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Teaching for Excellence and Equity in Mathematics

Special Issue on Antiracism in Mathematics Education, Part 1

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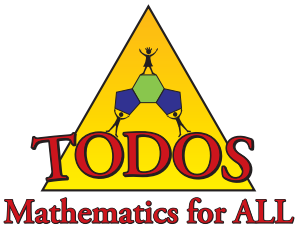

Special Issue on Antiracism in Mathematics Education, Part 1

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TEACHING FOR EXCELLENCE AND EQUITY IN MATHEMATICS

IN THIS ISSUE

From the Editors of TEEM Special Issue Antiracism in Mathematics Education, Part 1

We write this introduction as another wave of grief and injustice rolls through the United States. More losses of young Black lives at the hands of police, a series of unpopular Supreme Court decisions that will, as usual, disproportionately affect Black and Brown communities, loss of lives of young children, not to mention the organized curtailing of teachers' freedom in the classroom. Despite or because of all this, we believe that the time is right to talk about antiracism in mathematics education.

The call for this special issue focused on antiracism in action. We built off of the TODOS (2020) position statement, *The Mo(ve)ment to Prioritize Antiracism in Mathematics*, to ask for manuscripts sharing stories about what people in the field are grappling with in relation to themes from the position statement – what new learning is happening around antiracism in mathematics, and what may continue to be in tension or even in conflict. As we grappled with how paternalism, a characteristic of white supremacy culture (Okun & Jones, 2000; Okun, 2010), might emerge even in a volume devoted to antiracism, we made a decision to encourage submissions where authors continued to grapple with a topic even as they may have found some new footing in the terrain of mathematics education.

We take the view that all peer-reviewed processes are constrained by the call and the reviewers. Does this volume, the first of two for the special issue, represent the state of the field? No. What it represents is a variety of perspectives of what mathematics educators consider to be the work of antiracism in mathematics education, and that align to the view that TODOS (2020) takes on both the need for the responsibility to transform racist systems and structures in mathematics education, and the need to hear from a variety of stakeholders. The special issue has two parts. Each part has the same intention and organization, offering an assortment of reflective and research-based pieces from positionalities across K-12 classrooms and school districts, higher education and teacher education, and families and communities. In this way, we hope that everyone finds something to read and respond to in both volumes.

Why antiracism?

The change in language represents a shift from the more moderate notion of "equity" towards explicitly acknowledging and dealing with the racism that shapes every aspect of education, including the erasure of communities of color from the history of mathematics and the unearned privilege mathematics holds within a system that ranks the value of particular content areas.

As a field, we have tinkered with equity for a long time in mathematics education, and perhaps it is from these deep dives, when we have been left unsatisfied, that we realize a stronger stance is needed. And so we have moved toward social justice (TODOS/NCSM, 2016; see also Lesser, 2009 for more about how TODOS has grappled with the relationship between equity and social justice), but how is social justice perhaps similar to but distinct from antiracism, or shall we as a field utilize these terms interchangeably? Is there social justice within racist systems and structures, and if so for whom? For us

and for the articles in this special issue, a commonality is that an antiracist stance names the racism at the heart of the inequities. It names the elephant in the room that leads to a general questioning of what we do in the classroom, in the district decision making space, in the realm of teacher education, and how we interact with families and communities we purport to serve.

What do the articles presented here help us understand?

Perhaps similarly to equity, not everyone agrees on a single definition for antiracism. That is clear even from the manuscripts presented here. But also like equity, people are situated differently in relation to the very notion. Racism in a white body, racism in a Black body, racism in a Middle Eastern body, or a Latinx body - these are not experienced the same. And so the logics(note the deliberate use of the plural to question the singular logic that mathematics tends toward) that inform action towards antiracism are not the same. At the same time, the collection focuses on the particulars of racism experienced in the United States of America context. Mills (1997) argued in *The Racial Contract* that racism is contextualized, informed by the place and space in which it occurs. Perhaps a better title for the special issue would be Antiracism in Mathematics Education *in the US Context.* It is in the particulars of the US experience, the racial stereotypes and racist beliefs and actions that permeate our landscape, that we can understand what *anti*racism can be within the same context. This does not discount an understanding of the global landscape, and how that contributes to an understanding of the particulars of US racism, but rather we start from the immediate context of the pernicious brands of American racism.

The collection of manuscripts presented in these two volumes come from people who speak from their experiential logic, constructing narratives that are both reflective of their own situations and potentially instructive for future ones (Ochs & Capps, 2001). You may be very excited to read a piece that resonates with you. You may react viscerally and negatively to another. The goal of the volume is to provide springboards into your own reflection and action, not to be a how-to manual. To that end, you may also notice a variety of genres in the articles such as memoir and reflection, self-study, classroom-based research, program analysis, etc. You may also notice that a number of manuscripts in both issues are collaborations across settings, job types, and lived experiences, reminding us that antiracist work needs community instead of isolation. We hope that this issue provides a sense of community for our readers.

Okun and Jones (2000) describe white supremacist culture as having many features that were traditionally valued by colonizing powers, the eurocentrists who imposed their hierarchies of order, wealth accumulation, and power hoarding. Many of the works in this special issue draw on Okun and Jones' ideas. We found ourselves also considering the ways that white supremacist culture shows up in the publication process. While a whole volume could be devoted to this question itself, at the very least we found that there was a process unfolding as we grappled with what it means to be an antiracist editor and reviewer and questioned ourselves about the process, particularly who has access to publishing in journals and what barriers exist. Some ways in which we attempted to respond to white supremacist culture in our own editing process was to work closely with authors, treat deadlines as flexible, and create a flexible process for reviewers to voluntarily work directly with authors after a first round of decisions and revisions. Some may say such actions undermine the integrity of the peer review process; however, we argue they do not. In our view, they helped humanize the process and helped papers reach their full voice/potential.

One note about style across the whole volume: readers may notice that conventions such as what to capitalize and how communities are named were not standardized across the articles. This is intentional. We thought it useful in an issue about antiracism to give authors space to use language in ways that felt fitting to their contexts and positionalities. In particular, even though the current version of APA style guide requires that all races and ethnicities be capitalized, many of our authors chose not to capitalize white. They may have different reasons for doing so, though a common reason stated is that white people have less shared history and, perhaps more importantly, whiteness is already given too much importance in U.S. society.

Overview of Articles

In " 'Ask the Asian! He Knows!': Dismantling the Model-Minority Stereotype in Mathematics," author Nabb retells personal experiences as a student and teacher confronting the model minority myth. He reflects on these experiences through his understanding of what makes this myth damaging for all students, and how it is the responsibility of mathematics teachers even at the college level to dismantle this stereotype through both direct action and everyday attention to racialized dynamics in the classroom.

In "Express Yourself: Using Self-Expression in Forms of Poetry, Storytelling, and Illustrations to Share What Antiracist and Antibias Education Look, Sound, and Feel Like," author Ramsay-Jordan engaged in critical reflection with her family on what antiracism in mathematics means to one Black family. Her article is personal and poignant, making space for Black

youth and their parents to be centered in a conversation about antiracism in mathematics education. Though Ramsay-Jordan is also a mathematics educator at the university level, this article centers on her identity as a mother and a family member of a Black family expressing what they want and need from our mathematics education system.

In "Mathematizing Representation in Children's Libraries: An Antiracist Math Unit in Elementary Grades," authors Tate, Proffitt, Christensen, Hunter, Stratton, Fleshman, Aguirre, and Suh, educators across different contexts and settings, tell the story of planning, implementing, and reflecting on an elementary antiracist unit focused on mathematizing racial representation in school libraries. The unit contained rich mathematical content, and provided multiple opportunities for students and teachers to engage in conversations about race and to advocate for more diverse classroom libraries.

In "Antiracism Must be an Everyday Practice," Garcia and Warburton recount how Garcia, a secondary mathematics teacher, responded to the challenges of the pandemic, which exacerbated racial inequities, to prioritize equity and antiracism in all her work with her students. The article provides multiple examples of the everyday practices Garcia engages in to support her students and disrupt the racialized outcomes prevalent in schools.

"Grappling with the Messiness of Becoming Antiracist Educators through Learning our Historias" by Scott, Zuniga-Ruiz, Martinez Gomez, and Phan, uses vignettes from two research projects to describe how the authors, two teachers and two researchers, center historias in mathematics to affirm individual experiences and create opportunities to disrupt white supremacy in math education. Each vignette includes researcher and teacher voice.

And finally, in "How Four White MTEs Attempted to Acknowledge, Act, and Hold Ourselves Accountable for Incorporating Antiracism into Graduate Courses for Teachers," authors Anderson, Weiland, Males and Quaisley grapple with their roles as white mathematics teacher educators in predominantly white institutions. Drawing on Jones and Okun's (2001) definition of white supremacy and descriptions of white supremacy culture, they share what their collective work has been like, of supporting each other and confronting their own classroom practices to transform the mathematics education space for current and future teachers to model and embrace antiracist perspectives and actions.

It was a pleasure to work with the authors in this issue. We are especially grateful to the reviewers, who brought their expertise, compassion, and lived experiences to the reviews and helped the authors strengthen their arguments and sharpen their vision.

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Lesser, L. (2009). Equity, Social Justice, and the Mission of TODOS: Connections and Motivations. *Teaching for Excellence and Equity in Mathematics (TEEM) 1*(1), 22-26.

Mills, C. W. (1997). *The Racial Contract.* Cornell University Press.

NCSM & TODOS. (2020). *Mathematics education through the lens of social justice: Acknowledgment, actions, and accountability.* https://bit.ly/3JgR1Wm

Ochs, E. & Capps, S. (2001). *Living Narrative: Creating Lives in Everyday Storytelling.* Harvard University Press.

Okun, T. (2010). *The Emperor Has No Clothes: Teaching about Race and Racism to People who Don't Want to Know.* Information Age Publishing.

Okun, T. & Jones, K. (2000). *Dismantling racism: A workbook for social change groups.* dRworks. https://www.whitesupremacyculture.info/

TODOS: Mathematics for All. (2020). *The mo(ve)ment to prioritize antiracist mathematics: Planning for this and every school year*. Author. https://bit.ly/3j5Yvip

“Ask the Asian! He Knows!”: Dismantling the Model-Minority Stereotype in Mathematics

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Abstract

Two firsthand experiences with the stereotype “All Asians are good at math” are shared—one as an undergraduate mathematics student and another as a teacher of mathematics. Although the two episodes are separated by nearly twenty years, the experiences are remarkably similar. The article discusses the origins of the stereotype, as well as how it racializes the subject of mathematics and burdens members of the Asian American community. Through narrative storytelling, advice is offered on how to confront and defuse racial prejudice in mathematical settings.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. How would you reply if someone asked you, “What does race have to do with mathematics teaching?”?

