

Teaching Philosophy of Tara Taylor (April 2024)

The world needs creative critical thinkers who can see patterns, make connections, have integrity, can communicate clearly, see new perspectives, are resilient and can tolerate productive struggling. Mathematics provides one path to nurture such thinkers. My main goals are to pass on a love of learning and for all students to see themselves as mathematical thinkers. For some students this means helping them to face their math fears and anxieties and to help them develop their confidence. For other students it means helping them to deepen their mathematical abilities to higher levels of abstraction and application. When I first started teaching, I viewed it as delivering content, classes were basically scripted lectures. Now I view the classroom as a community of learners where all are welcome, respected, and valued. I need to learn about the students: what is their math background, what do they hope to get out of the course, what are their future goals, what concerns do they have, how can I help. It is important for them to see that I am a learner too. I struggle and make mistakes. I often express my gratitude to my students for their questions, suggestions, and feedback. Last year I made a flippant remark about how the numbers pi and the golden ratio were not really connected and several students went out of their way to prove me wrong. It was humbling and funny and it was a great opportunity to model that I am still learning.

My teaching philosophy is grounded in a love of learning and a love of math. These are both human activities, and my philosophy embraces the human side. Math is often described as being objective, logical and true. It is also a way to tell stories. Much of my research is in fractal geometry. Fractals provide a way to model complexities and irregularities, and they are a way to visualize infinity. "A fractal description of an object is a story about how it grows. Fractals remind us that science has a narrative component that we too often ignore. Fractals remind us that stories are important."-Michael Frame (mathematician and my mentor) in "Stories about Nature" TedTalk <https://www.youtube.com/watch?v=bz8NJ7ZVXwQ&t=18s>. I love this video because he gives a great explanation of fractals but he ends the talk by encouraging people to help at whatever scale they are able to, and that this is a source of great joy.

My philosophy evolves as my own story unfolds. One of my earliest school memories is from grade 1 (age 6). We had to fill in a sheet with 100 math questions as quickly as possible. I was the first one done. My teacher marked it, and my answers were all correct. Her response was to accuse me of cheating. She said this in front of the whole class. I was very shy, sensitive, and anxious as a child, I felt like an outsider, and this experience had a profound impact on me. I did well in math classes throughout my school years, and enjoyed tutoring other students in math, but I didn't believe that I was a "math person". I wanted to go to university, and I went into science because I could get more funding, but I would have preferred arts. I started off in chemistry, then physics. I did well because I could do the math but struggled in the labs. In my second year I took a linear algebra course and had my Eureka moment. This is typically the first abstract math course. Other students hated it, but I thrived and fell in love with math. I loved that we started with abstract concepts and built theory. I had a math professor who became one of my most important mentors. We talked about art and literature too, and I realized that math isn't just a science but is also an art. My experiences at a small university have greatly influenced me: inspiring professors who challenged their students and who genuinely cared, a summer doing math research, and a range of courses including Latin and Greek.

I was encouraged to go to graduate school but needed a break. I travelled around Ireland working on organic farms and with mentally challenged adults, then returned to Canada to work in a group home. I learned a lot but realized I missed academic life, especially math. The day I found out I had been awarded NSERC funding for grad school, I found out I was pregnant. I deferred for a year, and started as a new mom. It was a challenge to balance motherhood and graduate work, I had to become very efficient with my time and learn how to juggle different demands. I worked in the math learning centre and my love of teaching grew. In 2001 I taught my first class, first year calculus. I cringe when I think of some of the rookie mistakes I made, but I loved it. I continued to teach throughout my PhD, and met other students and professors who deeply care about teaching.

I came to StFX in 2004. I love being at StFX for many reasons. I love the smaller classes and the opportunities for building relationships with students and colleagues from across campus. One year I was giving a talk at a math camp for high school students and mentioned how it was the linear algebra class that made me fall in love with math. One of the chaperones was a math honours student and he said that it was taking linear algebra with me that made him change his major from chemistry to math. I was extremely proud to hear this. My meandering path of becoming a math professor had come full circle. There have certainly been challenges, especially over the past 4 years. The pandemic forced me to make significant changes to how I teach. I am now a mom of 3 kids at very different stages of life (25, 14, 7). One child was diagnosed with ADHD in 2021 and another one was diagnosed as autistic in 2022. Learning about neurodivergency has helped me as a parent, but also as a teacher, to better understand my students and myself. Looking back at my own struggles through a neurodivergent lens has led to many personal revelations.

Everybody has a math story, and many of these stories start out with fond memories but then at some point there is a negative association with math. All students are capable of mathematical thinking. There are many stereotypes about who can, and can't, do math. I often try to bring in relevant content that breaks down the stereotypes. I show examples of "non-traditional" people doing math throughout history and in the present, along with examples of real-world applications to show how any student can find ways to connect math to something meaningful to them. I engage in ongoing professional development to make my teaching more inclusive and to advocate for equity/diversity/inclusion/accessibility for all students.

Learning has many aspects: hard work, fun, creativity, frustration, intuition, disbelief, wonder, reflection, and "aha" moments. Students are often embarrassed by their struggles in math, they are used to seeing teachers who make it look easy and straightforward. I focus on helping them develop their mathematical thinking, the process is just as important as the answer. This is reflected in how I do assessments and give feedback. I encourage students to develop their critical thinking through a range of assessments that involve skills practice, conceptual understanding, creative expression, reflection, connections with course outcomes, and challenge. I provide detailed feedback on assignments and tests. I encourage students to see them as important learning tools, and I hand them back quickly. I provide different ways for students to ask questions about assessments or anything else: in class, email, or help hours. My students know that I genuinely care and want them to succeed, and that each student has their own definition of success. I believe that my students develop their capacity to learn- to learn math but also how to learn.