STATEMENT OF TEACHING PHILOSOPHY

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Mathematics is sadly seen by many as a pointless hurdle in their education. At the other extreme, there are those who engage in it as just an indulging puzzle. First as a student, then as a researcher, teacher, and mentor, I have come to appreciate mathematics as a powerful conceptual tool for describing reality. Between my undergraduate multivariate calculus instructor at Universidade de Brasília, Celius Magalhães, and my PhD thesis advisor at Rutgers University, Eduardo Sontag, I have been fortunate to have many opportunities to observe firsthand how activating and empowering this conceptual and interdisciplinary approach to mathematics is. Thus, in my own classes so far, I have sought to create an inclusive and stimulating environment targeting the needs and aspirations of the student. This is the mindset I am taking with me as I pursue a teaching career in the liberal arts.

1. Interdisciplinary Emphasis

Real world applications of mathematics are of instrumental importance to future doctors, engineers and scientists; they also keep the rising mathematician grounded and motivated. Thus, I have placed a strong emphasis on modeling in every class I have taught. Even though computers can quickly evaluate a definite integral or solve a differential equation, they are not yet on par with the human mind when it comes to formulating and interpreting models. So, when I taught recitation sessions for the second semester of the mathematics sequence for students in the Life Sciences at Rutgers in Fall 2011, I encouraged them to appreciate the physical interpretation of derivatives and integrals rather than just learning to calculate them. At the end of the course, one of the students wrote, "I'm now relatively comfortable at using one of the most valuable tools available to a scientist." For many of the students in that class, that was the last stop in their formal mathematics education, although they would still need and use it in their careers as doctors or scientists in the future. Therefore, taking that opportunity to discuss mathematical modeling was of particular importance.

2. Conceptual Understanding and Computational Proficiency

A conceptual understanding of mathematics is at least as important as computational proficiency. The amount of material in a mathematics class may look overwhelming to the untrained eye. From my experience as both instructor and researcher, a breadth-first approach is a great way to mitigate this feeling. In the beginning of my Linear Optimization class at Rutgers in Fall 2012, I learned from our review session that my students were comfortable with Gaussian elimination. So, throughout the semester, I encouraged them to think of the simplex method as something they already "knew" from their Linear Algebra pre-requisite. The

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only difference was that the identity matrix we were looking for was somewhat scrambled instead of revealing itself along the diagonal. I would always remind them that elementary row operations were all we were doing all the way through, thus encouraging them to appreciate how ideas in mathematics relate to one another.

3. Classroom Atmosphere and Availability

The classroom environment must be inviting and inclusive. I seek to accomplish this in a variety of ways: addressing my students by their names, which I always try to learn early in the term, talking directly to them, establishing eye contact with each student throughout the lecture, moving around the classroom, and constantly offering opportunities for their participation. "I always knew that he was available to answer questions and especially appreciated the level of respect for feedback and classroom engagement," wrote a student from the Probability class I taught at Rutgers in the Summer of 2013.

While a typical college class meets for only about an hour a couple of times a week, learning mathematics is a continuous process, much of which needs to be carried out in between lectures by the students themselves. During that time, the instructor's role fades into that of a mentor. Although it is the students' responsibility (and in their best interest) to take initiative and seek to become independent learners and thinkers, it is also my job to be encouraging and available to motivate and assist them along this process. On top of widely advertised walk-in office hours, I also make myself available before and after class, throughout the week by appointment, and they may also, of course, email me any time. "He even answers emails if you send him a picture of the problem," a student once noted in the course evaluation. Indeed, once I realized that I would often myself scan or take pictures of handwritten notes in communication with my thesis advisor, I decided to experiment with making the same option available to my students.

4. Self-Skepticism

An effective teacher must have the resources to keep up with the changes in the classroom context. I am constantly seeking input and feedback from both colleagues and students about my teaching methods and circumstances, attending university pedagogy seminars, and I have recently taken my first online course on the topic, where I learned about the focused and diffuse modes of thinking, and how to trigger the appropriate mode at the various stages of acquiring a mathematical concept or solving a problem. Therefore, I am confident to say that I will not look back at the end of my career and realize that I have been teaching the same Calculus class in the exact same way for the past 25 years. I will most definitely hold on to the principles laid out above: approaching mathematics as a conceptual tool, with an emphasis on applications, and creating a comfortable and inclusive learning environment centered on the student. But I will remain constructively skeptical about how to best implement these principles, open to change my methods and devices as I become aware of more effective ones.

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