Teaching Statement

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“If you think in terms of a year, plant a seed; if in terms of ten years, plant trees; if in terms of 100 years, teach the people.” – Confucius

“Mathematical discoveries, small or great are never born of spontaneous generation. They always presuppose a soil seeded with preliminary knowledge and well prepared by labor, both conscious and subconscious.” – Jules Henri Poincaré

“It is the supreme art of the teacher to awaken joy in creative expression and knowledge.” – Albert Einstein

These quotes represent my holistic philosophy towards teaching mathematics. I believe that in order for a society to be successful we have an obligation to work hard to teach the next generation what we know. Furthermore, if we are to make progress we need to teach and prepare our students to work hard and to turn knowledge into discovery. Moreover, at our best we can teach them the joy of working hard, learning, and the discovery process. This may be a lofty goal as a mathematics instructor, but I feel there are many ways in which this can all be done. I outline below some features of excellent teaching that I use to help students grow and develop in the mathematical sciences. In order to demonstrate that my philosophy and methodology make me an effective teacher, I will give some evidence from my teaching evaluations at MIT and quotes from students whom I have taught. Finally, I will mention my volunteer activities here at MIT as an advisor and mentor, to demonstrate that although I see teaching as a serious obligation I also see it as a rewarding opportunity to guide young minds both in and out of the classroom.

Features of my teaching methodology

The first feature and arguably the most important is to always enter class prepared to lecture. By this I mean, review the material you are lecturing on in advance, prepare your lecture notes well ahead of time, and anticipate questions and have ready concrete examples to answer them. How I personally achieve this is by reviewing the material at least 2–3 days in advance. Then immediately after reviewing, I take out one sheet of paper for every ten minutes of lecture time and create the outline of my lecture. In the margins I write down potential questions I think will be asked along with an example that a student can take away with them to help answer that question.

The next feature I employ is emphasizing problem solving and choosing a well thought out set of problems for students to solve. I have always felt that to properly prepare a student the teacher must have them get their hands dirty and solve problems. But at the same time, a goal the teacher should have is to properly choose the problems they solve in a strategic manner that facilitates not only learning and understanding, but also discovery. The method I use to achieve this is, while I am writing up my lecture notes, I find or create for each topic about five good problems that are progressively more difficult and which build off each other when solved in order to convey an important point or two on that topic. I emphasize the importance of solving these problems through homework, quizzes, and tests. My lectures and the problems given are made to be a connective and coherent whole rather than objects seen as separate and unrelated.

The final features are encouraging classroom participation and an open door policy of accessibility. Part of the role of an excellent teacher is to get students to think critically about the material they are learning and to question what they do not understand. I have two tactics that I use to address these issues. The first is I start off at the beginning of any course by letting them know that I am available during office hours and that my door is always open. I also write on their homework and quizzes suggestions for improvement and extend that open offer to see me if they would like more help. Secondly, I work hard to encourage classroom participation for this is essential to getting students to do critical thinking and it leads to a higher quality academic environment for the students. I have particular success with incorporating question and answer portions to my lectures, and ending lectures with ideas or problems to think about for the next time we meet again for class.

This is a brief outline of a few of the features and methods I use in an effort to bring teaching excellence to my students. To awaken the joy of hard work, learning, and discovery in mathematics to future generations
Evidence of my ability to teach effectively  In order to demonstrate that my philosophy and methodology make me an effective teacher, I will now give some evidence from my teaching evaluations at MIT and quotes from students whom I have taught.

The following is copied from the Fall 2012 Subject Evaluation Report for the 18.02A Calculus course in which I was a recitation instructor. The evaluation report is an end of term survey from the students in the recitations that I was an instructor for, which evaluates the quality of my teaching. There was a total of 20 students out of approximately 30 that responded to the survey. The ratings are on a scale from 1 to 7 with: 1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree (7 is the best).

<table>
<thead>
<tr>
<th>Quality of Teaching</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulated my interest in the subject</td>
<td>4.7</td>
</tr>
<tr>
<td>Defined subject learning goals well</td>
<td>5.7</td>
</tr>
<tr>
<td>Gave well-organized presentations</td>
<td>5.9</td>
</tr>
<tr>
<td>Encouraged me to take a role in my learning</td>
<td>5.6</td>
</tr>
<tr>
<td>Encouraged questions and class participation</td>
<td>5.6</td>
</tr>
<tr>
<td>Used good examples and illustrations</td>
<td>5.8</td>
</tr>
<tr>
<td>Used education media (e.g. blackboard) well</td>
<td>5.7</td>
</tr>
<tr>
<td>Was available outside of class</td>
<td>6.1</td>
</tr>
<tr>
<td>Overall rating of teaching</td>
<td>5.7</td>
</tr>
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The following are quotes copied from this Subject Evaluation Report from three different students that I taught:

- He was a great recitation instructor who explained everything very clearly. He made the subject matter easier to understand, and the in-class examples really helped me learn.

- I liked that he stressed that we understand basic concepts, this made sense as the course proceeded. Definitely my favorite professor this semester.

- Very clear instruction overall.

My volunteer activities at MIT as an advisor and mentor  I will now give two examples of my volunteer activities at MIT. These examples demonstrate that my interest in being an effective teacher extends beyond the classroom to a range that includes advising and mentoring. The titles of the two MIT positions that I volunteer for are “PRIMES mentor” and “Faculty Freshman Advisor.” These positions are described briefly below.

My position, PRIMES mentor (begins Dec.), is part of PRIMES (Program for Research In Mathematics, Engineering, and Science) which is a year-long research program for local high school students, created 3 years ago at the Math Department at MIT. I will be serving as a leader and mentor for a reading group of 2–3 students who actively study an advanced mathematical book under my guidance. My role as the mentor leading such a group is to meet with the group once a week at MIT (for approx. 2 hours) to discuss with them the book (and any papers) that they are reading. In between meetings, they read assigned chapters, solve homework problems, and discuss the material with each other and with me by e-mail or Skype.

My position, Faculty Freshman Advisor, is part of MIT’s Freshman Advising Program which is overseen by the Office of Undergraduate Advising and Academic Programming (UAAP). The UAAP serves as the academic department for first-year students and their volunteer freshman advisors. I currently am such an advisor for six MIT freshman. The following provides a short list of bullet points describing this advising position.

Goals of First-Year Advising:
To provide an effective support system that ensures, as much as possible, the successful transition of first-year students into the MIT community and to academic success.

What I do as a Freshman Advisor:

- Help advisees become familiar with academics and campus resources.
- Assist with first-year class selection.
- Meet regularly throughout the year with each advisee to monitor academic progress and social adjustment.
- Help students to define and achieve their academic goals.
- Advocate for students as necessary; refer to helping resources should problems arise.
- Offers guidance through the process of deciding on a major.