Teaching Statement

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I always think that love of students and love of mathematics are the most crucial factors in becoming a good mathematics teacher. With love, teachers can offer genuine help to both the advanced students and those who struggle with math. Teachers’ love of math can become contagious only if they show their care for the students. Nonetheless, there are many other factors which can also affect the effectiveness of one’s teaching. In what follows I’ll try to summarize my experience and understanding on this important part of the college life.

1. Teaching strategies.

There are often many abstract concepts in a math course. They are the main obstacles to a large number of students. Before introducing a new definition, I often provide a couple of simple and conceptual examples to prepare my students first. Also, I always look for creative ways to bring these abstract concepts down to earth.

Concerning the content of the assignments, while it should mostly consist of straightforward problems, I think it should include a couple of sophisticated ones, too. The latter problems not only deepen the understanding of the concepts involved, but also more likely lure some the more advanced students into math. This is particularly true in advance math courses. Even if most of the students cannot answer the harder problems, they provide an excellent excuse for them to visit me during my office hours, which I consider to be an integral part of learning and which give me another chance to evaluate my lecture by talking to the students in a more relaxed and informal way. I also believe short quizzes are helpful. Especially carefully graded quizzes will provide students valuable chances for them to check their own understandings.

In my teaching I always pay more attention to the way the students think and solve problems than to the problems themselves. Usually I try to arouse students’ interest by instilling in them a curiosity about math, encouraging them to do the actual problems by themselves after giving them detailed solutions of some similar and simple examples. A number of my students continue their academic careers by going to some very prestigious institutions.

2. Teaching needs devotion.

Of course, good teaching involves much more than enthusiastic lecturing. Throughout the years I have constantly tried various ways to improve my teaching style by learning from the books about teaching and from other good teachers. Good preparation is essential. Nowadays I always start with a carefully prepared syllabus, taking into account as many factors as possible. Before the semester even begins I’ve already looked through all the chapters I need to cover and designed all the homework. As the semester progresses, I always keep the overall structure and the mathematical goals of the course in mind, knowing that cohesion both within a single lecture and between lectures is important. For each lecture I prepare my presentations thoroughly, finding good stopping points and paying special attention to illustrative examples. And I always begin with a lecture by summarizing the content I taught in the proceeding lecture(s).
3. **Teaching and research.**

I believe research and teaching should go hand in hand in our higher education institutions. I often use my solution of the BBB-conjecture in [1] as an example in my Abstract Algebra class to show that the non-commutative structure may arise naturally even when we deal with commutative objects. I also like to use the analytical continuation of multiple zeta functions [2] in my Real and Complex Analysis classes to show the differences and relations between two concepts: 1-dimensional (complex) singularities and higher dimensional indeterminacies.

The primary road block for more students to major in mathematics is their lack of experience in mathematical research. With my previous and recent NSF funding I have been able to attract a few students to help with my research projects and at the same time give them the opportunities to savor some of the most interesting mathematical problems on which the mathematicians are currently working.

4. **Teaching with technology.**

I like to apply advanced technologies in classrooms. I have learned some computer algebra systems and used them in my research as well as my regular courses such as calculus and number theory. At both UPenn and Eckerd College I taught a course/seminar called Number Theory and Cryptography. After I showed the students the basic skills of Maple programming I assigned several projects to the students which required large amount of computer aided computation. I believe that the students will be inclined to love modern technology if the teachers have set good examples for them. They also will probably try using advanced technologies in the future after they leave college.

5. **Coda.**

With over 15 years of teaching experience, I find that love of students and love of math are the most important factors for a math teacher to succeed. It is now also clear to me that to teach students how to think is more crucial than some specific tricks and formulas. I like to say this to my students: “Memorizing is important, but critical thinking is more important. You know how to integrate to find areas and volumes, but if your answers are negative then something must be wrong.” By making conceptual questions the focus of my efforts to improve the interactive environment I felt that I would also improve the overall learning and retention of material. As a matter of fact, students often forget how to “plug and chug” through a problem a year after completing a course, but conceptual knowledge, i.e., the “philosophy” we teach them, may remain with them for many years to come.

**References**
