Teaching Philosophy

A teacher's role is to *create experiences that promote learning*. These experiences can take many forms, from a lecture before an inattentive audience to an active discussion that draws in every student, but students' achievements reflect their experiences. A teacher's actions at the front of a classroom matter only insofar as they impact students' minds. This philosophy forces a change of perspective: rather than ask, "How should I explain a topic?" I ask, "How does the student learn this idea?" With this in mind, I plan each element of a course from the perspective of the desired outcomes, and what student experiences would best produce those outcomes.

My view of outcomes is broad. Proficiency in mathematics is not merely answer-getting, but more importantly sense-making and the disposition that the student is capable of doing so. The beauty in mathematics stems from how well distinct pieces mesh together to form a cohesive system, but when answer-getting is the instructional focus these pieces quickly become a disjointed list of rules and exceptions. A learner has an innate desire to make sense of incoming information, but is hindered when mathematics is presented in the abstract first and in specific applications afterwards. I invert this plan by leading with specific scenarios which contextualize the quantities in the problem and a solver's goals. Only once a specific case is understood can we abstract to a general case. In theory-heavy courses, I make a point of *first* asking questions that the theorem-of-the-day will answer, rather than stating the theorem and *then* listing questions it can answer; better yet is when I can craft an experience where the *students* ask the questions that a theorem can answer.

I craft experiences which are student-centric rather than teacher-dominated. During class time I try to never speak for more than ten minutes without letting the students think for themselves. A worked example is peppered with questions to students soliciting their input about first steps and what features are important. At the end of a worked example, I conduct a think-pair-share where students explain to each other what just happened and why I made the decisions that I did. Some pairs of students can answer each other's questions, while others get confirmation that their questions are valid and worth asking me in front of the whole class. One graduate student observing my class remarked that he found my calculus class of 35 students "unnervingly engaged," and this comes in large part to their knowing that they will not need to wait until they get home to reflect on what is happening.

I am committed to nurturing such evidence-based pedagogy outside my own classes as well. As Director of the Pennsylvania Mathematics Initiative, I work with in-service elementary school teachers to develop both math content knowledge and student-centric pedagogy. In Math 471 I work with future high-school teachers not only on communicating logical argument but I also provide a model of instruction for them to emulate. Through the Center for Excellence in Science Education I work with professors and undergraduate learning assistants on how to conduct undergraduate classes, and I am currently training graduate TAs for the Mathematics department.

In all of these endeavors I strive to put the learner first so that whatever momentum I impart will carry them through the rest of their lives.