Teaching Philosophy
Benjamin Elbert

As a mathematician who also teaches, I have the unique opportunity to approach the academic environment from an alternate standpoint. Being, first and foremost, an academic, my primary goal inside of a classroom is not to produce workers who will maintain the *machina quo*, but develop the analytical reasoning skills of students. Moreover, being able to teach at a university brings the added benefit of not only increasing the knowledge of the students, but also their ability to critically analyze situations and perceive them as more than a numbered problem in a textbook. Unfortunately, the mathematics education in America that leads up to the university is woefully hindered by our national focus on test results. Being a student first and an instructor second, thus far, in graduate school, I commonly teach courses such as college algebra and pre-calculus—ones which are usually the first experience freshmen have with college mathematics. One advantage of teaching such courses is the unique opportunity not only to deepen the knowledge of mathematics for freshmen and sophomores, but also introduce them to what it means to think mathematically. Possessing this ability will enable students to better solve problems more effectively in their future instead of waiting for someone to tell them exactly which formula they will need for the upcoming test.

Still, having the desire to teach these techniques to students is not enough; I also have to visualize and execute a clear plan of action. Early in my experiences with students—as an undergraduate tutor and teaching assistant—I certainly had the desire to broaden the mental sight of my peers, but I lacked a definitive blueprint to help me get there. One of the most important attributes that I have learned to use is bridging the void between classroom mathematics and real-world applications. One common view about the instruction in courses that serve as a precursor to calculus is that the instructor should throw as much material as possible at the students in the hope that they will retain most of it. In my classroom, however, we approach the material differently. Most of the topics covered in a pre-calculus course have been
taught to the students at one point or another, but most have not been exposed to as deep of a consideration of such topics as they are bound to be in a college course.

Students should provide evidence that they truly understand the material. For instance, they should know not just how to complete the square of a given polynomial, but any quadratic equation. Also, though technology is an important part of our scientific progress, I expect my students to take quizzes and exams without a calculator. In return, however, I intentionally write examinations so that they challenge the student’s understanding of the material instead of their ability to punch buttons. This approach to college mathematics often intimidates students as they come from a diverse background of preparation, but after the first or second week, students find themselves understanding the material better than ever and doing better with more difficult problems than previously placed before them.

All of these ambitions do well to provide for me an outline of what I ought to do in the classroom, but managing the classroom provides an entirely different challenge. In order to provide timely and effective feedback to the students, assignments and quizzes should be given often and handed back quickly. At the beginning of my first quarter I would commonly spend the first few minutes of a class handing back graded work if there was any. Doing this, however, wastes valuable time and provides too much time for students to socialize and remove themselves from an academic mindset. To resolve this, though, I learned to wait to hand back papers until either the very end of a lecture or hand it to them as they handed me their next quiz or exam. Implementing such strategies has allowed for more instruction time and has thus provided more opportunities to resolve issues that students are having. Additionally, gaining back those few minutes a week provides more time for examples, clarification, and questions.

Examinations in college should be markedly different from the tests that students took in high school. While standardized testing provides an even playing field for students to demonstrate their accumulated knowledge, over-emphasizing these tests has created a new standard which is to coach a student to success on a specific test rather than cultivate their knowledge and help it grow into
understanding. As a result, cultivating and deepening their knowledge is put off until the university setting where students often find themselves feeling overwhelmed by no longer being told precisely what formulas and problems to expect on exams. However, such a drastic change is not entirely negative. In fact, it is necessary as doing so gives students more freedom to experience both the rewards and consequences of adequate preparation. For this reason I prefer to take exam questions directly from the text—either unaltered or slightly changed—so that those students who put in the effort outside of the class are rewarded while those who feel as though the exam was unfair are reminded of the importance of outside work once they learn how much easier the exam could have been for them. Lastly, while a course must certainly have a clear cut outline of total points and requirements, an integral part evaluation is a student’s motivation. This is not say that those who are less motivated should be penalized—such students are more often than not just awarded the grade they earned—but students who find themselves on the boundary of a grade can most times be bumped slightly up to solid ground if they demonstrated constant progress and determination.

Finally, even though these various aspects provide a solid blueprint for instruction, I still have, and always will have, more progress to make. Knowing the material thoroughly is a small piece of the teaching puzzle, while being able to deftly transfer that knowledge plays a major part. I have noticed that there are two accurate ways of receiving feedback: monitoring the progress of students who struggled early on and being open to feedback from the students. While the first is a passive way of gathering this feedback, the second is both active and risky. The primary risk is that in making myself available to feedback directly from the students, I will receive information that fails to be constructive. Still, though this is a risk, being available for students to openly discuss the class is important in demonstrating to them my commitment to their success.

Aside from receiving feedback, one of the most elusive questions that I still seek to answer is how to bring all students—not just those who are “naturally” good at mathematics—to a necessary and valuable understanding of mathematics. For the most part, students only have the opportunity to
experience mathematics as a classroom event. Only having such opportunities fails to demonstrate to
them just how vital mathematics is to almost all aspects of life: they never learn the benefit of logic; they
never see the power of analytical algorithms; and, they never conceptualize real world problems as
scenarios solvable mathematically because the notion of mathematics intimidates them. Bridging these
voids and answering this question is paramount for me as both an academic and an instructor. My intent,
during each lecture of the day and each minute spent preparing for the next lecture, is to bring my passion
and respect for the utility of mathematics into the classroom and pass it on to future educators, scientists,
and mathematicians.