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Statement of Teaching Philosophy

Diversity presents opportunity, and college classrooms are full of diversity: nationalities vary, ages range, past experiences differ, and personal identities are unique to each student. Connecting with each of my students and understanding how he or she contributes or plans to contribute to the dynamics of the classroom is paramount when designing lectures and in-class activities. If I can recognize each student's individuality, then I can facilitate academic camaraderie among the students and lead them to succeed in mathematics classes and throughout their entire university experience. In the 2015-2016 school year, I was nominated for and one of five in Maths and Sciences awarded with the Arts & Sciences Certificate for Outstanding Teaching. The award is a recognition of the overwhelming effectiveness of my teaching, and it emphasizes my firm, mature belief:

A teacher is a leader.

In my time at University of Kentucky, I have taught a number of introductory 100-level courses with students of a variety of majors and interests. Indeed, in Spring 2017, one section of my MA 111 class had 34 students registered with 20 different majors! Many of these majors did not require further instruction in mathematics, and so many students had the mindset of, "I just want to pass and never think about math again." It was a difficult but achievable task of unifying the wide range of interests and convincing the students that this class had something to offer each of them.

MA 111 covers a multitude of topics including Voting Theory Methods, Cryptography, Compensation, and Elementary Graph Theory. Many students realize they will rarely if ever decide an election or send a cryptic memo, and so immediately after reading an outline of the semester students discount the relevance of the course. It was imperative that I reassured the students that on a basic level the material presented can be a red herring and that there is more to the class than simple recollection.

For example, the topic of Compensation in MA 111 deals with methods for fairly dividing materials among various parties laying claim on said goods. We discuss and practice the Method of Sealed Bids, Equitability Procedure, Adjusted Winners Method, and others. After learning the steps of implementing these methods, we reflect and evaluate these procedures to determine if they are fair, envy-free, equitable, and so forth. After gaining a strong understanding, we put on our "meta-thinking caps" and discuss what we've really done: we have understood, implemented, and reflected on the relevant quality of an algorithm. I ask the students to imagine other algorithms they encounter and implement on a regular basis, and I ask the students discuss appropriate standards for evaluating their imagined algorithm with each other. As a class, we quickly realize that algorithms are everywhere in our daily lives. The most popular algorithm imagined is following a cooking recipe, something to which every student can relate.

Mathematics courses should develop transferable skills such as logical reasoning, inductive inference, and quantitative literacy.

I have also led a number of elementary calculus recitations in which many students have the same majors. It is a challenge but a necessity to understand each students' individuality in spite of the uniformity. If I can recognize each student's individuality, then I can facilitate academic camaraderie among the students through group work. A student's most valuable resource is his peer, and the connections made during calculus recitations carry forward with scholarly benefits to other courses and social benefits outside the classroom.

In the Fall 2016 semester, I led a Multivariable Calculus recitation with 26 students. The goal of a recitation course is to organize and maintain self-guided practice sessions for students. At the beginning of the semester, this select group of students was determined to learn calculus and eager to

meet their fellow classmates and me. Students participated in each class exercise, students came to office hours, and students emailed me questions, which all gave me a chance to learn various strengths and weaknesses in the class. As the semester progressed, the utility of student-organized group work waned: academic endeavors were sacrificed for social fun. I was forced to refocus the classes outlook and organization, and so I took it upon myself to specifically place students in groups according to individual characteristics I had observed, such as determination, knowledge, and willingness to have other students provide positive criticism.

A great teacher should be constantly aware of his or her effectiveness.

