

TEACHING STATEMENT

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From a teaching assistant to an instructor of various math courses (at 3 universities), my teaching philosophy and pedagogical approaches have evolved throughout these years. In my view, the teaching of mathematics is important because students need to learn quantitative reasoning for both their lives and their studies in other disciplines. Therefore, we, as instructors, are responsible to show the usefulness and beauty of mathematics to our students. The following are a few key points in my teaching philosophy of mathematics.

1. INTERACT OFTEN WITH STUDENTS

The teaching of mathematics should be student-centered, which means that interacting with students is very important. I have developed the habit of conducting a pre-semester survey to identify the goals and expectations of the students before the semester begins. During lectures, I constantly ask the students questions to see what parts they don't understand or they consider difficult, so I could emphasize or elaborate on certain parts accordingly. I also encourage students to post questions on Q&A platforms like *Piazza* or to attend office hours and I have been quite active to answer students' questions on *Piazza* (within 2 hours on average).

2. USE EXAMPLES FROM DAILY LIFE

Many students may believe the stereotype about mathematics that it is too abstract and not very useful. Nevertheless, most concepts of mathematics are motivated from our daily life scenarios. I put a lot of effort into connecting the course material to our daily lives. For example, when introducing enumerative approaches in a combinatorial course, I incorporated examples from the number of possible zip codes to vehicle license plates and IPv4 addresses. I also intentionally choose exam questions with backgrounds from our daily lives.

3. EMPHASIZE PRACTICAL PROBLEM-SOLVING METHODS

Some parts of a mathematics course may be difficult to understand: abstract definitions, complicated methods, etc. I think it's a common phenomenon that after spending much time in a math course students still can not solve a related problem. To prevent such scenarios, I always try to emphasize practical problem-solving skills in my lectures. For example, computing something from a definition may not be a good idea (like Riemann integrals), so I try to show the most practical method to my students. In addition if there are several methods for solving the same problem, then I would compare them and explain the pros and cons of each method, so the students can choose wisely when facing such a problem.

In addition, for some proof-based courses, the transition from doing computations to doing proofs may be quite challenging for students. I usually spend time

summarizing popular proof techniques (for instance, proof by contradiction, proof by induction, and so on). To make sure that they indeed understand the key steps in those techniques, I also focus on critiques of proofs that are flawed (some flaws are common among their own attempts).

4. CONVEY IMPORTANT METHODOLOGY IN MATHEMATICS

In addition to the content, it is also important to convey some useful methodological approaches in mathematics to students. For example, when overwhelmed by a lot of new concepts, one could focus on the definitions to get correct and helpful understanding of them. I always emphasize the importance of conceptual understanding of definitions and key ideas. In summary, I want my students to benefit from my lectures in a variety of aspects.

5. BE CARING AND SUPPORTIVE TO MY STUDENTS

Last but not least, I have been reading an excellent book about pedagogy - *Teaching to Transgress* by Bell Hooks and have learned a lot from it. I understand that my students may grow up in quite different environments and some of them had to overcome adversities from many aspects. So I always try my best to be caring and supportive to my students.