

Miguel O'Malley

Teaching Statement

Methods and Experience

Math is not that easy. We've all seen and assigned the same sorts of problems over and over again, which makes it easy to forget how difficult it can be to see this stuff for the first time. What I've found most helpful in teaching math to undergraduate students, especially ones not in the major, is understanding that the right way to think about a problem is not obvious the first time around. The first time a student sees something in a lecture, or encounters a problem, it's almost certain that they won't understand it perfectly unless the explanation was right in their strike zone. I've found it most important that everything I introduce be approached from multiple directions, and more than once. It's critical to never forget what it's like to be in high school or undergrad, seeing a topic for the first time and making absolutely no sense of it.

When planning a lecture, I try to make sure I have a number of different ways to break down a particular subject. It seems obvious that that would be a good idea, but to say something should be said in more than one way doesn't do the idea justice. How would an aspiring biology major think of the definition of continuity? What's the best way to broach trigonometric functions for a humanities major who hasn't seen them before? How will someone who hasn't taken a math course in years make sense of the connection between the definition of a derivative and the shortcuts we take in their computation? I've found that actively thinking about these sorts of hypotheticals makes me stop for a moment and entirely reshape the words I use to talk about this subject. For me, I believe something when I see a proof. But for a first year calculus student, they might not get there until the explanation roots itself in something they already understand. I've found the explanations I give are best and best remembered when I'm unafraid to simplify. The importance of pictures cannot be overstated, and anecdotal explanations have the potential to be truly foundational. I've also found it can't hurt to throw in a few bad jokes.

Beyond lectures, I've found group work is critical to teaching mathematics, and I try to make sure there's always an opportunity for it. Math is an inherently communal subject, where the understanding you have is only as good as your ability to communicate it. Having students work on problems together not only reinforces concepts, but exposes problems before they appear on examinations, or in their eventual careers. We don't teach math to students, especially non-majors, because we want them to calculate the tip. We teach them so that they can communicate what they've done to others, and their compatriots are the first opportunity. This is something I see as critical for students to understand, as important as the content of the course itself.

Assignments are key, but they're ultimately a means to an end. There's little more valuable for both students and myself than one-on-one time in office hours, and assignments provide a vehicle for

that to happen. When a class has 20 or so people in it, it can be difficult to tailor explanations to each student's needs. That's why a 15 minute talk in office hours can become the most important 15 minutes a student spends in a course. There's really no medium where I've broken through as many roadblocks for individual students. Sometimes, though, it can be difficult to get students to go to office hours. They might feel that it isn't worth it, or that they should only go when they're really stumped, or they might even just be unsure the squishy uncertainty they have is even a real question. I try to make sure that students understand they should go to office hours whenever they have a question, assignment related or not. Learning to use the people whose job it is to help them is a critical skill for students in both education and life, and I think having a constructive discussion in office hours is a big part of that.

In the future, I think I'd most like to develop my teaching by using different methods of evaluation. This year we're trying a standards based grading system in the intro calculus section, and I think it seems promising. A student who makes a small mistake in an otherwise correct argument is not worse than one who does not. I've always felt that to tell students their understanding is the goal, then grade them based on perfection, is to speak from both sides of the mouth. When I was in undergrad, one of my friends in a real analysis course adopted the method of doing every single problem in every single section we covered in class. While an admirably tenacious approach, I never want students to feel they need to do anything like that. The grades we give students should be based on more than how meticulous they are, and I want to keep trying to find ways to make that more central to coursework.

Some excerpts from teaching evaluations:

- This course was one of my best classes, despite being challenging, the instructor always tried to simplify everything and making them look easy and easy to students.
- As someone who struggles with the subject of the course, it was an immediate challenge. However, the lecture style of the course served well to the understanding of the material. A strength of the course was its organization, it was very clear what was expected of you, and all the materials that were needed were very clearly accessible. I think some notable strengths is the accessibility of the professor. He was very willing to explain after lectures and answer any questions outside of class. He also did a good job of trying to engage the class despite the quiet nature of my individual section
- The strength of the teaching was that the professor was intelligent and cared about the subject.
- Professor O'Malley can be a little confusing something but he is patient with us which I truly am thankful for.
- Professor is enthusiastic about the topic. Works at a reasonable pace and is accessible outside of the course. Willing to stay after class to discuss any material. Answers all questions and clearly answers.