2. Think of a time when the stereotype “All Asians are good at math” or a similar generalization emerged in a classroom situation. How did it make you feel?

3. How do you want to support students of mathematics who may be subject to unfair societal assumptions and racial stereotypes?

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"Ask the Asian! He Knows!": Dismantling the Model-Minority Stereotype in Mathematics

Keith Nabb

Background

My mother is Japanese. This hardly makes me an expert on what it means to be Asian American but it does make for some experiences I had to grapple with as I grew up in a predominantly White community. Some people could tell I was Asian; some could not. Others could tell I was *something*. What follows is a reflection on how I have experienced and navigated the model minority myth surrounding Asian students in mathematics, from my own experiences as a student and also as a teacher of mathematics, from my emerging awareness of the stereotype to my continued learning of how to dismantle it. The names in these stories have been changed.

Two Stories, One Theme

When I was taking a probability course as an undergraduate, the professor asked the class the question, "Is this random variable discrete or continuous?" Silence. No one knew the answer. Some students were jarred awake by the professor's attempt at "engagement." A classmate I barely knew leaned in my direction and said the following, loud enough for about 10 classmates to hear: "C'mon, Keith. You know the answer, don't you? Use your ninja math to help us." Right there, in that moment, I had flashbacks to late middle school and early high school—Chinese restaurant takeout containers mysteriously left at my locker, students asking if I liked "flied lice" and the racist caricature, "Don't mess with Nabb—he knows karate." I snapped out of it and just answered the question: "It's definitely continuous." The professor heard neither my classmate's slight nor my reply. The professor was hard of hearing, always blaming the hum of the heater in the room (even on the days it wasn't running). And that was that.

As far back as I remember, I always sensed people thought I was good at math. In my formative years, I had no idea why. Many years passed before I would experience something similar to what happened that day in probability class. This time, I was standing at the other side of the room as the teacher. We were in the middle of a challenging problem in second-semester college-level calculus. We were calculating an arc length, simplifying the problem a bit, eventually collapsing the problem to some variation of $\int \sqrt{x^2+1}\,dx$ (which those readers familiar with calculus will recognize is the integral of the square root of the quantity x squared plus 1). I said something to the effect of, "Oh wonderful. Now what?" The most vocal student in the class partially stood up, grinning from ear to ear, and gestured repeatedly to the classmate to his left: "Ask the Asian! He knows!" It was said to invoke humor. Everyone in the room heard it. Some students laughed outright. Others covered their mouths in horror. Some silently shook their heads in disbelief. A student to my right lost part of her drink in my direction. She mouthed the words *I'm sorry*. For me, the air in the room suddenly grew thin. I simply said, "Tom, can you sit down?" Unfortunately, I was not prepared for this moment. I saw the pain in Jae's eyes. And I felt the weight of this dreadful familiarity. I needed time to process what had just happened. Even if some students found this humorous and others found it sad, I believe everyone knew it was wrong.

Tom is a white person who grew up within driving distance to the college. Jae was born in South Korea and had completed much of his early education there. To my knowledge, Tom and Jae were casual classroom acquaintances, exchanging words here and there and sometimes working as part of a larger team on group assignments. They never struck me as particularly close. This makes the episode all the more surprising—that such a prejudiced remark could be directed toward someone Tom did not know well. Similar to my experience as a student, I barely knew the person who asked me to answer the professor's question.

Sometimes I talk to colleagues about antiracist mathematics teaching and ask: What would it look like? Occasionally, a friend or colleague will ask me, "What does racism have to do with mathematics teaching?" Sometimes this question is heartfelt but other times it is presented as an intellectual challenge (e.g., *I dare you to give me an example*). My answer is always the same. We don't teach mathematics in isolation from the outside world. The everyday injustices "out there" can, and often

do, infiltrate our classrooms. It is fair to answer their question with this question: "What would you do with either of the above classroom situations?"

The "Asians Are Good at Math" Stereotype

Believing that individuals of Asian lineage are inherently skilled at math has roots in the model minority perception (Petersen, 1966), which, in the mid-twentieth century, applied mostly to Chinese Americans and Japanese Americans. Not only is there no data to support "All Asians are good at math," it is dehumanizing and racist (Chang & Au, 2008; Shah, 2019, 2020). The belief and ongoing perpetuation of this myth is harmful in the following ways (and this list is not exhaustive):

1. *It creates a racial hierarchy of who can do math* (Martin, 2009). "All Asians are good at math" is grounded in the stereotype that Asians are quiet, obedient, respectful, and hard-working. Scholars point to other reasons why immigrants (e.g., my mother) succeed—for example, *migrant advantage* (Kendi, 2019) or *relative functionalism* (Sue & Okazaki, 1990, as cited in Martin, 2009). Both are fundamentally anchored in resilience and adaptation, not race. The truth is, if Asian math achievement is due to some racial asset, the relational implication is clear for members of the African American, Latinx, and Indigeneous communities (Cvencek, Nasir, O'Connor, Wischnia, & Meltzoff, 2015; Martin, 2009). By saying "Asians are good at math" we devalue individuals by perpetuating the underperforming narrative of racial inferiority (Zavala & Hand, 2019).

2. *It paints the diversity of "Asian" into a monolith* (Chang & Au, 2008). The continent of Asia consists of over 50 countries. Asia contains half of the world's population. It is puzzling how one can assume "All Asians are good at math" when success in schools is an enormously complex metric to measure. Income, class, and parental educational attainment are just three driving factors. In addition to natural variance in achievement patterns, future success is tied to the historical, economic, social, legal, and political challenges one has had to overcome. Martin (2009) thoughtfully asked in our preoccupation with achievement why we focus so much attention on the "Black-White" gaps in mathematics but simultaneously ignore the White-Korean American gap or the White-Japanese American gap, among others.

3. *The myth places an unfair burden on Asian students to perform well in mathematics*. This unrealistic expectation causes depersonalization, emotional harm, and enormous pressure, all because of a societal assumption (Shah, 2019). My experiences with some of my former students from South Korea, Japan, China, Vietnam, and Hong Kong have been remarkably unique, almost equal parts "Let me help you with your question" and "You know, it's okay not to be great at math." One role I've relished as a math educator is helping students realize they can be "doers" of mathematics. In this situation, I find myself in an entirely different position, gently convincing my students it is normal not to score 100% on every mathematics encounter. Witnessing what Martin (2009) calls the "racialized nature of students' mathematical experiences" (p. 315) is painful, whether on the top rung or the bottom rung. Positive stereotypes can cause widespread damage.

4. *It opens the door to ethnic racism*. Despite the monolithic portrayal above, "All Asians are good at math" is almost always in reference to East Asia (e.g., Japan, China, Taiwan) and dismissive of Southeast Asia (e.g., Cambodia, Laos, Vietnam)[1]. This is a form of ethnic racism in that "we express a racist idea about an ethnic group" (Kendi, 2019, p. 63). Kendi's examples come from a different time and place but they are no less instructive—early American settlers making distinctions between "civilized" tribes and "wild" tribes and slave traders ranking their slaves by origin—e.g., Gold Coast slaves had the greatest value while Angolans were "lazy." (Kendi, 2019). Years ago, I witnessed a brief exchange between two students in the math tutoring center:

> **Student**: You look like you're good at math. Can you help me?
> **Tutor**: Uh, I guess.
> **Student**: Where are you from?
> **Tutor**: I grew up in Thailand.
> **Student**: Oh. [long pause] *Are you* good at math?

There is a piercing irony in the generalization "Asians are good at math" when what is really meant is "some Asians

[1] Singapore is a noteworthy exception.

are good at math." But to be clear, the whole stereotype is problematic.

Resolution

To return to the situation at hand, I will tell you what I did. At the end of class, I asked Tom if we could talk. Fortunately, he was free. I told him I wanted to share my perspective with him and that this was difficult for me to do. I told him I wanted him to listen and that I was trusting him by offering this advice. I shared with him why his remark was a form of racial prejudice and why it was hurtful to Jae. Tom immediately shot back with how it couldn't possibly be racist—how could it be when he was saying Jae was *good* at math? Tom added that he was simply joking with Jae and that they occasionally did this. He then offered how crazy our world is: "You know, I'm not going to be able to get a job because I'm white." I listened attentively, nodding as he told me the world was "stupid" and "full of snowflakes." He was the victim.

After affirming his feelings, I shared some of my own experiences. I told him I used to believe the false stereotype "All Asians are good at math" and that I likely benefitted from its application. He was shocked. Once he was invested in the conversation, we made some progress. I told him what I believe: we are socialized into a racist culture, and this episode wasn't about him or Jae as individuals but part of a much larger problem. I asked him if he would have said something similar were it not Jae but perhaps some other person of Asian descent. He just bit his bottom lip. I tried to make this less about Tom—to explain that we all have a racist worldview. Our conversation de-escalated quickly after this. In the course of about 10 minutes, Tom went from angry and defensive to reflective and guilt-stricken. Tom told me he still had some thinking to do and that he was sorry for what had happened. I told him I appreciated this but that he should probably apologize to Jae directly.

I emailed Jae that evening and asked him if he wanted to talk. He did and we spoke the next day. To my surprise, Tom had already told Jae he was sorry (they were in another class together). Jae told me he was used to things like this. "I always feel pressure to perform well in math. But this is a difficult subject for me. I never want to ask for help because that's not what we're supposed to do." He said this was the first time a teacher had ever acknowledged this stereotype. "Sometimes people ask me to tutor them in math and I say, 'I can't help you.'" We shared a laugh. I shared with Jae my experience as an undergraduate. He told me he was "surprised but not so surprised" to hear about this.

Before the next class meeting, I was feeling much better about the recent discussions with Tom and Jae. Admittedly, I was relieved these events were in the past. At the start of our next meeting, completely unexpected and unscripted, Tom stood up from his seat. It was clear to me he was about to say something important. I thought I was going to have a heart attack. He announced that he was sorry for what had happened—that he said something ignorant and racist. He apologized to the class, to me, and to Jae. I could not believe what I was experiencing. Tom was very nervous but he was authentic. I could feel his sincerity. Jae closed his eyes and nodded. There were many silent nods from classmates. And that was that.

