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Teaching Philosophy: Social Constructivism in Mathematics

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Background Context

I am a second-year graduate student pursuing a Master of Science in Applied Mathematics and Statistics at a California State University. While I entered my graduate program with no prior formal teaching experience, my academic journey has been intentionally shaped by a strong commitment to developing as an educator. Throughout my graduate studies, I have actively participated in programs that allowed me to explore pedagogy, leadership, and learning in meaningful ways. I have been tutoring friends and family voluntarily for numerous years in the subjects of mathematics and science. Upon entering my graduate program, I worked for the Calculus Achievement for Success Program at a community college, where I managed student tutors as well as tutored students in the first-year calculus series. While completing my graduate degree, I also participated in a Teaching Academy and eventually became a peer mentor. My experiences while working there, as well as participating in an author community, played a crucial role in shaping my teaching philosophy. Since I have no formal teaching experience, I was able to learn and grow as a student and teacher within the author community. I met with aspiring teachers and experts that pushed me to think and develop a teaching philosophy that I can be proud of.

Values and Beliefs

At the core of my teaching philosophy is the belief that learners thrive in a safe environment, which allows me to empower students to continue learning even when it is difficult. In quantitative disciplines such as mathematics and statistics, many students enter the classroom with negative prior experiences, anxiety, and fear of failure, all of which act as barriers to their learning. Creating *psychological safety* is essential, as students must feel comfortable to take the intellectual risks necessary to engage deeply with challenging material. When students feel safe asking questions, sharing ideas, and making mistakes, learning becomes a collaborative and exploratory process rather than an individual, performance-driven one. I believe teachers can promote psychological safety by intentionally framing mistakes as valuable sources of information and growth, emphasizing that errors are opportunities to refine understanding. It is important for students to frame their mindset from being result orientated to process orientated. Creating a safe environment allows students to more freely develop their mathematical skills at their own pace leaving room for more support and reteaching opportunities as they are needed. Allowing students to safely make and share mistakes creates opportunities for the whole class to learn from their mistakes together. Even the students who feel that they mastered the material can benefit looking at the problems from different perspectives. Once the students are comfortable in their academic environment, then a new mindset of resilience and endurance can develop and carry them through their future academic and life experiences.

Also central to the core values of my teaching is creating *a supportive and inclusive learning community* because I believe that building a community of learners enables students to

feel safe. I vividly remember a time in elementary school when my teacher became interim vice principal. This new responsibility took her away from the classroom and she was replaced by a temporary hire. With this unexpected change, there was a diminished sense of community and support among students which hindered learning. Within a supportive learning community, students are encouraged to learn from one another, even if they do not learn at the same pace or in the same manner. I believe that students thrive when learning is a shared responsibility and students are active contributors and become knowledge constructors rather than passive recipients of information. Building a community of learners creates opportunities for students to want to engage with the material that is presented as opposed to students left on their own to figure out math with just their textbook as their resource. Allowing space for students to learn with and from each other is vital so students see the material presented from different perspectives. When students collaborate on assignments not all students reach the final answer the same way. For instance, when solving integrals, some students can easily identify patterns that others cannot. Students within this type of supportive community are likely to develop important life skills such as learning to work with students with different ability levels and sharing the wealth of everyone's experiences. A learning community can help students feel supported while becoming academically proficient.

Finally, encouraging students to become metacognitively aware of their learning abilities so they become confident and self-regulated learners is a core value of my teaching philosophy. I strive for all my students to achieve self-regulation in a mathematics classroom, so that they can carry over that *confidence* to any facet of their lives. I believe providing opportunities for students to reflect on their learning processes and discover their learning strengths helps them become more confident, self-regulated, and autonomous learners. I truly believe that half the battle of an academic journey is for a student to know their own learning strengths. For instance, once I knew my own strengths as a visual, auditory and kinesthetic learner, I was able to develop a plan for how to study that was transferrable to any subject, which helped me tremendously in my academic career. As students become cognizant of their own learning strengths, they become more effective. This in turn adds to their confidence and motivates them to continue their academic journeys successfully, when the work becomes increasingly challenging. Beyond benefitting personal learning, knowing learning strengths allows students to adapt to variations of multiple professors' teaching styles. For example, if direct instruction such as lecture is challenging for students, they can apply strategies such as graphic organizers, music, or gestures to better understand and remember essential concepts.

Theory

My teaching philosophy is grounded in social constructivism, a learning theory that emphasizes the social nature of knowledge construction and asserts that learners actively construct understanding through interaction, dialogue, and collaboration, connecting new ideas to prior knowledge (Vygotsky, 1978). By valuing safe, supportive, and inclusive communities where students learn to become self-regulated, I create a classroom where diverse perspectives are recognized as essential contributions to the learning process. Social constructivism addresses both cognitive and social dimensions of learning: students internalize knowledge by connecting it to what they already know while simultaneously negotiating meaning through interaction with peers and instructors. Co-constructed understanding contrasts with many college lectures, where the instructor conducts a lesson and then leaves the students to work independently with no

support from their peers nor assistance from the instructor on math assignments. This type of lecture method allows for students to easily get lost and confused which can lead to disengagement and frustration.

