

Teaching Statement

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“The secret to education is respecting the pupil.”

RALPH WALDO EMERSON

In this short essay, I will discuss some of my general ideas on teaching mathematics and a few principles on which my teaching method is based.

Let me start by briefly describing my teaching experience. As a graduate student at the University of California, Berkeley, I was a Graduate Student Instructor (GSI) from Fall 1990 to Spring 1995. I also taught several summer courses in which I had full responsibility for the class. From 1995 to 1999, as an Assistant Professor (non-tenure-track) at the University of Illinois, Chicago, and University of Southern California, I taught two undergraduate classes per semester, including two summers, and one summer graduate class. Since Spring 2000, as a Research Scientist and Lecturer at the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley, I taught several graduate applied mathematics courses. (Please see my curriculum vitae for more details.)

Based on my teaching experience, I have come to realize that teaching – especially good teaching of mathematics – is an extremely complex process. However, there are a few basic principles that make teaching more effective and more enjoyable for both the student and the teacher. I will now briefly describe them and try to give the reader a sense of my teaching style. I have been influenced in different ways by numerous teachers, students, colleagues, articles and books, as well as by my father who spent most of his life educating future teachers.

These basic principles are:

Teaching mathematics, in its diverse forms and contexts, is important and worth doing well. This is the fundamental premise that must be part of every good teacher’s credo. To some, it may seem like an obvious, even trivial statement. I state it as an antidote to discouragement, sometimes even cynicism, felt by math teachers when dealing with a class of uninterested and unmotivated students, and a reminder that our teaching *can* and *does* make a difference in people’s lives.

Teaching works best when tailored to each individual student’s needs. Teaching human beings cannot be done successfully in an assembly line fashion. It works best as an interactive and evolving process. This is often hard to achieve in today’s classrooms, which increases the importance of one-on-one interaction during office hours and after class.

Teaching is much more than mere transmission of knowledge. Knowledge, and especially mathematical knowledge, is only real and permanent if it is the result of student’s own efforts, which is why the teacher cannot be a mere transmitter to her (or his) passively receiving pupils. Furthermore, it is not only knowledge that our students should

take home. It is the ability to *think critically* and to *accept only claims supported by sufficient evidence*. The role of mathematics teachers is becoming increasingly important in a world in which we are bombarded with “information” for which little or no evidence is provided, while we are expected to accept it at face value. We are therefore given a precious opportunity to encourage students to be independent and critically thinking members of society.

Having established the basic principles, the following **practical guidelines** address the more concrete aspects of teaching.

Prepare thoroughly. Good preparation is the foundation for every well-taught class. I find the discussion of this topic in [Kra93] very helpful. My preparation process consists of two parts: (1) I write a concise outline of all the definitions, theorems and worked-out examples I want to present, including pictures, tables, graphs, etc.; (2) I go through the outline thinking of possible ways to connect the new material to familiar concepts and to make it as intuitive as possible. I think of suitable stories from the history of mathematics and ways to relate the new concepts to ideas from physics, biology, economics or engineering. Right before I teach a class, I go over step (2) again. I also like to “think out loud” as I teach, to share with students how a mathematician approaches a problem.

Give your all during every class. The moment I step into the classroom, I try to forget any private or professional issues on my mind, and dedicate all my physical and mental capacities to teaching. This is not always easy, but when successful, it works well.

Never be afraid to repeat yourself. No student can pay attention all the time; some ideas may make sense only after being heard the third or fourth time. This is why my approach is to first clearly state what I am going to teach (writing the title of the lecture on the board), then to teach it as well as I can, and at the end, to briefly review what I just taught. Repetition may not be the mother of all knowledge, as the ancient Romans claimed, but it certainly is its good friend.

Teach ideas rather than facts. Give lots of examples. The best way to show the motivation for a new idea or concept is by a simple, well-chosen example. That is why in my lectures every definition, theorem, and lemma is preceded and followed by examples and counterexamples. I often ask students to create their own, to test a claim or disprove it.

Encourage students to participate and ask questions. I try to create an atmosphere that promotes active participation. After every definition, theorem or example, I pause and ask: “Are there any questions or comments?” I find that eye contact with the students really helps engage them.

Try to present yourself as an alpine guide to your class of climbers, rather than as a part of the mountain. I borrow this one from [Rez85], a helpful little book used in the Teaching Workshop for new GSIs at Berkeley. This principle simply means: I try

to always be there (before and after class, during office hours or appointments, etc.) to offer help, encouragement, and to make students feel that, with time and effort, they *can* succeed.

Teach with enthusiasm and passion. When students see that the teacher is genuinely excited about the subject, they are more likely to get excited themselves. When teaching is passionate and full of enthusiasm, students learn more. (It is interesting to note that such classes seem to stick with them for a long time. I recently ran into a former student jogging down the street who, ten years after he took my class, exclaimed “Simić, you really *love* math!”)

Respect the students and be a warm, empathic person. Students have a sixth sense which tells them if teachers really care about them. I have found that showing a little understanding on a human level tends to inspire them to reciprocate to do their best in the class.

There is much more to say about teaching. Instead, I would like to let my students speak through: (1) an unsolicited letter written to the Chair and Vice-chairs of the Berkeley Mathematics Department by a student who took my multivariable calculus class; (2) student evaluations of my teaching.¹

References

- [Kra93] Steven G. Krantz. *How to Teach Mathematics: A Personal Perspective*. American Mathematical Society, Providence, RI, 1993.
- [Rez85] Bruce A. Reznick. *Chalking It Up: Advice to a New TA*. Random House/Birkhäuser Series for the Mathematical Sciences, 1985.

¹Detailed surveys for the courses I taught at UC Berkeley since Spring 2000 can be found at http://hkn.eecs.berkeley.edu/student/nsurvey/professors/Simic_Slobodan.html.