Then and Now

Sitting in that probability class as an undergraduate, I cocooned myself from racism. I knew my classmate's remark was racial prejudice but I convinced myself it was not harmful due to its positive connotation. I'm grateful to people like Shah (2019, 2020) who tell us why this is fallacious. Today, I see things a little differently. Being an antiracist educator means not being complacent and not being silent. It means going beyond simply seeing or contemplating an existing problem. The calculus teacher in me wanted to run the other way just as the probability student had 20 years earlier. But burying the problem doesn't make it go away. I saw myself in Jae and I had already heard this story. It was my responsibility to rewrite this story—or at least a chapter—to attempt to do the right thing, even if I should fail. Kendi (2019) uses two words to describe his experiences and demeanor in defending what you know is right—*respectful* and *measured*. Honor people's humanity, give them time and space, and listen deliberately. Had I not affirmed Tom's experiences (DiAngelo, 2018; Kernahan, 2019)—had I not listened to how he felt, I believe this story would have had a different ending.

At the same time, it is important we do not unintentionally elevate ourselves in this work—that we do not fall victim to our own racism and our own hypocrisy. Growing up as a member of a small white community, I was one of just two Japanese American

students (the other one was my brother). While I'll never really know what the community said or felt about me, I do know what was said about the one Black boy in our community. He was "really good at sports" but "lazy and not so bright" when it came to academics. I recall a parent saying, "He'll be on welfare, eventually a danger to society." I grew to believe these stereotypes. When we are surrounded with this rhetoric—when this is what we are taught by those we trust and love—it becomes part of our world view. As Tatum (1992) so eloquently reminds us, we cannot be blamed for what we were taught as children, but as adults we are responsible for interrupting cycles of racism and prejudice (p. 4). I have certainly learned from day-to-day experiences that provide the necessary counter-narratives. But I still have work to do and I still have blind spots. And I'm far from perfect. If I embrace these flaws as axiomatic, then I can move forward.

References

Chang, B. J., & Au, W. (2008). You're Asian, how could you fail math?: Unmasking the myth of the model minority. *Rethinking Schools*, *22*(2), 15-19. https://bit.ly/3NvtORF.

Cvencek, D., Nasir, N. I. S., O'Connor, K., Wischnia, S., & Meltzoff, A. N. (2015). The development of math–race stereotypes: "They say Chinese people are the best at math". *Journal of Research on Adolescence*, *25*(4), 630-637.

DiAngelo, R. (2018). *White fragility: Why it's so hard for White people to talk about racism*. Beacon Press.

Kendi, I. X. (2019). *How to be an antiracist*. One World.

Kernahan, C. (2019). *Teaching about race and racism in the college classroom*. West Virginia University Press.

Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record*, *111*(2), 295-338.

Petersen, W. (1966, January 9). Success story, Japanese-American style. *New York Times Magazine*, pp. 20-21, 33, 36, 38, 40-41, 43.

Shah, N. (2019). "Asians are good at math" is not a compliment: STEM success as a threat to personhood. *Harvard Educational Review*, *89*(4), 661-686.

Shah, N. (2020). *Asians are good at math? Why dressing up racism as a compliment just doesn't add up*. The Conversation. https://bit.ly/3aK4F7o.

Sue, S., & Okazaki, S. (1990). Asian-American educational experience. *American Psychologist*, *45*(8), 913-920.

Tatum, B. (1992). Talking about race, learning about racism: The application of racial identity development theory in the classroom. *Harvard Educational Review*, *62*(1), 1-25.

Zavala, M. D. R., & Hand, V. (2019). Conflicting narratives of success in mathematics and science education: challenging the achievement-motivation master narrative. *Race Ethnicity and Education*, *22*(6), 802-820.

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. In what ways can teachers support Asian American students who may not view mathematics as their favorite or strongest subject?

2. How can teachers identify and address classroom situations in which "All Asians are good at math" is assumed and propagated by others?

3. The article lists four ways in which the perpetuation of "All Asians are good at math" is harmful to both the Asian American community and to other communities. List and explain another way in which you believe this stereotype causes unintentional harm to individuals wishing to engage in the study of mathematics.

4. In what ways do you think this stereotype is passed on to others? What enables the myth to continue to be propagated in mainstream society?

Express Yourself: Using Self-Expression in Forms of Poetry, Storytelling, and Visual Arts to Share What Antiracist and Antibias Education Look, Sound, and Feel Like

Natasha Ramsay-Jordan
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Abstract

The impetus for this article is to share one family's understanding of what antiracist and antibiased education looks, sounds, and feels like. Through different forms of expression, including poetry, storytelling, and illustrations, this Black family's voice captures perspectives of students and parents, each being essential stakeholders to essential discussions about race and biases in education. The article is a personal and conversational piece where responses highlight each person's view of what antiracist education looks, sounds, and feels like across different levels of education. Afterward, concluding thoughts about what this work means for mathematics educators and researchers are shared.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What do you remember feeling or doing when you saw the video of George Floyd being killed?
2. Do you have children, friends, or students who had to have “The Talk” about what to do when encountering police?
3. Have you had the experience of turning a very negative experience into positive motivation to make important changes?
4. Have you found ways to draw from your family’s wisdom and experiences to inform your teaching?

Dr. Natasha Ramsay-Jordan (nrjordan@westga.edu) was born and raised in the Caribbean country of Guyana, South America, and is an associate professor of mathematics education in the Department of Early Childhood through Secondary Education (Grades P-12) at the University of West Georgia. She has several years of teaching experience in K-12 mathematics. Currently, she teaches mathematics methods and content courses, and education courses for undergraduate and graduate students in Early Childhood through Secondary Education. Dr. Ramsay-Jordan's teaching philosophy centers on love and logic, respect, critical empathy, great determination, and personal integrity. Her research interests include the intersection of educational policies and urban education with respect to diverse student learners, especially as these relate to teacher quality and professional development; issues of equity in education; STEM equity and development grades K-12; and the role of culture in mathematics education and development.

Express Yourself: Using Self-Expression in Forms of Poetry, Storytelling, and Illustrations to Share What Antiracist and Antibiased Education Look, Sound, and Feel Like

Natasha Ramsay-Jordan

Introduction

Racial matters remain a signature part of the American experience. Issues of race and racism, biases, and discrimination, including racial disparities, are all still ever-present. These matters are not aberrant to American life. In fact, they arguably took center stage, on May 25, 2020, when the world witnessed Derek Chauvin, a White police officer kneeling on the neck of George Floyd, a Black man, killing him. The actions of a White man kneeling on the neck of a Black man, extinguishing his life source, in many ways epitomized the racial experiences of Black people living in America. Furthermore, the centuries of killings of Black people at the hands of White people have become all too familiar, resulting in uprisings across the globe and, with this recent killing, reigniting global debates about race and racism. Many people of all races cried out for changes in what is currently an unfair race-based system. From the young to the old, Mr. Floyd's death prompted activism, a call to action, and conversations about working toward a more just and equitable society. For my family, the unconscionable murder of Mr. Floyd was heart-wrenching to watch. Everyone in my household felt hopeless. The anguish we felt was rooted in an awareness that Mr. Floyd's death was not the first of its kind and would unfortunately not be the last. As a Black family, the hurt was deep. We understood that what happened to George Floyd could have happened to any of the four Black males in our family. This awareness, of course, helps set the tone of our positionality and subjectivities for this article. Our subjectivities proliferate from our life experiences as Black Americans, as parents of Black children, as Black college students, as a Black high school student, as a Black woman educator, as a Black youth, as Black women, and as Black men in the United States.

As our family talked through the different feelings and emotions, we experienced from seeing Mr. Floyd's murder-- hurt, grief, and focused anger-- we found ourselves thinking about how education must play a key role in dismantling what we saw. As an educator, I thought clearly about the key differences that set Mr. Floyd and his killer apart but settled on one similarity: George Floyd and his killer both went through the U.S. education system. With this commonality in mind, I started to question how educators can make a difference in educating future generations of people to be racially civil and socially just human beings. I called on my family to help me design a course that would help prepare teachers in ways that engage them in thinking about activist teaching. It was my way of getting the family to collectively bring about change while working through our emotions. We worked together on a course description while watching memorial services for Mr. Floyd. I remember us pausing on the work for the course description and standing for the number of minutes and seconds the police officer pinned George's neck to the cement road. I remember sobbing uncontrollably with my children's arms around me and those on the phone telling me everything would be ok. I remembered my son, AmunRa's words piercing my soul when he captured part of my feelings and fear that this could have easily happened to any of the Black men in my life, my three sons, husband, brothers, friends, and loved ones. I remember each day like it was yesterday. Through the tears, we continued our work on designing the course to include objectives, assignments, readings, and discussions. It was essential to get the family's input because they mattered, their Black lives matter, and it would be necessary to discuss how to get it right in education. We came up with many different titles and eventually settled on "Teaching as Activism." The overarching design of the course was centered on the rationale that antiracist and antibias work in all schools is essential. Such teachings, we felt, would move educators to an active and committed role of examination of all aspects of schooling, not just in the classroom. So recently, when a colleague shared a link to the call for submissions for this *TEEM* special issue addressing antiracist and antibias practices in mathematics education,

I asked my children and husband to revisit 2020 and all their lived experiences within mathematics education and, for the purposes of this article, engage in a self-expression activity that would answer what antiracist and antibias education means to them.

As a mathematics education research scholar, I understand the inherent value of the role self-expression plays in combating traumatic racial experiences. Each person's self-expression about antiracist and antibias ideas, concepts, and practices, and the overall message of this work reminds us of the critical work ahead to reclaim our strength and change our perspectives about education. Three of my four children, Askia, Asaru, and Akenti, contributed to the content of the article, while one, AmunRa, assisted with editing and suggesting improvements for the final draft. Since this was to be completed as a family, my husband joined in to give a parental view. Together, their contributions help to bring a much-needed perspective to education, that of the Black family. Sharing our perspectives about antiracist and antibias educational practices is an important part of our learning journey and reminds us that self-expression is profoundly powerful and political. Through self-expression, we often discover that even in our unique experiences, there is a commonality in the voices of historically marginalized populations. As one tenet of critical race theory describes it, the unique voices of People of Color reflect their histories and experiences with oppression (Delgado & Stefancic, 2001). Antiracist and antibias education calls for an end to oppressive learning. Our uniqueness in expressing what that type of education looks, sounds, and feels like is a start to knowing and understanding what is required. So, it is within the ideology of unique voices of people of color that this article of shared experiences from a Black family articulate self-expressions of personal dispositions as productive points about the educational spectrum. We invite readers of this article to reflect on their perspectives about antiracist and antibias education to see what is different and similar. First, the perspectives of the children are shared, followed by a parental viewpoint. Afterward, concluding thoughts about what these self-expressions suggest for mathematics educators and researchers are shared.

