

Teaching Statement

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As a teacher, my main focus is to cultivate well-rounded mathematicians who possess flexible mindsets and sustainable skills such that they may positively impact the world. I have been fortunate to cross paths with many talented and experienced teachers and professors, and have used them as models in crafting my own teaching philosophy.

My teaching objectives may be briefly summarized as (1) developing a set of core teaching values, (2) developing curricula and learning experiences that reach a broader, more diverse student group, (3) a willingness to use modern techniques for delivering and measuring teaching in effective ways, and (4) a drive and interest to continue my development as a teacher.

Teaching mathematics is more than simply having students memorize formulas and theorems and regurgitate information. Instead, it is about **developing students into fundamentally strong and intellectually curious mathematicians** who can seek out and solve problems on their own. I use metaphors, wit, and humor in order to engage students and make the material both understandable and memorable. If students can create a connection to formulas and concepts, and if the numbers and ideas can become both familiar and tangible, then they are more apt to recognize and properly apply each concept. I want students to **acquire the appropriate skills necessary to ask the right questions**, where being creative and adaptive go beyond the rote skills of how to do a problem. Building creativity requires exposing rigid attitudes and mindsets to alternative solutions of problems and reshaping them to acknowledge more than a unique method. My experience has prepared me to leverage the accomplished student's experience so that I am able to teach higher, more complex topics.

In my earlier years of teaching, I believed that lecturing was the best way to provide my students with the fundamental tools to solve problems. While effective for some students, particularly those who were self-directed learners, most struggled to connect concepts with their applications. Students were able to copy down what I said and wrote onto the board, but most did not fully understand why and what it all meant. While I do still believe lecturing has benefits, and I utilize it when appropriate, I often take a guided and explorative approach to learning. In my experience, **guided discussions and explorations are more effective in getting students ready to tackle real-world situations**. Since implementing this approach, my students have performed higher on assessments, as they have developed an ability to more easily extend concepts to new and more challenging situations. In addition, I frequently **use mathematical software** (i.e., GeoGebra, R, and MATLAB) **as teaching tools to illustrate concepts and methods** through visualizations and demonstrations **that make learning more interactive and collaborative**. While students must learn the technical skills, they need to develop their critical and creative thinking abilities in order to effectively extend fundamental concepts. I use and develop interactive and dynamic technology, and provide downloadable applications for students to explore and expand their conceptual knowledge outside of the classroom. Although I have incorporated commercial technology in my classroom, I am interested in building my own technological tools to better help students learn mathematics. While obtaining a solution is an important part of mathematics, cultivating the ability to interpret and explain how to reach a solution, and why a solution is correct, is paramount. By **making learning more collaborative, interactive, and explorative**, students not only obtain a better grasp of concepts, but they are more likely to retain and apply them correctly in the future.

Although the majority of the courses that I have taught at the University of Arizona have been core courses with set curriculum, I have previous experience with designing and developing courses. In particular, I restructured a computer science curriculum whose class roster consisted primarily of male, tech-oriented students. It was discouraging to see such a lack of diverse representation, and

I made **attracting a more heterogeneous group of students** to the class a top priority. I restructured the course by introducing object-oriented and procedural programming through Python, substituting some of the traditional class meetings for “labs” in order to provide guided practice on the computer, and scaffolding the development of fluency and understanding with fun and engaging assignments (e.g., programming the traveling salesman problem). Although the course was taught using a particular high-level language, I emphasized the course as language agnostic and stressed the importance of developing ideas to solve problems, rather than focusing on learning a particular language. As a result, the class size steadily increased each year, growing from an initial size of 8 to 16+ current students. Additionally, 63% of the students, on average, have been female, and there has been a consistent increase in the enrollment of non-STEM students. Due to my restructuring and development of the course, I was able to break through the “male oriented” bias and created a learning environment more accessible to women. But as I do with all my courses, I look to **motivate students to follow fields they initially never thought they could pursue**. Currently, I am developing a proposal for a course elective for the statistical analysis of network data with an inquiry-based curriculum and a programming component in R. Since networks have a myriad of applications, the course will be designed to attract students from various fields, such as public health, social, biological, or technological.

All these points of focus, though, pale in comparison with being a teacher who shows students that they and their success matter. While I push and challenge my students to perform their best work, I always **treat them first as human beings who merit respect**. Because success and self-confidence begin in the classroom, it is important to build a community that allows students, especially those who feel turned off towards mathematics, to feel like they belong. While choosing mathematics as a career is their choice, I want them to know that they *can* be successful if they decide to pursue it, so I **cultivate a classroom environment that encourages questions and participation**. I want every type of student, especially those who feel less-qualified or lack a sense of belonging, to leave each class feeling more confident and better prepared to tackle the world at large.

I expect high standards from my students, and I know they expect it of me, so I **pay close attention to various aspects of my teaching**. For each course, I provide a detailed syllabus that contains the course description and objectives, expected outcomes, the required textbook(s), an overall list of covered topics, an ethical behavior statement, office hour availability times, and my grading policy. I focus on utilizing classroom space and available whiteboards effectively, and writing legibly and large enough so all students, regardless of their seat selection, can follow along. In my live-online courses, I prepare PowerPoint slides in lieu of writing on a virtual whiteboard for readability and class time efficiency purposes. Yet, I include interactive components, such as the annotation feature, breakout rooms, and polling, to infuse more interactivity and spontaneity in each meeting. I publish my slides before each class, as I have found that in remote learning setting, students are more likely to engage in discussions when they are not worried about taking notes. In addition, I solicit feedback from my students to gauge their level of understanding, and then **adjust appropriately to teach to all levels of students**. Facilitating a student’s understanding is a top priority, so I make sure to be accessible and available to assist them in any way I can.

During my time in academia, I have grown as an instructor and have been privileged to be surrounded by and exposed to colleagues and professors who possess an abundance of teaching advice. Although I have developed curricula and courses, and have had success in doing so, both in terms of learning and in creating learning environments, I am continually striving to become a more effective teacher by building and applying new tools and skills. I am looking to leverage my experience by joining faculty who are interested in building curricula and new programs, as I have seen firsthand how exposing students to mathematics early in their academic career can get them ready and motivated to learn more. Teaching mathematics is and will forever be my passion, and I am excited to continue to learn and grow as a professor in the future.