

SCOTT SCHNEIDER: TEACHING STATEMENT

I have been teaching mathematics since my friends started having trouble with algebra in the seventh grade, and I enjoy it as much today as I did then. I've had time to improve my technique a bit in the intervening years, but the tutor in me remains intact. I still believe that the best context for learning mathematics is conversation rather than lecture, preferably with an involved and caring acquaintance rather than with an aloof and distant instructor. My teaching style is the result of attempting to reconcile these beliefs with the demands of the lecture hall.

I have taught nine courses at Rutgers, five as primary instructor and four as TA. My duties included preparing and delivering lectures, leading recitation sections, assigning and grading homework, writing and grading quizzes and exams, holding office hours and review sessions, and assigning final grades. In 2005 I served as head TA for all summer math courses, acting as a resource for other instructors and observing their classes. Twice I have been involved in mentoring programs with undergraduates, including the Directed Reading Program and the summer REU. I also have extensive tutoring experience in courses from basic algebra to advanced calculus. At the University of Wisconsin-Madison I worked at the walk-in tutoring lab and as a grader for an undergraduate course.

From my experiences I know that teaching is a difficult task requiring preparation, focus, energy, and strong organizational and communication skills. I believe that successfully teaching mathematics to a group of college students requires excellence in at least two contexts. One context is the lecture, or recitation session, presented to the class as a whole. Here a teacher must attempt to engage all students at once on topics they may find dry and confusing. Each student brings to the lecture hall his or her past knowledge, learning style, and natural ability, to say nothing of mood, personal issues, and dispositions towards the material and teacher. This can make lecturing to a large group an absurd task. Success involves timing and clarity of presentation, and perhaps an element of theatrical entertainment. But the chance of success is strongly improved by attention to another context in which teaching takes place: personal interactions with students. For some students this may mean time spent at the end of class or in office hours; for others it may simply mean knowing names, strengths and weaknesses, past performance, and an occasional remark indicating this knowledge. But I believe it is nearly impossible for students to learn math without being treated as more than simply one of many, a consumer of this strange product, the math lecture.

At the end of each semester I ask myself the following questions about any courses I taught. Have I done all I could to get my students to care about the class? Have I done all I could to facilitate open, comfortable, effective communication with and among my students? Have I done all I could to present the material in the clearest, most accessible, most professional way possible?

The essential starting point to me is getting my students to care. About math, about their performance, about their grades, about me — anything that will get them to come to class and engage the material and actually try to learn. Ideally they will care about the math, but sometimes this can be too much to expect in a required course. I've learned, from teaching and from doing math myself, that success is a crucial ingredient in caring. Failure to understand math as frustrating as success is rewarding and empowering. So it is essential to find, for every student, some initial foundation of understanding, to recognize and praise this understanding, and in general to challenge students in roughly equal portions with material that is already understood and material that will stretch their grasp. Another way to inspire interest is to give students opportunities to be responsible for each other. I believe in group work and encourage students to teach and learn from their peers; this also may engage talented students for whom the pace of lecture is too

slow. But I believe the best way to motivate my students is simply to display at all times how much *I* care myself, and to try to engage them on a direct and personal level so as to evoke passion from them as well. Caring is contagious, as are intensity and enthusiasm. To a precalc student math is likely already boring enough; it does not require assistance from the instructor. If *I* don't look like I want to be there, why would they? I therefore try to spice up lectures and have some fun. I try also to connect personally with students in an effort to cement their interest in the class — and, hopefully, if only through my own enthusiasm, in the mathematics itself.

The worst criticism I could imagine receiving as a teacher is that of unapproachability. My highest priority in teaching is to establish strong channels of communication with my students. Learning *must* be interactive; a class with no questions is probably not learning much. I also want students to feel welcome discussing material after class, or in office hours, where more personal attention is possible. I feel that one of my strongest qualities as a teacher is my ability to develop meaningful relationships with my students that induce them to care about the course more than they otherwise would, and allow me to teach in a way that is tailored to their specific background and needs. I've connected with many students who otherwise would have had no interest in math or in the course aside from their grades. Students work harder when they find they are not anonymous.

But no amount of theater, personal attention, or open communication can replace the need for a clear, organized, and professional presentation of the material. Preparation is essential; the ability to explain something informally and extemporaneously is useful, but apart from answering questions, or the rare aside, a classroom lecture is not the place for winging it. I write my lectures ahead of time in a style that will both facilitate in-class learning and repay later study when students revisit their notes. I've also borrowed some techniques from other teachers that I found especially effective. For instance, I am a strong believer in verbal repetition of important facts and themes throughout a semester. My experience (as both student and teacher) is that it is difficult to remember what is said only once. But hearing something two or three times in different contexts flags it as important, and with subsequent repetition students begin to anticipate what is about to be said in a way that seems to dramatically reinforce learning. Indeed it seems the best situation a math student can be in is to know the answer, or to be able to complete the teacher's next sentence with, say, 70% confidence — and then to have that knowledge confirmed by hearing it once again, as a repeated theme. At worst students gain confidence from hearing again what was already known.

Such confidence should not be treated lightly in a math student. Math is hard and acutely less enjoyable when it makes no sense. I keep this in mind this whenever I teach. For every one of us, mathematicians included, there is some piece of mathematics that lies beyond our easy grasp and may make us feel slow and incompetent. When I see someone struggling with a concept familiar to me, I recall my own difficulties learning it for the first time. I also think of the frustrations of my own research and this helps me understand and work with a student's confusion. It may be the tenth time I'm teaching it, but it's likely to be their first time learning it, and I try never to forget that.