Antiracist and Antibias Education: The Perspectives of the Children

Askia: To share what antiracist teaching in mathematics education looks, sounds, and feel like across PreK-12, Askia expressed himself with this reflection, followed by his original poem. The oldest of my children, Askia is now in college and reflected on his prior schooling:

> It looks like Neapolitan ice cream, diverse and inclusive of different colors representing the mathematical contributions of people from around the world and sounds like jazz filled with improvisation and passion. Simply put, antiracist and antibias teachings in the mathematics classroom feel like truth. But unfortunately, for me, throughout my PreK-12 years and even into college, my mathematics experiences all looked like vanilla ice cream filled with Whitewashed toppings. Even though I excelled in my math classes and was always at least two grade levels ahead in high school, taking courses such as Pre-calculus and AP Calculus, it was very difficult to stay engaged because I always felt missing. I would always wonder why people that looked like me were not in the textbooks. Where was the representation? I knew there were Black mathematicians and scientists from all over the world. I knew of them because my parents taught me about them. However, that didn't help when those Black mathematicians and scientists clearly weren't in the text. The text was supposed to be the place where the knowledge and the contributors of the knowledge were. So, the absence of Black mathematicians and scientists from the texts, conversations, and images, for me, suggested that Black people were not thought of as holders of mathematics knowledge and ultimately contributors of that knowledge. I remember thinking about other students and wondering what if their education wasn't being supplemented at home? Those students will never think of Black people as mathematicians. The following poem I wrote helps to capture the essence of my experience in mathematics classrooms:

educational flatlines
waste no time
leaving a people of culture and grace
disgraced
curriculum neglects to
resurrect the real legends
instead aims to wash away any color from our lessons
leading us to feel there's no point paying attention
end up learning more about ourselves in detention
while teachers still give out stolen theories without truth
like crediting Greeks when Egyptians had been using square roots
now just imagine if our kids' minds were flattered
with a lesson that showed what they're truly capable of
mapping out cities using the stars above
now we get beat down, shot down, erased
imagine if we knew ourselves
would this take place
went from pyramids to chains and links
unlawfully arrested riding in a back seat
creating formulas and building temples
to be cast out in school and labeled as a rebel
told we weren't good at math
or made to believe it
now we don't even try
no thoughts to achieve it
I've seen it
witnessed a classroom fade out to black
when the math ensued
lost without a clue
but were we given any choices?
the world tries to tell our story
like we don't have any voices
and the system shuts us down
afterward for silly choices
or just being [black]
could've avoided all this pain
if our pride was intact

Asaru: For Asaru, now a college student, answering the question of what antiracist teaching practices for the mathematics classroom look, sound, and feel like across PreK-12, he reflected on his middle school experience. Asaru shared the following:

> I [Asaru] am glad I was asked this question and can speak about the importance of antiracist teaching. I feel like more students should be asked the question and speak out about their schooling experience. When I was in middle school, my math teacher doubted my ability to advance to a higher level of mathematics. I was a 7th-grade student, and I was performing at high levels of mathematics, as I did throughout my schooling, and when I got to the 7th grade, my teacher questioned whether I could "do" the 9th-grade math, which at the time was advanced algebra. Never mind the countless test scores indicating my proficiency, nor my clear understanding of the subject. All that mattered to my teacher was that she didn't think a young Black male in the 7th-grade could complete a curriculum that was two years above his grade level. I remembered feeling hurt and angry that my teacher was not supportive and encouraging. She had access to my transcript and could see that I was always advanced in my mathematics performance. Of course,

she tested and retested me to convince herself of my scores, and I was rightfully placed in the 9th-grade advanced algebra course. Coupled with my memory of this experience, is also realizing that I was one of the only 7th-grade Black males in the 9th-grade class amongst other non-Black students. Unfortunately, my teacher's attitude was hardly an individual instance. Instead, it resulted from Eurocentric and biased education that has fostered systemic and unchecked subjective views towards students of color. Now, as a junior at a predominantly White university, where less than 2% of the students are Black, the consequences of those systemic racial biases are even more evident. Given my 7th grade experience, I often wonder how many students of color have been negatively impacted by the biased views of that teacher and countless others. Could such ideas be responsible for the small percentage of students of color on my college campus? What educational experiences, systematic or otherwise, historically minoritized students might have had that hampers their presence on university campuses? If education is at the forefront of change in youth, then education has a moral responsibility to address the failures of the past, eliminating the possibility of mistakes being repeated. This can be done through antiracist and antibias teachings. We know education has an impact that goes far beyond a student's PreK-12 academic years and even into college. Students carry their experiences with them into their careers and livelihood. Take, for example, that while in high school, I studied and completed my associate's degree in business management. The positive educational experiences I had while completing my associate's degree continue to influence me in many ways. I currently major in international business at my university. Because of my associate's degree, I have even managed to secure paid internships with job offers upon my graduation. My example suggests that if more Black students have positive experiences during their PreK-12 mathematics education, perhaps it would translate into more Black students taking up mathematics in college. Therefore, antibias education must be at the forefront of a classroom's focus. Such as to equip students with the tools to permeate racially-biased structures within education. Antiracist education for all students, particularly the teaching and learning of mathematics, which is considered a gatekeeper, should empower students to change society for the better. Preparing students in the mathematics classroom to thrive in an increasingly diverse community should be the prevailing priority for the foreseeable future. Thus, antiracist and antibias education in the mathematics classroom should look like cooperation, sound like respectful discourse, and feel like justice.

Akenti: The youngest of the siblings, Akenti was a junior in high school at the time of this writing. In expressing what antiracist mathematics education looks, sounds, and feels like across PreK-12, Akenti drew an illustration (see Figure 1). The drawing depicts the struggle of students of color who face biased teachings in mathematics classrooms. The black band with math symbols over the students' eyes represents how the students' identity is continuously stripped because of racist curriculum and instruction from teachers who teach with racial biases. Notably, the teacher in the back also has the black band over his eyes to depict that he, too, is blinded by his own bias.

Figure 1

Drawing by high school student Akenti.

Racially-biased teachings can hinder the engagement and performance of students of color, resulting in race-based disparities in academic performance within schools. The above drawing, which shows the lackluster approach to learning mathematics, captures the feeling of far too many students of color who feel left out of the curriculum. For Akenti, antiracist and antibias education in the mathematics classroom looks like allowing students of color to express their culture in the classroom, sounds like including the contributions to the study and practice of mathematics from ancestors of people of color, and feels like students of color being listened to and understood.

Antiracist and Antibias Education: A Parental Viewpoint

Michael: For over two decades, Michael has been working with his four Black children to ensure that they receive a high-quality education. So, when asked for his perspective both as a father and as a Black man about what antiracist teaching in mathematics education looks, sounds, and feels like, Michael stated the following:

> So, as a parent, I [Michael] work with my children to help them navigate a Eurocentric education system, including their mathematics curriculum. As my parents and their parents before them, I was intentional about teaching my children antiracist ways. Meaning, I made sure to expose my children to expansive works of African people from throughout the diaspora. It was vital for me to teach my children that they were works of greatness and came from great people. This action that I took as part of teaching and learning with my children is, in itself, the action of antiracist education. I am well aware that the view that dominates current mathematics texts, curriculum, and instruction omits great African mathematicians from any significant contribution to mathematics. For example, images, information, examples, depictions, and mentioned contributors of mathematics knowledge are often White Western Europeans. As a result, the rich historical mathematical legacy of Black people around the world and their contributions to both scientific and natural mathematics are readily absent in mathematics and mathematics education. This omission of the contribution was significant for many reasons, but the two reasons that stand out the most are (i) truth and (ii) representation. Based on personal research, I knew that Black and Indigenous People of Color (BIPOC) were, and still are, great contributors to the field of mathematics. Therefore, to challenge Western views of mathematics that minimize Black people from the history of mathematics, I would regularly highlight for my children some of the mathematical contributions that Black people made around the world. This list of African contributors to mathematics was not exhaustive. Still, it did help to tell a broader narrative of Black mathematicians from Africa, the Americas, Asia, and around the world. I would tell my children about contributions to the field of mathematics from the great Egyptians and pyramids, Dogons and architecture, Imhotep and architecture, Mayans and the understanding of the number zero, and Muhammad ibn Muhammad al-Fullani al Kishnawi, who worked on Magic Squares, to the more famous Benjamin Banneker a self-taught astronomer, mathematician, and surveyor of Washington D.C. and to all those less known and unknown who were missing from my children's textbooks. This omission of diverse people is dangerous and an enemy of the truth. It leaves students, particularly BIPOC students, without representation, and the message sent is that they are not capable of being scientists and mathematicians. Education should be an equitable and just experience for all. Antiracist and antibias education in the mathematics classroom will require truth-telling. It should look like students engaged in critical thinking about and with mathematics, sound like teachers and students sharing knowledge from diverse peoples and perspectives, and feel boundless.

What Can Mathematics Educators Take Away From the Experiences of This Black Family?

The self-expressions and lifted voices of this Black family remind us that as mathematics educators, we cannot remove ourselves from crucial debates about race and racism in classrooms. Nor can we remove ourselves from the history of biased mathematics teaching, mainly since there is a great need to address race-based disparities in academic performances that have historical groundings (Dennis, 2021; Ohito, 2021). As I share their expressions of what antiracist and antibias mathematics look, sound, and feels like I couldn't help but think of the numerous Black families across the United States who share similar experiences. So, thinking about what's next and the 'so what' factor, the words "transformative practices" come to mind. Each family member's expressed viewpoint calls for a change in how we educate our youth in mathematics. Askia's poem, which was primarily centered on the need to see and feel represented in mathematics education, called on mathematics teacher educators (MTEs) and researchers to continue to assist classroom teachers in identifying ways to create classroom environments supportive of diversity in the mathematics content. MTEs and researchers should increase their collaborations with PreK-12 schools and facilitate conversations to help teachers learn ways to support students' identities in ways that make classrooms safe for students to be themselves fully (Aguirre et al., 2013). The joint work should include an intentional focus on how mathematical problem

solving is reflective of everyday lives, especially those of marginalized people.

Asaru's negative 7th-grade mathematics experience invites an examination of the hidden curriculum and practices at schools relating to race, racism, systemic oppression, indifference, inequality, culture, and lack of access. Thus, MTEs should work with schools to promote ethical and just behaviors for positive mathematics classroom culture and teacher responsibility to effect progressive change. This work with schools should assist teachers in seeing antiracist and antibias curriculum as their own journey in dismantling racism and implicit biases that work to keep Black students from excelling. Examinations of school practices, both explicit and implicit, should be conducted to correct and develop curricular materials and techniques that dissect approaches to solving complex problems leading to the creation of safe classroom spaces where all PreK-12 students could thrive (Ladson-Billings, 1995). Such work would afford teachers with opportunities to reflect on and formulate personal, anti-deficit philosophy as to their role as an antiracist and antibias educators in providing safe spaces within the classroom for all students.