As soon as I realized the students could not form groups without my help, I admitted my fault and changed—albeit, a minor change—the structure. A similar self-aware moment occurred in Spring 2016 when I taught MA 111 for the first time. During the Compensation unit, I designed an activity where three students were hypothetically disputing over a hypothetical parent's bequests (a bag of skittles, a banana, and a dollar bill) with hypothetical money (Monopoly money). The students were to walk through the Method of Sealed Bids and determine who should receive each item and how each bidder should be compensated. In my mind, the activity would go flawless and everyone would learn the method. Unfortunately, things did not go too smoothly, and I spent the next class period reteaching the method. An effective teacher must be willing to blame himself, correct his mistakes, and reevaluate what went wrong. In Spring 2017, when I taught MA 111 for the second time, this activity was much more effective: I staged the auction with just two students, gave the students a list of bids to choose from—one student chose from bids of the form $5+10n$ while the other chose from bids of the form $10n$ for different positive integers n—and I distributed the hypothetical money (still according to their calculations). Seeing the money physically exchanging hands helped reinforce the fact that compensation is more than just cash, which is typically a point of confusion.

Work ethic in the classroom—much like the variance of majors and interests—also presents challenges and opportunities. Dedicated students will learn mathematics with or without me. Overzealous, energetic students are always enjoyable to work with thanks to their determination. However, it is my duty to educate even the most apathetic student. My teaching strategies over the past years have matured so to combat indifference while fostering a fertile learning environment both in and out of the classroom for the self-driven.

Students that work one-on-one with professors learn more.

Having been an undergraduate, I understand that students' schedules can be fairly complicated. Consequently, it can be very hard to find even 3 hours (the minimum number of required office hours for graduate students at UK) during the week that work for each of my students. The first step in being available is making sure students are aware that scheduled office hours are not the only time I am available. Since much of students' education occurs outside the classroom, working with students' schedules when it comes to my availability is a cornerstone of my teaching philosophy.

Some semesters, like Spring 2014 and Fall 2016, I established weekly group meetings outside of class with a handful of determined students. In 2014, I set up weekly hour-long meetings with two of my Calculus II students. We worked through homework problems—in which they completed the problems and I simply guided—studied old exams, and read through their scribbled lecture notes. By the end of the semester, this weekly meeting turned into a group (of 5, sometimes 6) meeting! Having heard of the availability, students originally reluctant to come to office hours jumped at the opportunity for small, personable meetings.

In today's technological age, office hours are not the only form of availability. Most homework assignments in mathematics courses are assigned online and submitted online (e.g., WebWork, WebAssign, MyMathLab). A point I always stress with my students is the ease with which they can email me while working online. Emails directly from the homework system often include details

about the problems and links to each problem, but I ask that students detail their attempts and concerns in the email. My response typically provides a hint to their specific problem, or it provides a reference in the textbook or notes that may help.

Learning mathematics requires discovery.

Hence, persistence is imperative. Most recitation classes at UK are structured to give students time to work through worksheets full of example problems. The problems are certainly difficult but doable. Given the difficulty, students often consider giving up before an initial attempt. It is my job to push students to try while at the same time restraining myself from doing the work for them. Given a new tool for evaluating or technique for computing, students must be given freedom to explore new possibilities and examine old problems in a new light.

In the few lecture courses I have taught, it's absolutely necessary to keep this mindset. When a new topic is introduced, students must have the chance to practice. In MA 111 each semester, I prepared two-sided half-page worksheets for each student to complete at two different arranged times in the 50-minute lecture. These breaks in the lecture give some students a perfect opportunity to ask questions and other students a chance to reassure their understanding. After giving them 3-5 minutes to complete a side, I ask them to trade papers with their neighbor and discuss what each student may or may not have done wrong.

Teaching mathematics is certainly a difficult endeavor, and it is a challenging task that many are unable to achieve. In my five years at UK, I have been weighed, measured, and not found wanting. I am confident in my abilities to teach mathematics: I will receive first-generation students and ensure they have the resources to succeed; I will speak to underrepresented students and make sure they belong; I will challenge the brightest students and guarantee their eager minds. While sure of my effectiveness, my desire to improve and mature as a teacher stands in juxtaposition. I welcome the opportunity to expand my experience in the classroom by exploring new technology and instructional strategy.