

TEACHING PHILOSOPHY

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The single most important thing a teacher can do is to have specific goals in mind while teaching a course. Overarching goals can focus one's teaching in order to maximize the potential of a particular class based on the students in the course. Throughout my years of teaching, I have developed goals for each of my classes in order to teach my students more effectively. Having taught a wide variety of classes ranging in complexity from intermediate algebra to graduate-level abstract algebra, I have thus developed and pursued a wide variety of goals.

For instance, in the precalculus courses I've taught, my goal has been to build students' confidence in their own mathematical competency while helping them develop the tools they need to think logically. I pursue this goal by breaking down problems into small steps and by giving students exercises to work in class so they can immediately practice skills we've just discussed. However, in the abstract algebra courses I've taught, my goal is to help students who have already reached a high level of mathematical maturity to further improve their critical thinking skills and to prepare them to conduct research. Thus, I give these students problems to work on that remain unsolved such as Goldbach's conjecture; even if students do not successfully prove a mathematical statement, by engaging a problem, trying different approaches, and spending days or even weeks on this problem, students get a sense of how mathematical research often works.

My teaching goals, however, have differed not only across classes of different levels of complexity but also across different groups of students. I have taught classes comprised of elementary education majors, medical and life science students, engineering students, and math undergraduate and graduate students. Bearing in mind one's audience is critical in developing teaching strategies. For instance, I often give elementary education students exercises in which they are given an incorrect solution to a mathematical problem and are asked to explain why this solution is wrong and how it can be fixed. I give life science students problems about population growth such as determining when exponential growth models can accurately model population sizes over time. In this way, I am not only helping students to face problems they will one day encounter in their respective professions, but I am also making them more excited about mathematics, helping them to see that math can be enjoyable and applicable to their lives.

It is important to remember though that even among students with similar career aspirations, there exists a wide variety of personal backgrounds and learning styles in any one class. I find that one of the best ways of teaching students from different backgrounds is to foster an atmosphere of collaborative learning in my classes. By working in groups, students share a collective experience in mathematics and are able to solve problems they would not have tackled effectively on their own. Through embracing rather than shunning diversity in my classroom, I encourage my students to learn more from each other than from me, a type of learning that will be far more invaluable in the long term. In doing so, I am mindful of stereotype threat and implicit bias, and thus strive to create a safe learning environment in which all students can learn.

I believe that the cornerstone of any class is student participation. Students learn best when they actively participate; my teaching is designed so students are engaged for the entire class time through the use of inquiry-based learning. Research has shown inquiry-based learning techniques to be more effective than traditional lecturing in teaching all groups of students, especially underrepresented groups in STEM fields. I have attended multiple workshops in inquiry-based learning and now use the tools I have learned in these workshops to further encourage students to maintain

active involvement in my class. For instance, my students both write and explain answers to problems at the board, playing devil's advocate by forcing students to defend their own logic, and even conduct role play activities. I also ask students to engage in "think-pair-share", in which students discuss topics in pairs with their classmates, leading to a class-wide discussion among all of the different student pairs. Along with group work, I find it useful to design mathematical projects that challenge students. For instance, in one precalculus course project, my students discovered how to calculate the heights of different buildings on campus using trigonometry. In another project, my students have explored inflation rates to witness the power of exponential growth. In all such projects, my students work together in order to apply math to the world around them.

I find that keeping organized is a critical aspect of teaching students of all levels. As college and graduate students are adults making their own educational decisions, it is important for me to keep them informed at all times about what is going on in the course. To that end, I always begin each class by spending a couple minutes discussing current objectives. It is important for students to understand the context of any given lesson. I try to reveal the connections that each lesson has to previous lessons and how that lesson will be used in the future. Students cannot retain material that is taught as isolated facts; mathematics is a story, and it is my job to relay this story.

For me, teaching extends beyond the classroom. Professors are mentors, and I take this mentoring role very seriously. It is valuable to connect with students and talk with them outside of class in order to develop meaningful relationships with them. One way I try to get to know my students on a more personal level is to distribute surveys at the start of each semester. Additionally, I encourage them throughout the course to meet with me after class to discuss any academic challenges they might be facing. I also give surveys halfway through the semester to let students give me feedback so I can adapt the remainder of the course to their needs. By doing this, students know I am not an unapproachable expert whose knowledge may be beyond their grasp but rather a friendly, respectful person who is always eager to talk with them.

A key part of what makes me unique as an educator is my sense of humor both in and out of the classroom. When appropriate, I like to tell amusing stories, make puns, and in other ways attempt to make the classroom more enjoyable. I also begin each class with a mathematical joke to engage students from the start. Most of all, I use humor by simply saying funny things that come to mind while teaching. I do not believe that showing my sense of humor makes me appear less professional as a teacher; rather, I have found that students respect me more for letting my personality shine through. Showing a little personality goes a long way toward keeping students attentive during my classes.

At the end of the day, the measure I use to determine whether or not a course has been successful is not what grades the students receive. Rather, I base success on how well the goals I developed for that class at the start are met. In general, I also base a course's success on whether or not the students leave with better critical thinking and creative skills and if they appreciate mathematics more than they did at the start of the course. If my students are able to improve their abilities to both think effectively while gaining a greater appreciation of and curiosity towards mathematics, then I have succeeded as a teacher.