Akenti's illustration also demonstrates that more collaborative work between MTE, researchers, and PreK-12 schools is needed to address implicit biases. Her artwork makes clear that in many cases, both teachers and students are blinded by their implicit biases, which they bring with them into the mathematics classrooms causing students to become disengaged. Therefore, collaborative work with educators to challenge teachers' implicit biases should include an invitation for teachers to keep a journal for potential conversations. Students could do journal writing or quick-writes as springboards for conversations that lead to a more informed mathematics classroom, one where students increase empathy and take on current socio-cultural, political, and economic issues to become more active participants in society (Jez, 2020; Novak, 2021). Unlike what is seen in Akenti's illustration, mathematics classrooms should look productive, busy, and responsive, with students engaged in mathematics in ways that work toward a socially just society.

The views expressed by the children in this article about what antiracist and antibias practices in mathematics classrooms look, sound, and feel like suggest that they want mathematics spaces to sound like a full-range choir with diverse voices and tones. The children want the mathematics classroom to be filled with inquiring minds that clamor for truth, for students to feel critically empathetic, and given opportunities to support positive changes. This type of inquiry-based, empathetic, and supportive mathematics classroom would be more easily achieved with the intentional involvement of parents from historically marginalized groups (Marrun et al., 2021). When we consider the invested work Michael did with his children, we must think of the value Black parents, as important stakeholders, bring to the teaching and learning experiences. Inviting Black parents into PreK-12 classrooms as collaborators presents a more diversified approach to teaching and learning mathematics as Black parents bring with them their lived experiences, diverse thinking, knowledge, and approaches. This type of collaboration is not new, as it is often seen in reading and language arts courses where parents are invited for "story time" or "reading time."

Understandably, parental involvement in children's reading is considered instrumental in encouraging children to become readers and plays a fundamental part in increasing children's interest in learning to read. Thus, a similar approach in mathematics classrooms would be beneficial (TODOS, 2020). Inviting historically underrepresented and marginalized groups such as Black parents into the mathematics classroom should be a welcome approach to building and sustaining students' interest in mathematics while creating a more inclusive and experiential learning environment. The presence of Black parents as contributors to mathematics instruction would help position and develop Black children as mathematics thinkers, knowers, and doers. The collaborative work between mathematics teachers and Black parents can lead to safe yet brave and informed ways of how to begin antiracist and antibiased conversations as teachers introduce math lessons. Parents can also assist teachers with utilizing those safe yet courageous and necessary conversations as informal assessments of the curriculum, course content, and students' learning experiences. Thus, a call to action from Black parents to MTE and researchers becomes finding ways to further explore how schools and Black families could work together to provide a richer understanding and appreciation of teaching and learning with students in antiracist and antibias ways.

Concluding Thoughts

In discussing race and racism within U.S. public schools and strategies for effective changes, education policymakers and teacher education programs need to meaningfully consider input from the families of PreK-12 Students of Color (Marrun et al., 2021). These expressions and experiences from the perspective of students and parents, all important stakeholders, invite us all to (re)examine how current mathematics curriculum and instruction perpetuate negative race-based educational experiences for Black children and the need for antiracist and antibias teachings. Shared stories and experiences are critical pieces that help us engage with race and racism (Chioneso, 2020; Pitts, 2017).

The lived realities, personal stories, and activism can provide ideas to improve students' everyday experiences in our mathematics classrooms. Take, for example, Asaru's experience, which is far too familiar. The teacher's framing of his mathematics ability, if left unchallenged, could have harmed his mathematics trajectory and eventual post-secondary experience. Many education researchers posit that teacher-student relational interactions mediate student access to mathematics content (see Battey et al., 2016; Stipek, 2006). Teachers' relational interactions speak to the quality of instruction that seeks to affirm students' mathematics ability and help move students to a more sophisticated understanding of mathematics. Whether through addressing behavior, framing mathematics ability, acknowledging student contributions, or attending to culture and language, teachers help to shape the mathematics trajectory for their students (Aguirre et al., 2013). Given this importance and challenge of creating and sustaining positive teacher relational interactions, calling on teachers to teach in antiracist and antibias ways is a necessary start; otherwise, far too many students could have negative schooling experiences such as the one Asaru described. To rise further to the challenge of counteracting negative race-based experiences, teachers will have to unpack historically dominant practices and processes in mathematics education for a more equitable approach to the teaching and learning with their PreK-12 students.

In closing, we assumed that readers of this article are committed to helping students learn and thrive in the mathematics classroom. Therefore, in lifting our voices in the form of poetry, storytelling, and illustration, we hope that readers explore, critically, ways to enact the look, sound, and feel of antiracist and antibias teachings for the mathematics classroom.

References

Aguirre, J., Mayfield-Ingram, K., & Martin, D. B. (2013). *The impact of identity in K-8 mathematics: Rethinking equity-based practices*. National Council of Teachers of Mathematics.

Battey, D., Neal, R., Leyva, L., & Adams-Wiggins, K. (2016). The interconnectedness of relational and content dimensions of quality instruction: Supportive teacher–student relationships in urban elementary mathematics classrooms. *Journal of Mathematical Behavior, 42*, 1-19. https://doi.org/10.1016/j.jmathb.2016.01.001

Chioneso, N. A., Hunter, C. D., Gobin, R. L., McNeil Smith, S., Mendenhall, R., & Neville, H. A. (2020). Community healing and resistance through storytelling: A framework to address racial trauma in Africana communities. *Journal of Black Psychology*, *46*(2-3), 95-121. https://doi.org/10.1177/0095798420929468

Delgado, R., & Stefancic, J. (2001). *Critical race theory: An introduction*. New York University Press.

Dennis, T. (2021). Changing course: Beginning steps to becoming an antiracist educator. *Journal of Negro Education*, *90*(2), 147-151.

Jez, R. J. (2020). Examining equitable practices within teacher preparation. *Teacher Education Quarterly*, *47*(4), 100-106.

Ladson-Billings, G. (1995). But that's just good teaching: The case for culturally relevant pedagogy. *Theory Into Practice*. *34*(3), 159-165. https://bit.ly/3ahWejL

Marrun, N. A., Rodriguez-Campo, M., Plachowski, T. J., & Clark, C. (2021). Divergent values: A family critical race theory analysis of families of color and their perceptions of teachers and teaching as a profession. *Taboo: The Journal of Culture & Education*, *20*(3), 11-36.

Novak, L. (2021). Review of storytelling for social justice: Connecting narrative and the arts in antiracist teaching. *Studies in Art Education*, *62*(2), 195-199.

Ohito, E. O. (2021). How to be an antiracist teacher educator in the United States: A sketch of a Black male pedagogic provocateur. *Teaching and Teacher Education*, *98*, 1-9. https://doi.org/10.1016/j.tate.2020.103235.

Pitts, J. (2017). Don't say nothing. *Education Digest*, *82*(7), 50-53.

Stipek, D. (2006). Relationships matter. *Educational Leadership, 64*(1), 46-49.

TODOS: Mathematics for All. (2020). *The mo(ve)ment to prioritize antiracist mathematics: Planning for this and every school year*. https://bit.ly/3j5Yvip

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. How might resources from organizations such as the Benjamin Banneker Association be helpful to show historically marginalized students that people that look like them have been making important contributions to mathematics?

2. How important is representation in improving the mathematics teaching and learning experiences?

3. Having seen the wonderful examples of creative expression in this article, how might you incorporate opportunities for your students to express themselves creatively as well?

4. How might you highlight for students the many mathematical contributions that Black people have made? Would you put up posters, give a list, invite guest speakers to the classroom, tell stories or historical vignettes, or something else?

5. Inviting parents to the classroom is not unusual in elementary schools, but not as common in secondary schools. What is a good strategy for creating a culture of having Black parents in a high school mathematics classroom? How might parents best assist teachers?

Mathematizing Representation in Children's Libraries: An Antiracist Math Unit in Elementary Grades

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Abstract

In this article, educators across schools tell the story of planning, implementing, and reflecting on an elementary antiracist unit focused on mathematizing racial representation in school libraries. Students and teachers engaged in conversations about race, utilized mathematics to visualize erasures of race in literature, and involved parents, administrators and the community in recognizing and taking action to change this injustice. Our team considers tensions and powerful student thinking involved in using mathematics for antiracist learning for second through fifth-grade children.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What mathematizing opportunities exist in a school or classroom library?

2. Who chooses the books in your classroom or school library? Whose identities are centered with those choices and whose identities are erased?

3. How would you prepare for initial conversations with elementary students about identity and race?

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Mathematizing Representation in Children's Libraries: An Antiracist Math Unit in Elementary Grades

Holly Tate, Tracy Proffitt, Amy Christensen, Caitlin Hunter, Diane Stratton, Elicia Fleshman, Julia Aguirre, and Jennifer Suh

> *"I think math definitely had an impact, and a lot of people wouldn't think it took this much math to figure out what we needed and what was missing in our library*." *-5th grade student*

Our story begins with two instructional mathematics coaches, Holly and Tracy, on a journey to become antiracist educators. We start by positioning ourselves as white mathematics educators and facilitators of learning. In our ongoing personal learning and growth, we acknowledge our privilege and seek to leverage our leadership roles to build collective communities of antiracist and critically conscious mathematics teachers (Seda & Brown, 2021). As we grappled internally with the pervasiveness of inequities facing the children in our schools in the wake of the pandemic, we knew that moving beyond the state mathematics curriculum was imperative for the communities we served. As TODOS president Linda Fulmore (TODOS: Mathematics for All, 2021, p. 2) stated, "We can no longer believe that a focus on curriculum, instruction, and assessment alone will be enough to prepare our children for survival in the world. We need antiracist conversations for ourselves and for our children."

The creation and implementation of our mathematics unit, Mathematizing Representation in Children's Libraries, echoes the TODOS antiracist statement and call to action. In particular, the unit addresses Essential Action #4, which commits to "elevating the professional learning of mathematics teachers and leaders with a dual focus on mathematics and social justice" (TODOS: Mathematics for All, 2021, p. 4). Though students have spent close to 2000 hours in school mathematics by the age of 16, Wright (2016) notes that today's curriculum still adheres to the reproduction of order and unequal power structures in society. The challenge, Wright argues, is for mathematics educators to centralize the role of mathematics schooling as a way for students to access learning that emphasizes societal struggles. Our learning around antiracism with teachers and students worked to co-construct and interrogate our realities by weaving students' unique funds of knowledge (Amanti et al., 2005), language, and cultures into the facilitated classroom experiences – experiences that can both empower and heal students (Kokka, 2019). Our unit highlights the importance of using Teaching Mathematics for Social Justice (TMSJ) to empower students of color who have historically faced disparities and oppression (Gutstein, 2003). We define Teaching Mathematics for Social Justice as having two main components: reasoning about mathematics *and* reasoning about fairness and systemic barriers within society through peaceful collaboration about conflict, discussion, and democratic decision-making (Aguirre & Zavala, 2013; Stocker & Wagner, 2007). We want to support students to analyze and change the world with mathematics while developing positive social, cultural, and mathematical identities (Aguirre, 2009; Gutstein, 2003).

