

Teaching Statement

I get a lot of curious looks from students as I dim the lights in the classroom and place a large cardboard box on the table in front of me. They gather around as I place my phone camera up to a small hole in the box revealing on my phone screen an inverted reflection of the brightly lit classroom window behind me. “It’s up-side-down!” Says a student. They are right. The box is a homemade camera obscura (or pinhole camera). My elementary algebra students have just learned how to graph a line connecting two points and we use this understanding to describe the lines made by sunlight as it bounces off of objects outside and passes through the small hole projecting an inverted image into the back wall of the box.

Because I come from a nontraditional educational background which emphasized hands-on exploration, I believe flexibility and applicability is at the core of successful teaching. I was homeschooled until the age of sixteen and my first formal classroom experience occurred in community college. Therefore, my philosophy is this: *each student’s motivations, experiences, and backgrounds are different and these differences deserve to be celebrated.*

In the eight years since my first community college tutoring job in 2014, I have sought out a wide variety of teaching experiences and worked with students of all ages who face both mental and physical hurdles which impacted their mathematical success and confidence. I have tutored children between eight and twelve years old in a Mathnasium, assisted high schoolers in the classroom at two high schools in San Diego, taught adult learners at West Los Angeles College (WLAC), and college students through teaching assistant (TA) work at University of California San Diego (UCSD) and University of Southern California (USC). Currently, I am instructor of record for Math 040 (Basic Mathematical Skills) which is a college algebra course.

My 040 course consists of small tri-weekly homework assignments which are released at the end of each lesson and due at the start of next lesson. They are all graded by me—with detailed comments—and returned before the next assignment is released. Additionally, I feature exams and a final project consisting of a single page description of a math problem which they face in everyday life. Non-graded content includes weekly worksheets and in-class group work. All questions and examples are created by me with a list of learning objectives prefacing each question.

A teaching methodology I have worked deeply in is Just in Time Teaching (JiTT) which I discovered at WLAC after I joined a small group of interdisciplinary faculty members reading the book Just-in-Time Teaching by Scott Simkins and Mark Maier. The group met periodically between December of 2017 and June of 2018 to discuss the reading and incorporate the techniques into their classes which included math, biology, and English.

JiTT requires students to read ahead and answer open ended questions which are due just before the next class period. As the instructor, I would go over these answers, edit my lesson to address any misconceptions I noticed in the responses, and select a few student responses to anonymously discuss with the class.

I received mixed feedback from the JiTT method while at WLAC. One student in my Basic Skills 56 (Arithmetic I) course with a visual impairment and a disability which affected his motor control had difficulty reading the questions due to the small text size. Based on his feedback, I changed the formatting of the questions. However, I do not believe JiTT was the perfect teaching method for him due to its emphasis on reading and writing. Another student in the same class was having difficulty understanding my questions on percentages. Based on one of her JiTT responses, I included more questions about discount percentages relating to items she had recently purchased. This change was a “click” moment and I believe JiTT was an excellent fit for her.

While I am not using JiTT in the class which I am currently instructing, one aspect of the methodology that I have found especially useful is the emphasis on asking students questions about material that you—the instructor—have not yet covered. When students are asked a JiTT-style question, they are forced to fall back on existing knowledge and intuition rather than notes. I maintain this theme via in-class worksheets. Since most of my students are business or economics majors, I describe a fictional business and then ask them to make decisions based both on intuition and past experience as well as techniques we have used previously in class.

I further emphasize the implementation of personal experience during lessons by asking students to provide scenarios for me to work into problems. For example, one of my students works for her mother’s bakery. She offered the approximate cost of flour and a fair amount to charge for a dozen cookies. As a class, we used this framework to construct a linear equation including the profit of selling cookies minus the costs that go into baking them.

Of course, I also love bringing in props such as my camera obscura. After teaching my upper division abstract algebra students about quotient groups, I like to bring out a few of my many strange Rubik's cubes and discuss the subgroup of S_{54} generated by allowable moves on a Rubik's cube. In my calculus courses, I like to describe how students can write the volume of their favorite coffee mugs by modeling it as a paraboloid.

There is so much beauty to math that cannot be taught by problem drills. For this reason, when it comes to assessment, I always look for conceptual understanding and sound problem solving first and actual computational ability second. I also design my exams in a way that builds confidence. For example, I include a short list of learning objectives (essentially key words) for each question on my students homework. I list these learning objectives in each exam question in the hopes of jogging the memories of my students when they see it.

