

TEACHING PHILOSOPHY STATEMENT

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The Hungarian mathematician George Pólya wrote “Teaching is not a science, but an art,” and elaborated, emphasizing that good lectures borrow from the theatrical arts by exciting students about the material and from musical composition by skillfully using repetition in the style of “air with variations.” I have been inspired by teachers skilled in this art, and work to incorporate their best ideas into my teaching. In addition to my experiences as a learner, my broad experiences as a teacher have exposed me to diverse levels of students and teaching environments, which have molded me into the teacher that I am today. Beyond serving as a recitation TA and instructor for introductory courses, I have served as a TA for a 3000-level combinatorics course. For this course, I not only performed typical TA duties but also co-authored lecture notes, gave substitute lectures, and attended almost every lecture. This experience allowed me to learn much about excellent teaching through observation and dialogue.

Strong teachers are aware of learner needs and adapt their approach to different students and settings, recognizing that one size rarely fits all. My recitations, for example, are driven by the students’ needs. Early in the semester, I establish the expectation that students come to class with homework questions, and they expect me to help them with those questions. My approach engages the students in problem solving, waiting for them to suggest steps to take. Incorrect suggestions provide great opportunities for students to learn how to avoid common mistakes, and I often emphasize this. When teaching over 100 students in a fast-paced course, lectures can rarely be this intimate. In such a setting, I stress that both student and teacher must take responsibility for learning. My lectures emphasize key concepts and their application to problems. Students must then solve many homework problems to acquire the skill for themselves. Students learn best when their teacher is approachable and available to them. To accomplish this, I make myself readily available to students both in person and electronically to answer questions and help them develop the skills they need.

A belief that every student deserves the opportunity to learn is essential to good teaching. Sometimes, this opportunity can be provided by having students work together with the teacher at hand to answer questions. Because my precalculus students ranged in abilities, I regularly reserved time in lecture to have them work in groups. The students would work on problems similar to those in the homework and lectures for about 25 minutes. In doing this, I often saw the stronger students helping the weaker students, which was a positive experience for all involved. Some students struggled with concepts as fundamental as adding fractions, and this activity helped them develop confidence. One of the most rewarding parts of teaching precalculus was seeing students who had been treated in the past as if they simply could not do mathematics realize that they *could* solve these problems. I will never forget the excitement on the face of a student-athlete in my class when he realized that matrix multiplication was something that he could practically do in his sleep.

A significant component of teaching is helping students who are struggling. It is important for a good teacher to identify the source of students’ problems: course content itself or deficiencies in their preparation for the course or their college-level study skills. Once defined, it is important to assist them through these difficulties. In MATH 1501, I assessed my students’ precalculus skills from the outset by adapting the mathematics placement test used at North Dakota State University to evaluate their basic algebra and trigonometry skills. The results provided a warning to any inadequately-prepared student. Students took the test during the first week of class and those who performed poorly were encouraged to meet with me

in my office that week. I spent a considerable amount of time discussing with students how they felt about the results and what might be the right solution for them. Some moved to the precalculus course, and others were giving strategies to review key precalculus concepts early in the term. At the end of the semester, I compared the placement test results to final grades and found a clear correlation between them. I shared this information with the administration in the School of Mathematics, and discussions are ongoing about how to best ensure that students are given the support they need to succeed in Calculus I.

At the other end of the spectrum, there are many bright first-year students who come to my office because they are struggling. Generally, they are students who rarely studied in high school and need guidance on how to study mathematics in a university setting where concepts are emphasized over mechanical manipulation of symbols. I often suggest to students ways in which they can incorporate better study habits into their routine, and every semester, I have had students who were foundering at midterm because of poor study skills make remarkable turnarounds and earn good grades in my courses. These success stories have bred further success, as students feel more reassured about their ability to succeed when they hear I've had students in their same position at midterm leave the class with the grade they wanted through hard work and improved study habits.

In a course that emphasizes concepts over computation, it is important for students to receive meaningful, non-intimidating feedback from the instructor. This enhances learning by allowing students to focus on their understanding of concepts rather than additional computational steps that might apply only to a particular problem. With my Calculus I students, I adopt a holistic grading rubric in which each problem is scored on a scale from 0 to 5, with 5 considered an A+, 4 an A, 3 a B, 2 a C, 1 a D, and 0 an F. For a test, scores on each problem are averaged, giving a score back on the five-point scale. Similarly, course grades are assigned on this scale. While some students initially find this scale confusing, the confusion leads to conversations with students about their grades and progress in the course that helps get them on the right track.

It is also important that good teachers create an environment in which students can provide feedback to the teacher about the course. By soliciting student feedback and being sensitive to student concerns, a teacher sets the stage for an increased buy-in to the educational process on the part of the students. I am receptive to feedback through one-on-one interaction, but a formal tool such as a midterm evaluation is also useful. Some students use it to vent, but many more give valuable feedback, both positive and negative. I discuss the ideas with the students and indicate which can be incorporated and which cannot and why they cannot. I also use the midterm evaluation to help students realize that they share responsibility for learning by including three questions of the form "If I am to succeed in this course, [Person] must do more of ___, less of ___, and the same amount of ___," where [Person] is replaced by the instructor, the TA, and the student. Often the most valuable feedback I receive comes from this question, and students' responses usually reflect their realization that they must put in more work (and play fewer video games).

It is essential for teachers to create an environment that promotes academic integrity and ensures that academic misconduct is not ignored. I became committed to promoting academic integrity when I observed classmates engaging in behavior I felt violated the professor's policies. I subsequently joined the Honor Advisory Council (HAC), Georgia Tech's proactive student group that educates the campus about the Honor Code. This involvement has led to a greater personal awareness of how to set the correct tone through clear explanations of class rules and how to respond to academic misconduct if it does occur. I have developed academic integrity programs focusing on differing cultural perspectives to smooth the transition for new international students and have shared my experiences as a TA by speaking at the Institute-wide TA orientation.

I believe the core of teaching mathematics successfully is sharing my excitement for the subject with my students. Even if some students initially do not reflect that enthusiasm, it must not deter me from challenging them and helping them achieve their best. In doing so, I am continually seeking ways to improve myself, striving to master the art of teaching.