Through this collective self-study, (Samaras, 2011; Samaras & Freese, 2006), each individual teacher-author reflects deeply upon and critically examines one's own practice, then shares unique reflective moments, allowing for the overlap of perspectives and exchange of ideas. The focus for our collective reflections was to document student learning of mathematics for social justice, based on the two components mentioned in the previous paragraph. We hope to continue the multiplier effect of engaging students in TMSJ lessons as readers consider our communities' cognitive dissonance, engagement, and pride within this antiracist unit.

Background

The inspiration for the Mathematizing Representation in Children's Libraries unit developed from the blatant overrepresentation of white main characters in children's books. As instructional coaches, Holly and Tracy are both fortunate enough to work in schools with students who identify primarily as BIPOC (Black, Indigenous, People of Color), including one school community composed of

a majority of multilingual and immigrant students. At first, we felt a sense of hopelessness in knowing that erasure of race and culture in children's literature was not a new injustice. Annual newly-published books across the nation reveal disproportionately low representation by race of books with main characters who are BIPOC or who are written by BIPOC authors (Cooperative Children's Book Center, 2021). The goal of our unit was to use mathematics to recognize who might be excluded from our own libraries and invite students to make decisions on how to create more equitable libraries. Two iterations of our project included examining with fourth- and fifth-graders the whole-school library, then having second- and third-graders analyze the libraries in their classrooms.

Our project compelled a collective of cross-school collaborators (Amy, Caitlin, Diane, and Elicia) to plan the lessons for the unit . For instance, in developing a team, coach-teachers (Tracy and Elicia) initiated the project planning with a discussion, which was overheard by a nearby instructional assistant. She enthusiastically joined as a change agent, bringing along the school's Family Engagement Liaison (Diane) to participate also. Other collaborators included vertical grade level teachers and a school librarian. After talking and reflecting with Tracy on the project, Holly invited Amy and Caitlin to try a second iteration of the task with their classrooms of younger students.

We understand that our own identities impact both our participation and perspective, therefore we describe the positionality of collaborating authors here: Diane identifies as a Black family liaison while Amy, Caitlin, and Elicia are white teachers. Julia, a biracial Chicana, and Jennifer, positioned as an Asian American, are BIPOC mathematics educators who served as collaborators and advisors in the writing process. Based on our populations and settings, our processes slightly varied. The project was enacted in three different schools, one reflecting a majority white population and the other two schools comprising mostly multilingual and racially diverse children. This account is a compilation of our experiences.

The lesson planning process included much learning for our collaborative teams, both about antiracism in mathematics education and the best ways to help our students recognize and act on oppressive systems affecting children's literature utilizing mathematics. As we began to plan the unit, we wondered about our students' perceptions of race and racism in our country: How do we have initial conversations about identity and race to prepare them to think through the task of library representation? How do we, the coach facilitators, negotiate our role as white educators working collaboratively with other staff and students of color? How do we facilitate student conversation to help them recognize the problem? How do we support students to mathematize this situation and draw on their mathematical knowledge to investigate it? As we unpacked these wonderings and implemented the unit plan that follows, we regularly reflected on the far-reaching impact that this project could have on our students, our school communities, and our mathematics teaching and learning.

Recognizing the Problem: Talking About Race

We knew the first step in engaging students in the work of antiracist libraries was to learn about race as a part of identity. Across schools, our students had not had experience in conversations about race facilitated within formal, school-based lessons. Identity work is an essential component of TMSJ, as students consider their sense of self inside the mathematics, amongst their peers, and within the community (Gutiérrez, 2013). To initiate conversations about identity and develop background knowledge needed for talking about race, one of the coaches gathered images of people who represented different recognized racial groups such as Black, Indigenous, Latinx, Asian, and white. Students in both schools used "I notice…" and "I wonder…" sentence frames to share their observations about the groups of people (see Figure 1).

Figure 1
Sample of Image Collection

*Note: Citations for these images can be found in the Unit Plan in the Appendix, Lesson 1 "Example Slide"

Further, utilizing books like *Our Skin: A First Conversation About Race* (Madison, Ralli, & Roxas, 2021) helped students conceptualize the idea of race ("What is race?") and why it is so crucial to our identities ("Why is it important to learn about race?"). This picture book allowed for children to see that racial identity is a difference in people around us, and also that there are times where race may make things unfair for those with Black or brown skin, such as always having to play the "bad guy" at recess.

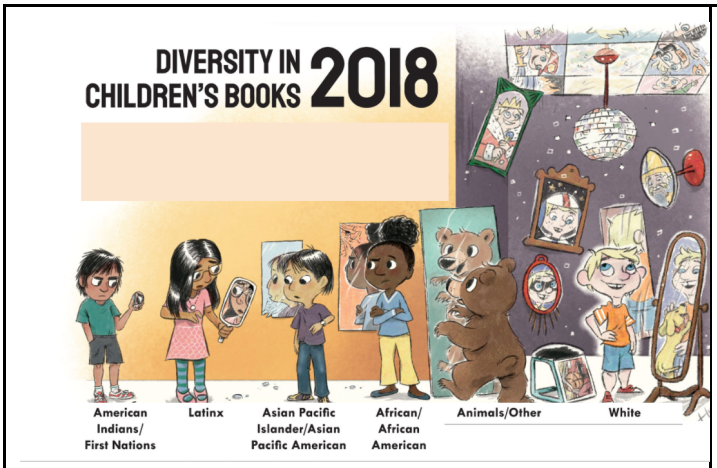
In order to mathematize representation in our libraries and to recognize the problem, we studied a series of graphs in different ways across the grade levels. The Cooperative Children's Book Center (2021) published a graph categorizing 3,134 children's books published in 2018, depicting an overwhelming proportion of white characters as opposed to other races in a non-traditional graph. Using this image as a Numberless Graph (Bushart, 2016) through a Data Talk (Youcubed, n.d.), second- and third-grade students noticed and wondered about what the mathematicians and graphic artists were trying to communicate (see Figure 2). We removed the original numerical percentages from the graph, prompting students to consider the significance of the size and condition of the mirrors.

Much of our students' interpretations of the graph stood out through this notice and wonder launching of our task. Young children's statements immediately recognized that this is an issue of fairness, and that there is something wrong with the representation of race in books. They pointed out quantity differences, such as the number and size of the mirrors for the white and animal characters, drawing on the relationship between the graphic design and the number of books available to readers. Seven- and eight-year-olds also felt empathy for these characters in the graph, relating the looks on their faces to what they must be feeling and even acknowledging feeling "shocked," "sad," or "angry" themselves.

Also utilizing the graph, fourth and fifth graders considered the causes of the nationwide underrepresentation, their ideas recorded by the teacher as seen in Figure 3. Interesting mathematical ideas emerged in their hypotheses about causes, including a misinformed statement about more white people than Black people in the world. The final comment listed indicates a strong understanding of ratio, a fitting mathematical concept to represent the situation.

Figure 2

Data Talk with Numberless Graph



Data on books by and about Black, Indigenous and People of Color published for children and teens compiled by the Cooperative Children's Book Center, School of Education, University of Wisconsin-Madison.

What do you notice?	What do you wonder?
-The kids are frowning because there's a lot of books about White people and not a lot about Brown people -Back then, they said White people were better so they didn't write as many books about other people. -The LatinX girl is shocked. -The mirror is broken. -It's not fair.	-[POC] are probably wondering why there aren't more books about them. -Why isn't it fair? -Why are they not getting the same attention as the White boy? -Why is the bear's mirror bigger than the people?

Figure 3

Student Ideas About Causes of Inequities in Book Representation

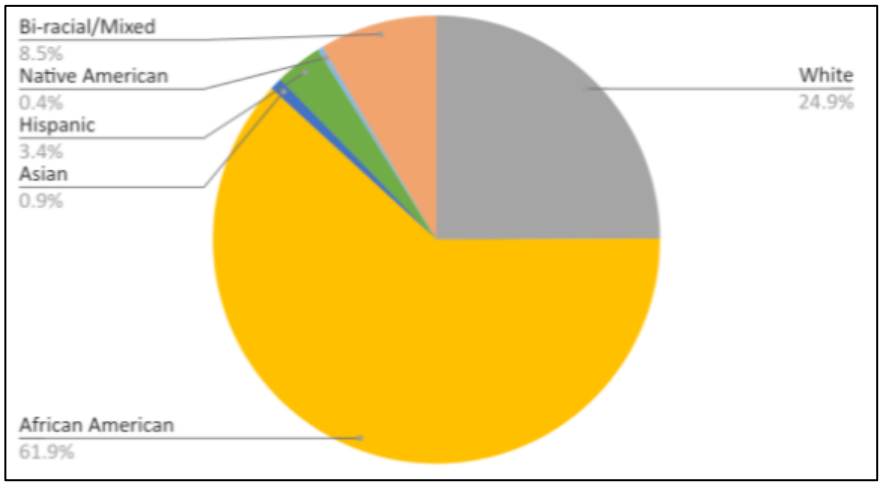
What are the causes?

- We're not really sure
- What teachers are comfortable with
- Authors write about people like themselves often
- Some White authors write about Black characters but they know about it from where they grew up
- Maybe there aren't a lot of authors that aren't White
- Maybe the publishers haven't hired diverse authors
- Because there are a lot more White people than Black people in the world
- So many books that have built up over time with not much diversity over time. Hard to catch up. People of color weren't allowed to do certain things in the past.
- In the past there weren't many authors of color. The White race has to accept that people of color can be really good authors. They were used to having white authors, now we have new authors and it's going to take a long time to change the ratio.

Data analysis continued with the examination of our current school and city demographics, helping us make sense of race representation within our communities (see Figure 4). This data was introduced to prime students in thinking about the mismatch that exists between the people depicted in books and the students who will read them, drawing on students' innate sensitivity to fairness and the lack thereof.

