Teaching Statement

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My goal in teaching is for my students to learn that mathematics is more than "number crunching." I want my students to understand the logic, intuition, and critical thinking needed to solve mathematical problems. I especially want them to develop a robust problem-solving process rather than just a short list of problem types, so they can apply what they learn well beyond the class. I also want my students to learn how to communicate clearly in mathematics. One particular area I want to help them improve in is using clear and consistent notation, a struggle for many undergraduate students that keeps them from communicating mathematics well.

I have taught pre-Calculus (MATH 1030) and introductory Calculus (MATH 1060 and MATH 1080) classes at Clemson University since Fall 2023. I have taught some classes in a "flipped" format, where students watch lecture videos before coming to class, and others in a "traditional" format, where I spend the whole time lecturing. However, my current approach to teaching is to spend about 75 percent of class time lecturing on the material I wish to cover, and the remaining time is devoted to a learning activity with 1 to 3 questions similar to the in-class examples. For this learning activity, the students can work together, use their in-class notes, and ask me or a TA questions, but no other resources are allowed.

I have several reasons for adopting this approach. First, it makes the class more naturally engaging for the students. Second, I believe that it is very helpful for students to begin trying problems related to the material right after learning about them. This helps bring out questions that students may not realize they had or were not sure how to ask during the lecture. It also provides more opportunities to give feedback both on mathematical content and on their presentation in a "low-stress environment." Even further, it reveals how I can improve my lectures by helping me see where I was unclear. Lastly, I want to avoid making homework a significant portion of the grade due to the prevalence of resources that can immediately solve most undergraduate math problems. Instead, I want to ensure that students are practicing the material we discuss in class. I believe the easiest way to do this is to do frequent in-class learning activities along with regular quizzes and exams.

For the lectures, I currently use a traditional style. I create slides containing theoretical questions or specific problems, each followed by a large blank space for me to answer or work out with the students live in class. I also include some "summary" or "reference" slides with the main results we will discuss in class, which the students may find useful after class. During the lecture, I make sure to stop and ask for questions regularly.

I first used this approach to teach a Calculus II course (MATH 1080) at Clemson in Spring 2025, and I received very positive comments from the students in the course evaluation. Two comments that explicitly mentioned this approach as a benefit to them were

- "His teaching style is very interactive and helpful; working through the examples on the board is very useful for understanding every step of solving problems and learning concepts. ...he ensures that we actually think about why we do the things we do, rather than just memorize information."

- "His lesson plan of explaining the theory and intuition behind concepts, then backing it up with examples, and then wrapping the class with student learning activities was very effective for getting me to understand [and] retain the information."

While I do feel that this class format works well in contributing to achieving my teaching goals, I do not hold inflexibly to it. There are class periods where I need to spend more time answering questions or doing extra examples, depending on the students' needs. In that case, I do not try to force a learning activity into the class, and either shorten it or drop it entirely. Moreover, I am always looking to improve as a teacher. If a different method allows me to meet my teaching goals better and present mathematics with greater clarity, then I will gladly adapt to make use of that method.

In addition to my in-class interactions with the students, I believe that personal or small group interactions contribute greatly to understanding the content and developing a stronger intuition. As such, I strongly and frequently encourage students to make use of office hours, and I try to carefully set times that would allow everyone the ability to come for at least 30 minutes. In the event a student is not able to make the times I set, I frequently remind the students that they can always reach out and schedule meetings outside of the usual office hours. This belief further motivated me to help out several times for the Clemson Math-In, where I and other volunteers served as tutors to help students in any undergraduate math class prepare for their final exam.

To try to keep the class experience as smooth as possible, I provide all of the materials a student might ever want in a single website or LMS as much as possible. (At Clemson University, I used the Canvas LMS.) Even if something could be found on a separate "course website," I would also upload it to Canvas to prevent students from having to keep track of multiple websites and their contents. Furthermore, I try to make it clear where we are in the class at all times, such as by making labels in Canvas clearly denoting the days for each class and what topic will be covered that day.

One kind of assignment that I would like to try to implement into a class at some point, but have not yet had an opportunity to do so, is to have the students write a short in-class essay. For example, in a calculus class, the students learn about the mean value theorem. Having the students explain both the intuition behind the mean value theorem and how the theorem is useful in applications (such as in obtaining a formula for the arc length of certain curves). For smaller classes with more mathematically mature students, this could be changed to a presentation. The topic could be as simple as a problem or a small section in a textbook not covered in the lectures. For example, if an undergraduate stochastic processes class discusses the $M/M/1$ queue, a student might give a presentation on what happens when a queue capacity is added to the model. Either one of these will challenge the students' understanding and intuition of the material and require them to think carefully about how they write and present mathematics.