When it comes to student interaction, I attempt to make myself as available as possible. I create polls so that I can hold office hours at times where the majority of my students are available and am always open to appointments for students want to talk to me for reasons outside of homework help. When it comes to students who are under-performing, I take time to meet with them personally and discuss how they are currently feeling. I have an extra credit question on my exams which is a "Yes" or "No" question: "Do you feel adequately prepared for this exam?" Only one of my 21 students said "No." I met with this student privately and discovered that she was facing an upcoming surgery due to tearing her ACL and physical therapy has been taking up all her free time. She had submitted only two homework assignments since the start of the semester. Together, we make a plan. This student now submits as much of the homework as she has time to do—which could be as little as one question. She tells me her confidence in the course has improved as a result of this more flexible approach.

I also met privately with a student who's exam was riddled with fundamental arithmetic and pre-algebra mistakes. I knew this student was capable of answering questions without these mistakes and after talking with him we came to the conclusion that the time pressure of the exam made him too anxious to check his work. As a result of meeting with this student, I now incorporate additional arithmetic questions into every Monday worksheet. We also play Kahoot! when we finish a chapter of the textbook. This quiz game desensitizes students to time pressure and forces them to use intuition which improves their test taking skills.

In addition to teaching, mentorship has been a large part of my outreach on campus at USC. Throughout my time in the graduate program, I have mentored both undergraduate and graduate students and continue to work on improving the culture and community of our department through my involvement in Charlotte's Web (graduate women in math group), Women in Science and Engineering (WiSe), and Math Graduate Student Association (MGSA).

Since 2019, I have mentored five math graduate students and one Earth science graduate student. I meet with my graduate mentees once per month, or as needed, to provide information and support as they navigate the hurdles of their program. I always give my mentees my personal phone number and inform them they may reach out to me at any time—day or night—if they feel especially anxious or upset. Many of my mentees have accepted this offer and reach out to me frequently to vent about qualifying exams, midterms, or TA grading. If a student seems especially lost, we arrange to get lunch the following day. Many times, a small amount of validation and encouragement is all that's needed to turn a terrible week into an opportunity for growth.

I have also mentored undergraduates in my time at USC. In Spring 2021, I participated in the Directed Reading Program (DRP) organized by MGSA and mentored a senior engineering student working in robotics. Together we worked through the linear algebra that goes into computer vision software and she created a presentation on which theorems are implicitly used by her robots to detect and avoid inverted obstacles (holes) when navigating outdoors. Currently, I am working on a project with a freshman math undergraduate on a project exploring differential geometry topics as they apply to her Calculus III course.

I have also helped former students. I wrote a letter of recommendation for one of my former Calculus III students who listed me as a reference in her applications to REUs. Other past students of mine have reached out about ways to get involved in undergraduate research. One former student who reached out to me about my work in representation theory is now pursuing a research project with a Physics professor related to the field.

In the future, I would like to improve my teaching methodology by implementing more ungraded pre and posttests which would give my students periodic feedback on their progress through the course. Since several of my students suffer from test anxiety, I would also like to explore a low-stakes end of lesson quizzes which could act as a sort of exit ticket. Additionally, I plan to meet with experienced faculty—as I have at WLAC and at USC—to learn about and utilize more methods to improve student success. Finally, above all else, I will continue my flexibility-centered approach which will allow students to have some control of their learning. Sometimes all that a student or mentee needs to hear is *"I'm on your side. Let's make a plan."*

Teaching Evaluations

“Kayla was always there for me and my classmates whenever we needed help. She is one of the couple of tutors out of all that would consider our answers and tell us why they would work instead of just dismissing it. She never makes me feel like i’m incompent even though my answers were wrong, instead I feel more encouraged to try again with her guidance.”

–Math 109 (Mathematical Reasoning); Summer Session 2 2016; UCSD

“Kayla is by far the best TA I have ever had and is probably the best TA I will ever have. She is really good at explaining concepts, and is sometimes better at teaching things than the professor. She is very accessible and cares about us actually learning and understanding things. I strongly recommend her; my suitemate who is in this class doesn’t have Kayla as her TA, but comes to Kayla’s discussion with me instead of going to her own. Everyone I have talked to who has gone to her discussion really likes her. I cannot express enough how awesome Kayla is.”

–Math 20C (Calculus III and Analytic Geometry); Winter 2017; UCSD

“Kayla carried the entire class through calc 3.”

–Math 226 (Calculus III); Fall 2019; USC

“[The most valuable aspect of the course:]The TA sessions. I’d feel so behind if we didn’t have these opportunities to review and catch up on the current material.”

–Math 225 (Linear Algebra); Fall 2020; USC

“Learned to love math”

–Math 226 (Calculus III); Spring 2021; USC

“[The most valuable aspect of the course:]Lecture zooms, Kayla’s office hours, Asok’s notes, homework assignments”

–Math 510A (Graduate Algebra); Fall 2021; USC