Figure 4

Race Representation Within a School Community



Delving into Mathematizing Race and Racism

These initial conversations about race and identity put our teacher teams in a place of cognitive dissonance and ignited the conversation of "What do we do next?" We recognized the importance of facilitating conversation around race and identity before engaging in the task after the fourth- and fifth-graders attempted to categorize books. Without the background knowledge of racial groups, the scope of student understanding did not allow for them to make inferences about a character's race. Amy, a second-grade teacher, reflected on discussing race as identity work with her second graders, "I failed to anticipate the level of background knowledge that it would take for students to complete this task independently. My kids needed an understanding of race and racism before we could dive into analyzing our classroom library." Beginning conversations about the role race plays in one's identity provided the space for students to feel pride for who they are and their backgrounds. Caitlin, a third-grade teacher, noted, "Some students knew a lot about their own race and were excited to explain their own identity to the group."

Common in the younger grades was student discussion around discomfort in talking about race, holding the belief that even talking about race is inherently racist. Amy continues by explaining:

> Many students were uncertain about talking about race. These students--many of them white--assumed that it was racist to talk about race. I found this simultaneously fascinating, concerning, and not surprising. We know that many forms of racism are prevalent in our country. This fear of talking about race from my white students gave me just as much pause as a child saying something blatantly racist would have.

Equally as jarring to us as facilitators was when students often commented on issues of race and racism as "things of the past." There were two significant ways this happened, starting with the concept of racism in general. For instance, in the school of a predominantly white population, students noted that racism "happened a long time ago" or used phrases such as "back then" in their discussions. Further, students classified specific races themselves as existing only in history. One student explained when exploring the slides demonstrating various races that Indigenous peoples were "from history." Conversely, when looking at slides of self-identified white people, there was unanimous agreement across schools that their race was "American," and words like "normal" described the people in the pictures.

We were struck by these interactions with students after our initial conversations about race. We reflected on the following questions: In what ways are we failing as an educational system if the product of social studies and history lessons include the erasure of entire groups of

people from current history? How do we have groups of privileged students who have restricted systems of oppression into a timeline of hundreds of years ago? What work needs to begin around race and identity starting in kindergarten to decolonize our Euro-centric and white supremacist ideologies and messages of normalcy?

Reading the World Through Mathematics: Evaluating our Libraries

TMSJ allows students to develop a deep understanding of their lives within the classroom walls, their communities, and the sociopolitical complexities of the world (Gutstein, 2003). Friere (2018) describes the type of political awareness created through TMSJ as "*conscientizacao*" (p. 67). He argues that liberation of the oppressed comes from distinguishing their position in society and within history. Our students, developing *conscientizacao*, recognized that a systemic issue was, in fact, affecting the books on the shelves of their own classroom libraries. Across schools and grade levels, students were eager to examine their libraries. Thus, *reading the world through mathematics* describes the part of our unit where students used mathematical thinking as a tool to evaluate humanity and recognize disparity (Gutstein, 2003).

This work was done on two varying scales depending on the grade level. Fourth- and fifth- graders analyzed a sample of the whole-school library, deciding to focus on picture books, chapter books, and graphic novels because these books would more likely portray a main character. A random, stratified sample of 1,190 books was chosen within these genres as an attempt to capture a true snapshot into what was on the shelves of the library. On a smaller scale, second- and third-grade students focused on their classroom libraries. Decisions in this space were made as a collective throughout the entirety of the process, making it a complex and democratic task. Student-driven decisions included defining the categories of the race we would look for in the main characters of books, co-creating the parameters for deciding on the race of the main character, and how to sort the texts in the classroom. Specifically, Amy recalls the complexities of identifying races within the books:

> A character with tanned skin might be called Latino, American Indian, or Black. As I guided their thoughts and conversations to look at additional details such as clothing, setting, names, and languages, I realized that this task was much more nuanced than I originally thought.

Caitlin also considers the impact of providing the space for children to feel empowered through identity work:

> I also had many students from Northern African and Middle Eastern countries as well. The first day they sorted I noticed that these students were not finding any books that they related to, and I realized that we did not have almost any books about characters from these countries, and even worse, we did not have a pile. When we first began the project, some of these students had self-described themselves as white, but I noticed we were putting the very few books we had about characters from the Middle East in the Asian pile. Although this caught my attention, I did not make any changes because I wasn't sure what racial term was accurate. However, on day 3 of sorting, one student approached me to let me know that there wasn't a pile of books for "people like him." I asked "Well, what race do you say you are?" and he confidently responded "Arab." So immediately this student and I created a new pile with a new label and started sifting through the pre-sorted books to find ones we had mislabeled. Although we found very few, it was inspiring to see this student advocate for himself and have a strong understanding of his own identity. Later on in the project, when it was time to order more books, he enthusiastically researched and calculated which titles would fix this problem in our classroom.

Mathematics, of course, was the imperative sense-making vessel for our students to understand representation oppression within our school walls. Teams worked together to tackle between 500 and 1,200 books, sorting and organizing their data into categories of main character races. Mathematical strategies for counting and keeping track of their data varied among groups of students. Some built larger book piles, spreading out across the room and using Post-it notes to record their counts, often in groups of five or ten. Others chose to record on larger anchor chart paper and work in smaller increments, tackling smaller portions of their books then adding to calculate the total. As second- and third-graders collected and kept track of their data in small groups, they reported on their findings and compiled totals at the end of a day's counting as a whole class. This whole class convergence allowed some space for reflection on the

meaning of the data throughout the process: what are we seeing so far? Is this surprising? What feelings are we having about fairness and the books that we are counting? Conversely, fourth- and fifth-grade students collectively counted and tracked main character race data in a shared spreadsheet.

Once the collection of data was complete and final race categorical numbers were calculated, an important mathematical task was to create and analyze graphs of the findings, aligning with the data and statistics state standards (found at https://bit.ly/3zD4Mw3). Children made decisions for which kind of graphic representation to use, and considered graphing components such as scale, title, and organization of the information. Figure 5 shows how a third-grade group decided to represent the data from their entire classroom library in a bar graph. The group found that, like the national 2018 findings, the white (205 books) and non-human (166 books) main character representation dominated the representation of other races, such as more than one race (65 books), Black (48 books), Pacific Islander/Asian (35 books), and Latinx/Hispanic (26 books). The graph also revealed further erasure or invisibility of race within the classroom library, such as with Native Americans (10 books), mixed race (5 books), and Arab (5 books). The mathematics in student analysis show that students honed in on the blatant overrepresentation and unfairness of white and non-human characters. This investigation led to inferences for which books *not* to purchase, while also questioning the number of books they will be able to purchase for other racial groups within the confines of their budget.

In the fourth- and fifth-grade analysis, students noted that the proportion of books with white main characters is roughly the same as the proportion of Black students in the school (see Figure 6). The left pie chart shows the racial makeup of the school with 62% African American, 25% White, and smaller percentages of other races. In contrast, the right pie chart shows how students categorized books: 68% White, 21% More than One Race, 6% African American, and smaller percentages of other races.

Figure 5

Third-Grade Group Graph and Analysis

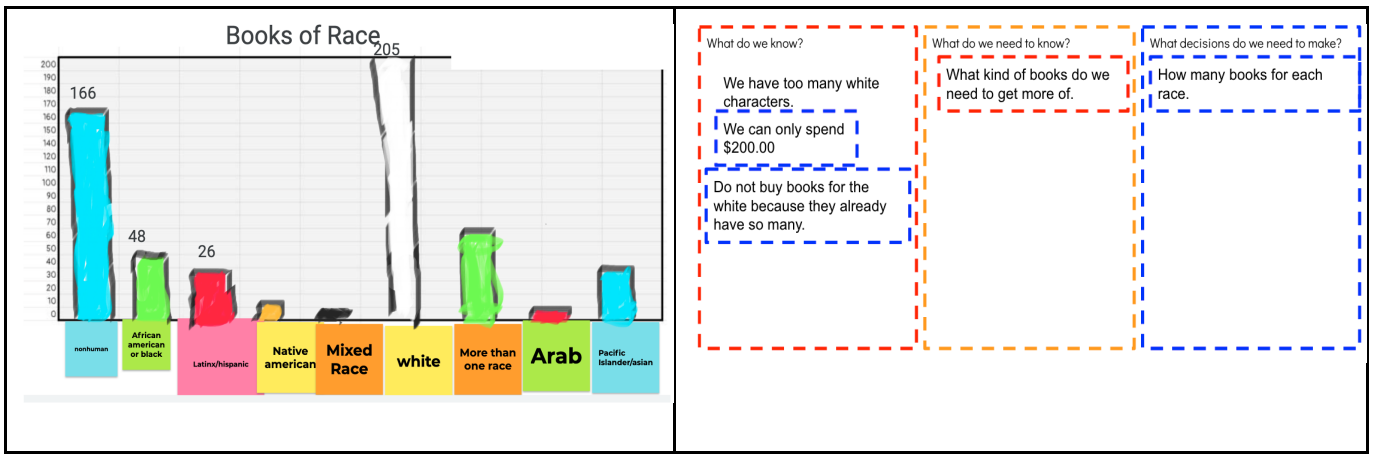
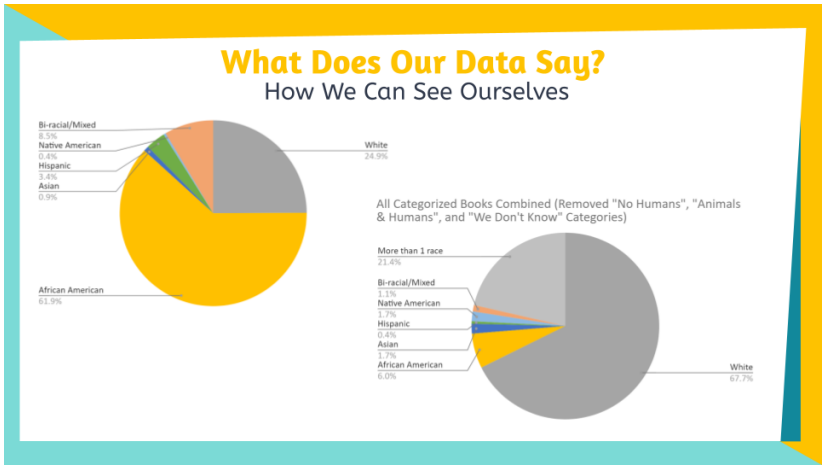


Figure 6

Fourth- and Fifth-Grade Data Comparison



"When we compared the data, there are a lot of African American students, but there are still more books about white people than about African American people in this school. We can probably find some African American books so that Black students wouldn't feel sad about not having many books where they see themselves."

