Teaching Statement

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I became an educator to help people improve their lives by sharpening their powers of analytic reasoning and acquiring the skills needed for success in their chosen careers. Over the course of my college teaching career, I have identified three primary objectives: to facilitate active participation in the learning process, to develop the faculty of critical thinking, and to cultivate diversity in STEM. Students in classes I taught as the instructor of record at UW–Milwaukee gave me an overall average teaching rating of 4.3 out of 5, and 87% indicated my teaching is "excellent" or "very good."

Active learning

Successful students of mathematics engage with the curriculum by solving problems themselves and discussing their reasoning with others. I therefore devote a significant amount of time during class to discovery-oriented individual and group assignments. To increase the likelihood of completion, I sequence these problem sets so that the solution of each exercise requires a single new technique which must be combined with previously acquired skills, and provide students with one-on-one assistance and encouragement when they find themselves stuck. I verify the students' understanding of the material by asking individual students to present their solutions at the board. I then prompt the class to ask the presenter questions about key steps, giving students the opportunity to defend their reasoning and critique the work of their peers.

Students are often most able to make mathematical ideas their own when they encounter them through media that appeal to their individual learning styles. I use mathematical software to write applets that provide students with visual and kinesthetic experiences of formal concepts they may find difficult to grasp. For instance, I introduce the limit concept in first-semester Calculus with an applet that allows students to find a suitable delta for a given epsilon by manipulating a slider. In introductory-level courses, I have used Mathematica notebooks to facilitate hands-on interaction with concepts such as function notation, average rates of change, exponential growth, and the production of sound using sinusoidals.

I employ several methods to keep students alert and interested when delivering a traditional lecture. The most important of these is that I maintain a high level of enthusiasm, a fact which many of my students have approvingly noted in their evaluations of my teaching. Secondly, I lead my students to recognize the utility of new ideas by motivating concepts before they appear through interludes of Socratic questioning. As a final example, I often deliberately pause before concluding a sentence, so that students may complete the thought themselves. These pauses communicate to the students that they are expected not to be passive listeners, and I have found it to be an effective way to get a quiet class to speak up.

Critical thinking

Written work in any college-level mathematics class must be persuasive, not just a rehearsal of a procedure committed to memory. I emphasize the critical thinking skills entailed in determining whether or not a given mathematical argument is convincing, even when the argument in question is a straightforward calculation, and teach my students that they must be able to defend each step in their work. I demonstrate the care which must be taken when applying identities by breaking down computations into simple steps, indicating the operations to be carried out with explana-

tory notation. I motivate the close reading of theorems and definitions as they are introduced by immediately giving examples and counterexamples, and asking the class in each case either to explain why the theorem or definition can be applied, or to identify which hypothesis has been violated. On exams and quizzes, I assess students' ability to reason critically about mathematics with open-ended questions that ask them to draw conclusions from the results of calculations and to correct arguments containing errors which the students must identify.

Diversity

Respect for cultural diversity and the promotion of diversity in the sciences are essential components of my approach to teaching mathematics. As the first in my family to attend college, I am sensitive to the needs of students whose experiences prior to college did not bring them into close contact with role models in the academic and professional sectors. My instructional style empowers students by making them active participants in the learning process and allowing them to share their achievements with their peers.

In science education, it is especially important to guard against the unintentional reinforcement of harmful cultural biases. This requires sustained, conscious effort. When asking questions of the class, I strive to make eye contact with each student with equal frequency. In developmental courses, I relate anecdotes about individuals who have overcome math anxiety and achieved success in fields that demand a high degree of mathematical competency. I invite students to share their personal ambitions during office hours and after class, and often adapt my lectures to demonstrate how course material is relevant to their present or future careers. Above all, I treat each student with dignity and respect. I abstain from judging students on the basis of prior performance in mathematics courses, which I find often does not reflect their ability to succeed.

In addition to encouraging my students to consider careers in STEM, I urge them to investigate connections between mathematics and fields beyond engineering and the sciences. I have a deep and long-held interest in interdisciplinary studies. Indeed, I chose my undergraduate alma mater in large part because of the school's commitment to student-designed interdisciplinary majors. I look forward to working with students on undergraduate research projects that draw on areas of study not traditionally associated with mathematics, such as linguistics, journalism, history, and the arts.