains, and fields. My ultimate goal for this research project is to use it to develop an innovative, original reinvention-based course in ring and field theory (a content area in which the research literature is exceptionally scarce), which will serve as a nice complement to the work which has been done by others in group theory. On a different note, because of my advanced mathematics coursework, I welcome the opportunity to teach other mathematics courses beyond the calculus level (something that, regretfully, graduate students are not often asked to do). For courses not directly related to the content area of my research, I certainly plan to foster a similar environment which promotes the students motivating and understanding the central ideas; this can be achieved both by drawing upon my own experience as a teacher and student and also by consulting the relevant research literature.

Above all, however, what will never change despite varying classrooms, universities, content areas, student backgrounds, learning theories and other possible variations, is that I will always dedicate myself to what is best for my students. I have been fortunate enough in my educational career to be influenced by some truly magnificent teachers, and I can only hope to make a similar impact on my own students.