Statement of Teaching Philosophy

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I find it difficult, perhaps impossible, to give a concise summary of my entire philosophy of teaching, especially given that I expect it to change as I gain more experience. For example, in my six semesters teaching introductory math courses at the University of Michigan, I have found great success in emphasizing cooperative learning—limiting lecture time and giving students ample opportunity to discuss problems and ideas in class, with me and with each other. On the other hand, my experience with traditional lecture-based courses is limited to several semesters of grading and running problem sessions. I expect that as I begin to teach more advanced courses, or possibly courses with more students (where certain cooperative learning methods may be less feasible), I’ll have to readjust my ideas. Still, even if I’m not prepared to describe my entire philosophy, I can at least describe several of my major goals in the classroom and the methods I use to achieve them. Three objectives that I find particularly important in teaching mathematics include “teaching my students to think,” maintaining my students’ confidence and desire to learn, and constantly improving my own teaching. I’ll use this statement as a platform to discuss my approach to these three objectives.

I want to teach students how to think about problem-solving rather than to memorize rules and formulas. More precisely, I feel that students can learn a fantastic amount about solving problems (mathematical or otherwise) by working on problems in which it’s potentially unclear how to apply the rules and formulas that they’ve learned. For example, it’s easy for my first-semester calculus students to find the local maxima of a given function, but it’s often incredibly difficult for them to learn how to solve an optimization problem given only a verbal description of a physical system. Students know they’re supposed to “set the derivative of the function equal to zero and solve for $x$,” but they may not know which function, or even what $x$ ought to be, in the problem at hand. I’ve developed several presentations and sets of worksheets, which vary from topic to topic, designed to talk students through these sorts of problems. Some students need to be reminded to give variable names to the unknown or changing quantities in a problem; others have trouble taking each statement in a problem and translating it into a mathematical statement involving these variables. For these students, learning how to approach these word problems can take them from being totally confused to being able to solve challenging and thought-provoking questions. Moreover, the ability to encode a real-life problem into mathematical language and back again is incredibly valuable. I expect that honing this ability in my students will help them not only in future math courses, but throughout their work in mathematics and the sciences.

I think it’s vital to keep my students’ morale high—to ensure that they believe in their own ability to understand and use the material they’re learning and that they persist in studying concepts that they don’t yet understand. Maintaining morale can be difficult because our students so often don’t yet fully understand the concepts we’re teaching them. For these students, math class can become a sort of psychological torture—the student is constantly reprimanded (via low scores on quizzes and homework assignments) for being slightly behind the rest of the class. To make matters worse, we often move on before these students have a chance to review the problems and concepts they had trouble with. One of my solutions to this problem is to give my students as many opportunities as possible to learn each concept and to prove that they’ve learned it. In particular, I periodically allow my students to retake quizzes and other assignments if they didn’t get everything right the first time. By telling them how to solve the problems they missed and asking them to correct their own work, I give them a second chance to learn difficult material; I also give them a chance to wipe low quiz grades from their record once they’ve proved that they can solve the problems on that quiz. Even in courses where quiz
scores have little effect on students’ final grades, students are often excited at the chance to prove that their understanding has improved. In this way, I’ve found that I can help them not only to gain a deeper understanding of the material but also to gain confidence in their own abilities.

I want to actively seek out ways to improve my teaching. Although I’ve found that the easiest way to improve as a teacher has been to gain more classroom experience, I also believe that it’s important to integrate myself into the teaching community, to learn from the ideas and techniques of my fellow educators. For example, during a recent semester in which I didn’t teach, I took the opportunity to engage about a dozen of my fellow instructors in conversation about their ideas and methods. I made an effort to seek out instructors who’d won teaching awards, or who I knew cared deeply about education. I found many of these conversations to be immensely valuable. I spoke to one instructor who, like me, tries to encourage students to rework quizzes and homework—he discussed his approach to this teaching technique, and our conversation profoundly affected the way that I manage this sort of reworking process in my classroom. More recently, I engaged in several conversations with instructors who’d mentioned taking pride in teaching their students to write clear and concise mathematics. Developing my students’ skills to write clear, concise mathematics is one area in which I’d like to improve, so it seemed like a good area to discuss with “experts” amongst my peers. Many of their suggestions might be considered common sense—for example, “set high expectations early”—but getting several different teachers’ suggestions on how to set high expectations has given me a set of potential techniques that I can try out during my next few semesters. I’ve also tried to expand my understanding of teaching by collaborating with educators outside of the university environment. I’m currently on the board of directors of College Students for Enrichment in Secondary Schools (CSESS), an organization which trains college students to teach short courses to gifted middle schoolers in the New York City area. My work at CSESS has connected me with many other motivated educators; it’s given me the opportunity to learn about middle school education, as well as to discuss techniques for teaching courses on topics ranging from cryptography to poetry. These interactions with other teachers and education experts serve to supplement my time with students, helping me become a more effective, more motivated, and more knowledgeable educator.