Teaching Statement

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A now well-known study conducted by Mary Budd Rowe found that, on average, a teacher waits only 1 second after asking a question before moving on. Hearing this fact in all of its absurdity has greatly influenced my teaching. It was the beginning of a still ongoing process to make my classroom as student focused as possible. This starts with what I believe is one of the most crucial aspects of a lecture, space to think.

Before starting most examples in class, I take a minute to pause and ask the students to think about the problem at hand. I have found a surprising amount of value in this practice. After writing the example, but before beginning the solution, I always ask a prodding question. For example, before testing a series for divergence, I always ask the students which test they think will work best. Upon completion of this time, I will solicit suggestions for how to proceed. This leads to a highly engaged classroom where students must constantly come to terms with what they really know. It is easy to nod along with an instructor going through the motions of a problem. But when the instructor uses method A, and you thought to proceed with method B, one is motivated to see why this particular approach works better. I of course try to predict the typical pitfalls and warn students away from them during lecture, but nothing works quite as well as a student making the mistake themselves followed by being immediately shown the more efficient way to approach the problem.

Another aspect of keeping the lecture focused on the students is providing a welcoming environment where no one is afraid to ask “dumb questions.” As a student, I have continuously found “dumb questions” to be one of the most useful ways to get to the heart of the matter in mathematics. One of the most reliable ways I have found to elicit basic questions is to simply have a fixed amount of time that is “question time.” Upon completing an example, no matter how simple, I always pause for at least 30 seconds. The students come to realize that we will not be moving on for some time, so that if they have questions, they may as well ask them. Students have responded well to this approach, and in my most recent course evaluation, the mean student response to the prompt “A positive environment was provided for student questions” was a 4.83/5. In a section of the evaluation soliciting comments about the instructor, one student responded with “Gabe is an AMAZING teacher. His lectures are extremely well organized, and his examples are super helpful. He also takes his time to pause for questions and creates a very friendly environment for questions.”

Of course, there is no point in leaving room for questions if they are not answered well. A mishandled question further befuddles an already confused student and may get them into the mindset that they just “can’t” get this topic. In this regard, I always tailor my response to the particular student who is asking the question. This can mean multiple things. First and foremost, one must be sensitive to the current mathematical level of the student. I have had

the opportunity to teach both potential mathematics majors in our “calculus” sequence as well as students trying to fulfil a requirement in our “survey of calculus” sequence. We clearly know that answering a calculus question using real analysis is inappropriate, but so too is answering a question of a “survey of calculus” student at the level of a potential math major.

Furthermore, it helps to keep in mind the main motivation of the student. If I am well aware that a student is only interested in obtaining a passing grade in the class, then I have found that something along the lines of “you will see problems involving this concept on the exam” is sure to grab their attention. On the other hand, when answering the question of a student who has a genuine interest in the class, it would be a disservice to not point out all of the connections to the mathematics that they will see in the years to come. If responses directed towards them are constantly referring to exams, one risks extinguishing their internal drive. Students have noticed my care in answering questions, and my most recent students surveyed responded to the prompt “Students' questions were handled well” with a 4.71/5.

While a student has their own motivations coming into a course, one of my main goals is that by the end of the course, many of them are motivated by the beauty and usefulness of the material we teach them. To this end, I always try to convey genuine interest in the material myself and hope some of it rubs off on the students. After completing a particularly interesting problem, I am not opposed to pointing out exactly what part I thought was awesome. At least some of this seems to come across to my students. During the last time I taught “a survey of Calculus I,” our lowest level math course typically exclusively taken for a requirement, surveyed students responded to the prompt “The instructor showed a genuine interest in teaching the course.” with a 4.81/5 and one student wrote: “Math is not my favorite subject, but Gabe made sure that we were well prepared for tests and was available if we had questions so the course was enjoyable, especially since he is very much interested in math and finds it ‘fun.’”

Looking to the future, as part of my constant focus on improving the quality of education my students receive, I have taken interest in the rising “flipped” classroom model. Throughout my years of teaching, I have regularly incorporated classwork as a tool for students to engage with the material, as opposed to passively absorbing it. This coming year, I will be participating in the “transforming calculus” project at the University of Virginia. Under this project, I will be leading a flipped classroom for math and science majors taking Calculus I. I am excited to partake in this and will be looking to incorporate the practices of a more active learning environment to future classes.