Additionally, social constructivism supports equitable and inclusive pedagogy by encouraging all students to participate and contribute, rather than working independently and being afraid they are not doing the problems correctly. Creating a safe, supportive and inclusive environment where every student's perspective is valued and respected allows students to become more vulnerable, participate wholeheartedly, and embrace mistakes as learning opportunities. Furthermore, I view my role as an educator, not as the sole authority over the subject matter, but as a facilitator and co-learner. I recognize I could still learn a certain pattern that students see in integral solving or derivatives that I might not see. Students often provide fresh perspectives to a subject that can allow me to view and teach the topic in different ways in the future. For instance, guiding students through new and complex concepts with relatable material, such as including students' prior knowledge, can help students to take ownership over their learning. Furthermore, it can foster a classroom culture where collaboration, reflection, and dialogue drive academic growth and personal development.

Methods

Scaffolding is a critical component of my instructional approach. Scaffolding includes providing guided examples, structured practice, and timely feedback to support students' learning at each stage. An important aspect of scaffolding is the gradual release of responsibility, where instructional support is intentionally reduced as students gain confidence and competence. This progression from guided instruction to independent problem-solving helps students develop autonomy while maintaining a sense of support throughout the learning process (DiNapoli & Miller, 2022). Within mathematics, scaffolding is essential when presenting complex concepts. For example, when students are beginning to learn derivatives, I would first begin with a review of algebraic functions to probe their prior knowledge. Once I am aware of what students know and do not know, using visual aids such as graphs will assist me in explaining the slope of tangent lines and which rates of change are derivatives. I can facilitate learning for students who need more support by walking them step by step through a derivative problem using the power rule, then gradually by giving them problems with less guidance such as in fill in the blanks. Eventually I will lead students to solve problems independently, with no guidance.

Collaborative learning is also central to my teaching practice. I strongly believe that students learn effectively by learning from one another, as peer interactions promote active engagement and deeper understanding (Hooper, 1992). I plan to intentionally design group activities that encourage discussion, explanation, and shared problem-solving. I will encourage students to follow the "see one, do one, teach one" approach, since explaining and modeling math concepts and problems are powerful ways to demonstrate and support mastery. This approach ensures that students actively construct and share knowledge while building confidence in a supportive community. The approach further promotes academic and social skill development, as students begin to feel they belong in their classroom and gain comfort working in small groups.

As a multimodal learner with visual, auditory and kinesthetic strengths, I recognize the importance of reaching students through multiple modes of instruction. I plan to incorporate visual, auditory, and kinesthetic elements in my lessons so that students have a variety of entry

points to acquire understanding of the material being presented in class. By offering various ways for students to access content and demonstrate understanding, I aim to reduce barriers to learning and support a wide range of learners. To enact these principles in practice, I frequently use Moses' five-step framework (Moses & Cobb, 2001), as a pedagogical guide to create lessons to help students learn effectively. I plan to begin lessons with an engaging activity that invites all students to participate, such as a discussion prompt, a real-world scenario, or a hands-on task. This beginning activity invites students to engage in experiential learning that incorporate multimodal learning. Allowing students to use all their senses is more likely to create a long-lasting impact that will help students understand and remember concepts more clearly and for a longer time. For example, when I teach the concept volume of objects, I would slice a loaf of bread to demonstrate what a cross-section is. Students can visually see and feel the concept of adding up each slice to approximate the volume. Many students can relate to a loaf a bread as it is a common food staple in many households. This analogy can also lead to further discussion of various shapes of bread based on different cultures, which could be used as other examples of how to find the volumes of different shapes.

Encouraging metacognitive awareness is another planned component of my teaching, as it empowers students to take ownership of their learning and equips them with skills that extend beyond a single course. Metacognitive skills enable students to navigate different teaching styles, advocate for themselves, and approach future learning experiences with confidence and adaptability. As noted above, I plan to encourage students to examine how they learn best, evaluate their strategies, and adjust when necessary. For example, I would demonstrate how students can properly evaluate their midterm exam results by going step by step through each problem even if they earned all the points. After demonstrating one problem, I would allow the students to work on the next problems, leaving the rest of the exam review time for the student to continue correcting their work, and encourage them to evaluate if this method helped them. Gradually, over time, students in my class can understand their learning strengths and apply them to all their courses. I believe the mathematical and metacognitive knowledge they gain will foster confidence as they continue their academic journeys (Kusaka & Claude Habimana, 2025).

Conclusion

My teaching philosophy as described above is grounded in the belief that learners flourish in a safe, supportive, and inclusive environment where they feel empowered to take intellectual risks, build knowledge collaboratively, and become confident. By embracing social constructivist principles and employing scaffolding strategies, I strive to create meaningful connections between students' prior experiences and new mathematical concepts, fostering both deep understanding and confidence. Through collaborative learning, multimodal instruction, and the implementation of self-reflection, I aim to meet diverse learner needs while nurturing confidence and metacognitive awareness. I view my role as an educator as a facilitator and co-learner rather than as the sole authority over the subject matter. I strive to model curiosity, openness, and reflection, demonstrating that learning is an ongoing and collaborative process. By positioning myself alongside students in the learning journey, I aim to create an academic culture that values a shared responsibility for learning. As I continue my journey as an educator, I am committed to evolving my practice with empathy, adaptability, and a passion for mentorship, so that I may positively impact students' academic, personal, and professional development.

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Reflection

The process of thinking about and writing my teaching philosophy resulted in my professional growth, as I was unsure of which learning theory I should select initially. However, through this entire process, I quickly realized that my methods aligned best with social constructivism. Allowing myself space to explore the why and how of my teaching philosophy challenged me to look more deeply into myself as an educator. This process has renewed my confidence in my ability to properly express and explain the true desires I have for my future students. I have written my teaching philosophy through the lens of my own experiences with the hope of becoming the educator every student wishes to have.

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