School of MATHEMATICAL AND STATISTICAL SCIENCES Clemson University

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Teaching Philosophy

I believe teaching is primarily about discovery. Effective teachers take the time to discover who their students are so that they can cater to each one's growth individually. Creative teachers foster discovery in the classroom by employing a variety of teaching methods, which they seek to continuously improve. Passionate teachers are people who have fallen in love with the joy of discovery, and who want to share that joy with others. *My goal as an effective, creative, and passionate teacher of mathematics is that students leave my classroom not only able to critically interact with and appreciate mathematical concepts, but also able to see and rejoice in opportunities for discovery as lifelong learners.* I accomplish this in three main ways:

- I welcome my students as **people** with backgrounds and lives outside my classroom
- I emphasize lifelong **learning** through researched-backed teaching practices
- I communicate **mathematics** with excitement, rigor, and an eye to applications

PEOPLE

Students often come into a math course with a pre-conceived notion about their own math abilities. I come into my math courses with the belief that every student has the potential to be successful in the class. To impart this belief to my students, I foster an atmosphere that is welcoming to questions, uncertainty, and diversity of thought. Students in my classes become comfortable with being wrong because I emphasize the notion of "productive struggle", and always seek to draw out a piece of truth in every student's answer. To encourage more questions and answers in class, I often pause lectures for moments of "Think-Pair-Share", where students can have a few moments to process new content individually and with a peer before a short whole-class discussion.

I also come into my math courses with the knowledge that every student has a different background, different motivation for being there, and different end goals for the course. In a survey I give on the first day of class, I always ask students what their relationship with math is and has been. I find I can learn a lot about the tools students do or do not have coming into my class, and I can adjust my teaching accordingly. My students know that I am available to them and will work with them around the other priorities in their lives. My office hours are scheduled, with student input, at a variety of times to accommodate the variety of schedules. By being available and patient during these one-on-one instructional times, I build trust with students, which increases their interest and engagement in the course. Arriving early to class to answer questions, calling students by their names, and seeking student input on the course through post-exam reflections are other things I do to show my students I value their input and opinions.

LEARNING

Students in my classes are actively engaged in their own learning through creative methods, individual inquiry, and collaborative practice. I am committed to setting aside class time every day for some form of active or inquiry-based learning. During lectures, I present material to the students and then immediately have them check their own understanding with an individual practice problem, often followed up with a check against a neighbor. This provides students with an opportunity to find their questions and ask them of peers first, which in turn provides peers with an empowering opportunity to answer and engage critically with those questions. Multiple times a week I will assign an in-class learning activity, and as students work my goal is to ask more questions than I answer. If a student states that they don't know how to complete a problem, I ask them if they have an idea for a first step. If a student asks whether a stated idea is correct, I ask them to articulate the reasoning that led them to that conclusion. This line of questioning not only helps me offer more specific help to the student, but also gives the student the opportunity to choose their own path through the problem.

Math often has a bad reputation among students as a harsh and rigid discipline. On the contrary, I find mathematics to be a beautiful framework within which we can exercise creativity and flexibility. I present materials as much as possible in multiple methods for the same concept. For example, when talking about velocity, we will talk about a real-world context problem such as a speeding car, we will look at the output of an equation on a table, we will look at the slope of a graph, and we will talk about the abstract concept of limits. Another way I demonstrate the flexibility of mathematics is by discouraging memorization in favor of building a problem-solving toolkit. For example, when teaching the unit circle, I do not ask the students to memorize the angles and values. Instead, I show them a method to build the unit circle using counting, a reusable method which also deepens understanding of what the unit circle values represent.

I set clear learning goals, and my students know they are responsible for staying curious and continuously seeking growth. Thus, students develop the necessary skills to continue their journey of discovery in math as well as in other areas. Similarly, I am committed to continually growing as a teacher by adding research-backed practices to my courses and seeking input from my students, as well as from fellow teachers.

MATHEMATICS

I am passionate about giving every student an opportunity to appreciate mathematical discovery and beauty. I aim to always be clear, rigorous, and excited in my teaching, while knowing the same level of mathematical rigor may not be appropriate for everyone in the audience. For example, not all students taking a linear algebra course may have the proof background to completely appreciate the rank-nullity theorem. In such a setting, I would also introduce applications to areas such as: optimization via linear programming, encoding messages by using matrices for cryptography, or even balancing chemical reactions.

Additionally, using my training in the discipline of history, I find it useful to offer students a snapshot of the historical introduction of some mathematical concepts. When students learn that the limit definition of derivative was hotly debated for several years by the mathematical community, they get a sense of the persistence required for discovery, knowing that these abstract ideas are grounded in observation and discussion and did not fall out of the sky. For a higher-level math class, an assigned paper or presentation on a historical episode in mathematics further cements this appreciation. These teaching methods empower students to become partners in discovery.

I have always held a certain joy in walking alongside someone as they come to understand a certain mathematical concept. I will never forget the light in a friend's eyes when, during one of our study sessions in college, linear independence became clear to her as a concrete idea she could use rather than a definition to be memorized. As I grow in my own mathematical journey, so grows my desire to share my discoveries with my friends and students of my own.