Teaching Statement

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When asked about the value of math professors and their pursuits, I have two responses. The first is that mathematical research, while abstract, can be useful for future generations in ways no one could have predicted. My second answer is that math professors are responsible for educating the engineers, natural scientists, doctors, and social scientists in the basic tools of their fields. While some people are skeptical of my first response, the second tends to be convincing. I take this as evidence that part of being a good mathematician is being a good teacher.

What does it mean, however, to be a good teacher? One metric for success is this: did my students learn from the class? If so, I've done my job. As I follow this answer to its logical conclusions, I have to see students for what they truly are: complex human beings. I am not simply writing information onto a blank hard drive; I am interacting with the students' innate ability to solve problems. My goal is to not only avoid suppressing these abilities, but to create situations which direct these skills towards the desired tasks. As a teacher, two of my primary responsibilities are to create a positive learning environment and to guide the students through that environment.

Generally speaking, I cater the learning environment to the course. Some aspects, however, are universal. I make expectations clear and foster a feeling of mutual respect, in which students are comfortable engaging with the material. While this allows for interaction, the way in which I present material determines whether or not that interaction takes place. In natural scenarios, people have problems forced upon them, and they are familiar with the tools used to solve the problem. In the classroom, I simulate this by introducing a motivating application before the corresponding material, and by explaining new methods in terms of old techniques. When I taught multi-variable calculus, one way in which I realized this philosophy was to briefly discuss work before talking about the dot product.

For statistics, much of the course can be motivated this way. I start with the problem of learning about populations from samples. This naturally leads to data types and probability. The final segment of the class is then particularly satisfying because the students are using everything they have learned throughout the class, and actually solving the problem the class began with.

Motivating students is step one. The next challenge is to guide them through the sea of intuitive, but ultimately incorrect, solutions. In most real life problem solving scenarios, there is a concrete object which is being manipulated and which gives real time feedback. Reality tells us when we are on the wrong path. Mathematics has its own reality, and one way I guide students is to make them to aware of that reality. At the most basic level, I can achieve this with visualizations on the board. In algebra, I do this by relating solving equations with intersections of graphs. Moving beyond the chalk broad, when I taught multi-variable calculus, I pre-rendered a host of surfaces and even made a brief GIF demonstrating the TNB frame. Computers can also be used to recreate that second aspect of natural problem solving: feedback. For instance, in algebra, live modifications of functions can display to students the correspondence between algebraic and geometric transformations.

My time as a graduate student has provided me with many teaching opportunities. I've enjoyed many levels of responsibility, from being a grader, to creating a course from the ground up and being in charge of graders. I have been able to teach classes at a variety of levels, from algebra to multi-variable calculus. As part of experimental programs, I've used technology to run labs for introductory math courses. I consider teaching to be a constant learning experience for myself, and I plan on continuing to challenge myself and refine my methodology to provide better and better learning environments.