Early Career


Amy Shell-Gellasch

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Pursuing a Career in Mathematics Education

Nicole Louie

I’d like to tell you about how I got into math education and share some thoughts for people who are interested in this field, but first, I’ll say a little bit about my current interests. My research is concerned with what it would take for learning math in school to be a vehicle for developing deeply humanizing relationships with ourselves and others. Often, school math does the opposite. It sets arbitrary standards, creates dehumanizing hierarchies based on how well we conform to those standards, and teaches us to know our own and others’ places in the rankings. It did that for me as a student, and it did that for many of my students when I was a teacher. The thing is, I know very few teachers who want that. I certainly didn’t. So one of the big questions my research addresses is, why is it so hard for math teachers to conform to those standards, and teaches us to know our own and others’ places in the rankings. It did that for me—creativity, debate, collaboration, and connection to the top—especially as a girl who had outscored all the boys. But even then, I didn’t see math as something that would play a big role in my future. As an undergrad, I avoided the math department. I took one class on multivariable calculus and linear algebra, and then I was done. The material wasn’t too difficult, but mathematics just didn’t seem like a place where people valued the things that mattered to me—creativity, debate, collaboration, and connection to social issues in the world we live in.

There were gendered and also racialized elements in how I saw math as something that wasn’t for me. I never thought, “Oh, I can’t be good at math because I’m a girl.” But the culture of the mathematics department at Stanford was not a welcoming one for most people, I would say, and I think it was accentuated for women. In terms of race, I grew up around a lot of Asian Americans, especially Chinese Americans, which is how I identify. But when I got to college, I had this new experience of being a “minority.” I became aware of the “Asians are good at math” stereotype in a new way, and I tried to distance myself from it. I think I was lucky to be successful enough to make that choice. As a researcher, I’ve seen multiple examples of Asian and Asian American kids’ struggles in math class just being ignored; teachers seem to assume that Asian kids are always doing fine, academically and personally. There’s been some really cool scholarship in recent years investigating how the idea that “Asians are good at math” is harmful, like Niral Shah’s work showing how it dehumanizes Asian Americans while also positioning Black, Latinx, and Indigenous people as a society make available to Black, Latinx, Indigenous, and Asian American students. I’m also beginning to investigate what it could be like for these students and their families to be centered as researchers and designers of mathematics education, versus having all of the decisions made by professionals who do have relevant expertise and skill but are often disconnected from communities of color.

My path to my current work was a winding one. I grew up in San Francisco, California, and I attended public schools from kindergarten to twelfth grade. Up until high school, math was just kind of there. I don’t remember any experiences with it that sparked curiosity or passion in me, the way reading did. High school was different. I was in honors classes at an academic magnet school, and the math classes I had in ninth and tenth grade were extremely frustrating. The explanations teachers offered were confusing and perfunctory. I had no sense that my teachers cared about me, my classmates, or our learning. I think I spent an entire year writing two-column proofs related to triangle congruence. Eleventh and twelfth grade were better in terms of quality of instruction and my feelings about math. My calculus teacher would write the grade distribution on the chalkboard after every test, and I’m not saying that’s a good practice because I really don’t think it is, but I remember feeling so proud one time when I was alone at the top—especially as a girl who had outscored all the boys. But even then, I didn’t see math as something that would play a big role in my future. As an undergrad, I avoided the math department. I took one class on multivariable calculus and linear algebra, and then I was done. The material wasn’t too difficult, but mathematics just didn’t seem like a place where people valued the things that mattered to me—creativity, debate, collaboration, and connection to social issues in the world we live in.

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“bad at math.” I’m hopeful that that work can support interracial solidarity in transforming mathematics education.

My professional journey into mathematics education started when I was in college. A friend of mine invited me to join her as a teaching intern in a summer program for middle school kids from low-income families in San Francisco. The program director asked me if I could teach math, and I thought, “Sure, middle school math, I can do that.” The teachers and students I had the privilege to work with were incredibly energetic, insightful, creative, and caring. But they didn’t always know it. One day, I was working with a girl who couldn’t remember how to do long division, and it suddenly struck me that school had taught her that she was stupid, because she struggled with things like that. I decided to become a math teacher because I wanted kids to have schooling experiences that better respected their dignity as human beings, especially kids from racially and economically marginalized communities.

I was extremely fortunate to get to do a significant chunk of my undergrad as well as my master’s in the Stanford School of Education. I learned there that math could be so much more exciting than it was for me in my schooling up to that point. I guess you could say that I’ve been trying to learn how to make all kids’ experiences of school mathematics joyful, empowering, and equitable ever since. Of course, the word “equity” means very different things to different people, and it can become a buzzword that doesn’t really mean anything at all. In browsing recent AMS Notices, I saw several perspectives on equity that resonated with me, including racially proportional representation among math majors and STEM professionals; environments where people from historically marginalized communities feel a sense of belonging;14 and re-definitions of mathematics drawing on culturally responsive and Afrocentric15 perspectives, challenging the domination of Eurocentric perspectives on mathematics.

One thing I would add is that for me, equity in mathematics education is also about people learning to relate to one another as equal members of a community, whose pasts, presents, and futures are deeply intertwined. Learning mathematics can be an opportunity to appreciate others’ perspectives, and to see yourself as an active and valuable contributor to a learning community that intentionally and deliberately embraces diverse ways of thinking, knowing, communicating, and being, and actively rejects oppressive and dehumanizing systems in mathematics education and beyond.

To anyone interested in a career in math education, I would ask you to actively seek out challenges to your assumptions about what learning math can look, sound, and feel like. Find opportunities to listen to kids being creative with math and solving real problems—not just working through pages of exercises for which they’ve already been taught an algorithm. If they get stuck, resist the urge to show them the way out; just try to understand what it is they’re thinking. Talk to people around you about their best and worst memories of learning math, in school and out. And read. For example, right now, I’m reading Mathematics for Human Flourishing, by Francis Su with Christopher Jackson. I think all these things are especially important if you’ve been successful with mathematics and tend to assume that what worked for you should work for everyone else. Teachers and researchers in math education have the power to perpetuate narrow, exclusive, and stereotypical ideas about what it takes to be good at math. We also have the power and the responsibility to redefine math in ways that open space for all students to belong, especially those students who have been excluded because of the intersections of their race, gender, language, class, and dis/ability status, or because how they think just doesn’t fit into that small box of being fast and getting the right answer that our society has recognized as mathematically smart.

The second thing I would suggest is that you think hard about what the purpose of a career in mathematics education is for you, and find other people who share that purpose—particularly if you take up the responsibility I just laid out. Pushing against the grain is hard work, and it’s easy to burn out. But when you have a strong community around you—holding you up, pushing you, affirming you, challenging you, and just letting you know you’re not alone—that makes all the difference.

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Photo of Nicole Louie is by Dante Nash.