

## *Statement of Teaching Philosophy*

During the past 14 years that I have been teaching college-level mathematics, I have constantly sought to learn exactly how students process mathematical knowledge. Through teaching students of all sorts of different backgrounds, ages, and abilities, I have had the opportunity to start understanding how people make sense of mathematical information, and this in turn has informed my teaching. In particular, I have come to the following conclusions concerning mathematical learning and teaching:

- *Mathematical learning is not like a building, it's like an eco-system.* It has become very popular to describe education in mathematics as akin to the building of a house, in the sense of establishing firm substructures before proceeding to other parts of the house. However, such an analogy leads students (and teachers) to falsely believe that, if things have been done correctly, then students should not have foundational issues in more “advanced” courses. The reality is that the mental framework we all use to interface with new information will always have problems with it. Even experts need to regularly revisit their intellectual scaffolding in light of information that reveals issues with previously held knowledge. As such, learning has more to do with a delicate eco-system, wherein small changes in one area can have an enormous impact on the whole system. Moreover, it is *expected* that eco-systems will undergo changes throughout their existence. Students need to know that revising old knowledge in light of new facts is a perfectly normal and healthy thing to do.
- *People tend to think from the specific to the general.* There are many college educators who have the philosophy that if they can teach students to think like an expert in their subject—a process which usually entails trying to impart to students a relatively sophisticated degree of abstraction and perspective—then students can figure out the particulars on their own. While admirable, such an approach puts the cart before the horse as far as the way that most people process information. The reason that experts think the way they do is only because of years of contemplating the particulars of their discipline. As such, providing students with specific examples and skills is a necessary first step towards their ultimate understanding of a subject.
- *Mathematical learning requires a great deal of effort.* Most students miss the fact that real mathematical learning demands a lot of time and energy, even for experts. It is very popular to believe that, at least in mathematics, you either “get it” right away or you will never get it (so why bother trying). It's funny that such a philosophy doesn't seem to carry over to other endeavors—I doubt most students would believe that if a nursing student doesn't learn to put in an IV right the first time, he or she never will. Students need to know that to master anything, including mathematics, you have to practice it over and over, and this takes time. Moreover, it is perfectly normal to struggle with mathematics and this is part of the learning process.
- *Mathematics teachers need to manage expectations.* I like to say that I am a firm believer in not just high expectations, but *fair* expectations. I hear far too many college professors complain about how underprepared their students are

for their classes, and perhaps rightly so. However, the real tragedy occurs when these professors develop a “sink or swim” attitude towards their students, as if it is somehow beneath them to put in the extra effort to help students meet their desired expectations for the course. The old adage goes that you need to teach the students you have, not the students you wish you had. While I wholeheartedly agree that there is no substitute for a good mathematical background (the vast majority of students need time to digest information to the point that they are comfortable applying it), brushing off students with a weak mathematical background benefits no one. Some college educators believe that such a brush-off encourages weak students to quickly get themselves up to speed, but I have never seen any evidence that this generally happens. More often than not, I think students become overwhelmed and demoralized and just stop trying. We as teachers then need to be aware that our expectations of students ought to be in step with the effort we are willing to put in helping students meet those expectations.

- *Good teaching doesn't just happen.* I have heard it said that if a college professor knows his or her subject well, he or she can teach it. This just isn't true. I personally have had a number of teachers who clearly knew their subject matter through and through, but had absolutely no sense of how to organize or present it to students in an effective way. I find it refreshing that the latest generation of college professors have been raised to understand that good teaching doesn't just happen, it demands an enormous amount of time and energy. Anyone can lecture aimlessly at the blackboard and pretend that education is taking place. However, if one is interested in truly imparting knowledge, an effort must be made to create positive learning experiences for students, which often times do not involve simply lecturing. Regrettably, at most institutions, such efforts are almost never rewarded, including with respect to promotion. However, I am hopeful that things will change along these lines in the near future, as universities are increasingly forced to confront the apparent contradiction in demanding more and more money out of students, presumably for a worthwhile education, while not rewarding their teachers who actually deliver on that education.

Based upon the above conclusions concerning mathematical learning and teaching, I endeavor to create learning environments in my classrooms where students feel free to ask questions of any sort and are encouraged to take an active role in their own education. Ultimately, I believe that the best learning occurs when a willing student connects with a willing professor, and I strive every day to be a willing professor.