Through this mathematical investigation of our libraries, the erasure of race and peoples were made very clear to both our children and participating teachers. Amy reflected on her practice and the cultural responsiveness of her library:

> I have a large classroom library of at least two thousand books. I know the importance of having texts that are representative of the global population, as well as my classroom population. I think of myself as a conscious book-buyer. Still, I was surprised by the number of books about animal, non-human, and white characters in the books we analyzed. As I continue to add to my library, I am increasingly conscious about the books I choose. Are they representative of the students in my classroom? Of the people in our community? Of the people whose stories often go untold?

As we embarked on the next segment of our unit, we considered the larger impact of the erasure of race in literature, drawing on empathy and compassion in seeing something from another's perspective: what might this make people think? About themselves? About others? Such questions and reflection prompted students to consider the need for action for making more just libraries for all.

Writing the World Through Mathematics: Towards More Equitable Representation

While students' understanding the systemic inequity in representation was a pivotal moment in their mathematics learning, it was not enough. A goal of TMSJ is that students themselves are part of the solution for injustices (Gutstein, 2003). Moving beyond just understanding inequities, to *write the world through mathematics* is to remedy unjust situations. Across our schools, students' calls to action came in different forms. Second- and third-grade students wrote letters to the principal through persuasive writing prompts that encouraged the purchase of new books within a defined budget, as seen in Figure 7. The voices reflected in the letter emphasize the power of "we;" the child moves from "I" in describing books that might be "perfect for the library", to "we" in finding books that will benefit all of the students in the class.

Figure 7

Mathematical Thinking for Book Purchases and Persuasive Letter to Principal

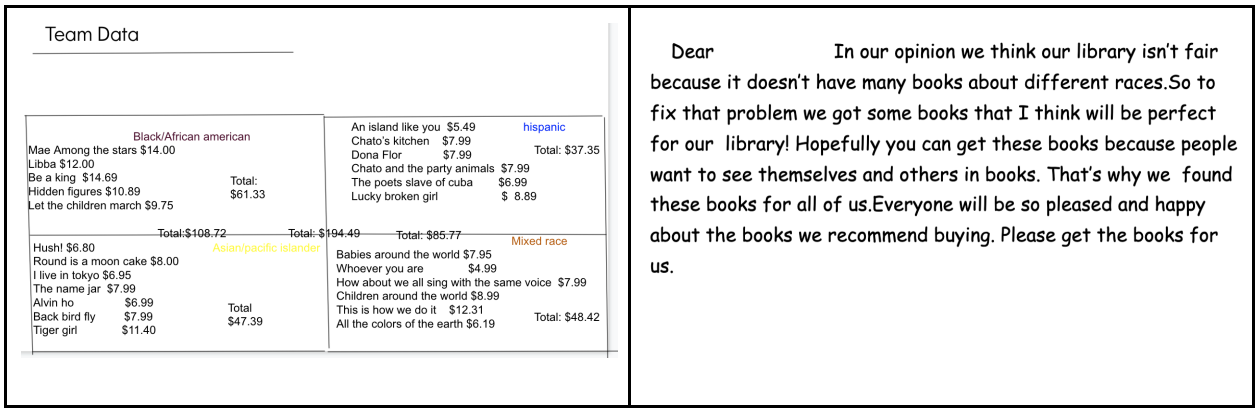


Figure 8

Book Talk Screenshot

Fourth- and fifth-graders, on the other hand, acted as decision-makers in purchasing titles more representative of themselves and their peers, funded through a local grant. In developing their critical consciousness, students presented their findings to the community, including parents, members of the community, and school board members, and recorded book talks advertising the new books to their peers. Figure 8 portrays a screenshot from one child's explanation of the book she chose for her peers.

The impact of "writing the world through mathematics" and being involved in action for change felt monumental for all of us as educators. Diane described the power of this project in connection to her personal experience of having to be a storyteller to help children visualize and understand Black culture:

> [My experience includes] telling stories from my grandparents and having the students use their imagination of what the characters looked like or the setting. I now have a collection of books in our library that I can go to and choose whatever topic I want. The children can actually see the characters and settings for themselves.

Diane also revealed a domino effect of the project on teachers across classrooms in her school, "I noticed that our teachers started to pay attention to the culture of the children in their classroom, which made them begin to make sure that they were sharing books with their students that identify with their culture." Similarly, fifth-grade teacher Elicia, who works within a predominately Black school, noticed a change in her students after purchasing new books and seeing the book talks. She explains, "I

have noticed my students borrowing books from the library with main characters that look like they do."

Not only did the mathematics and action for social justice affect the racial representation of teacher and student classroom library choices, but our team also noticed broader influences on learning and growing together as we continue our journeys for understanding the role of race, identity, and erasure of peoples. Amy acknowledged a newfound excitement from her white students when seeing characters in a group that they knew to be under-represented in literature, and also recognized, "The project also provided us with language to continue addressing topics that were challenging or typically wrought with misinformation." Amy's reflection exposes implications for this task and the determination of a truly "fair" library representation: what would the perfect graph look like? One that reflects the demographics of the students in the school or one that acts as mirrors for students to see themselves but also as windows into the lived experiences of others, particularly for a school or classroom with mostly White children (Bishop, 1990)? On a final note of reflection, Caitlin concluded with this powerful insight:

> This project helped me see that although I am the adult in the room, I don't have to try to be the expert in all topics, especially the cultural, racial, and linguistic identities of my students. This realization has already helped me to facilitate productive and profound conversations with the 8-year-olds in my classroom about tough issues of race, immigration, law enforcement, and language variety.

Conclusion

TMSJ lessons provide the space for students to use mathematics to critically analyze and take action on current injustices in our world. Our antiracist unit focused on racial representation in literature and poised children as decision-makers, and change agents. Curriculum materials provided to educators should be designed so that our students can see themselves, a mirror for themselves, and a window into their communities (Gutiérrez, 2012; Bishop, 1990). Through this project, our children recognized that this was not the case. They identified the situation as unfair and took steps to change it using mathematics to help them make their case. The educators involved expressed a sense of pride in participating in a project with such significant impact. Elicia stated, "I feel a great sense of pride and joy because we aided the students in creating change within their learning community where change was definitely needed." The erasure of race and peoples in libraries is the erasure of our students, a disparity to be attended to nationwide. We learned we can build on this project by examining representation in our libraries in other ways: bilingual books, disabilities in books, gender identity in books, LGBTQ+ characters in books. It is time to normalize conversations around the different identities we hold – our humanity. Our unit demonstrates an antiracist journey of growth not just in teachers, but in children, families, community members and even board members. Mathematics, as shown by our students, is a powerful analytical tool to identify inequities and change them.

References

Aguirre, J. (2009). Privileging mathematics and equity in teacher education: Framework, counter-resistance strategies and reflections from a Latina mathematics educator. In B. Greer, S. Mukhopadhyay, S. Nelson-Barber, and A. Powell (Eds.), *Culturally responsive mathematics education*. (pp. 295-319). Routledge.

Aguirre, J. M., & Zavala, M.D.R. (2013). When equal isn't fair. In E. Gutstein & B. Peterson (Eds.), *Rethinking mathematics: Teaching social justice by the numbers* (2nd ed.) (pp. 115-121). Rethinking Schools, Ltd.

Amanti, C., Gonzalez, N., & Moll, L. C. (2005). *Funds of knowledge: Theorizing practice in households, communities, and classrooms*. Lawrence Erlbaum Associates.

Bishop, R. S. (1990). Mirrors, windows, and sliding glass doors. *Perspectives: Choosing and using books for the classroom, 6*(3). https://bit.ly/3QbJhbi

Bushart, B. (2016) Numberless word problems. *Teaching to the Beat of a Different Drummer*. https://bit.ly/3mBKbAc

Cooperative Children's Book Center. (2021, April 16). *Books by and/or about Black, Indigenous, and People of Color (all years)*. Cooperative Children's Book Center University of Wisconsin-Madison. https://bit.ly/3aTnYv5

Freire, P., Macedo, D. P., & Shor, I. (2018). *Pedagogy of the oppressed* (M. B. Ramos, Trans.; 50th anniversary edition). Bloomsbury Academic.

Gutiérrez, R. (2012). Embracing Nepantla: Rethinking "knowledge" and its use in mathematics teaching. *REDIMAT*, *1*(1), 29-56.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37-73. https://doi.org/10.2307/30034699

Kokka, K. (2019). Healing-informed social justice mathematics: Promoting students' sociopolitical consciousness and well-being in mathematics class. *Urban Education*, *54*(9), 1179-1209.

Madison, M., Ralli, J., & Roxas, I. (2021). *Our skin: A first conversation about race.* Rise x Penguin Workshop.

Samaras, A. P. (2011). *Self-study teacher research: Improving your practice through collaborative inquiry*. Sage.

Samaras, A. P., & Freese, A. R. (2006). *Self-study of teaching practices primer*. Peter Lang.

Seda, P., & Brown, K. (2021). *Choosing to see: A framework for equity in the math classroom.* Dave Burgess Consulting, Incorporated.

Stocker, D., & Wagner, D. Talking about teaching mathematics for social justice. *For the Learning of Mathematics, 27*(3), 17-21. https://bit.ly/3Pn7mdM

TODOS: Mathematics for All. (2020). *The mo(ve)ment to prioritize antiracist mathematics: Planning for this and every school year*. Author. https://bit.ly/3j5Yvip

Wright, P. (2016). Social justice in the mathematics classroom. *London Review of Education, 14*(2), 104-118.

YouCubed (n.d.). Data talks. https://www.youcubed.org/resource/data-talks/

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. A student comment in Figure 3 is: "It's going to take a long time to change the ratio?" In this context, what would a fair ratio look like?

2. Are the books in your classroom and school libraries mirrors, windows, or both? In what ways could you improve the representation found in your school library?

3. In what ways can you imagine your students *writing the world through mathematics*?

4. What takeaways do you have from these educators' first conversations about race, racism, and antiracism with elementary students? What would you do the same? What would you do differently?

Appendix

Unit Plan

Mathematizing Representation in Children's Libraries

Created by Tracy Proffitt and Holly Tate

REPRESENTATION

"Data on books by and about Black, Indigenous and People of Color published for children and teens compiled by the Cooperative Children's Book Center, School of Education, University of Wisconsin-Madison has been collected since 1985" (The Cooperative Children's Book Center, 2021, para. 1). Their statistics show that while representation of Black, Indigenous and People of Color (BIPOC) in children's literature is increasing, the overall percentage of new books published with BIPOC main characters is hovering around 30%. Conversely, BIPOC students make up roughly half of the public school population (NCES, 2021). Books can serve as both mirrors and windows, but current classroom and library shelves are full of books that do not reflect the diversity of our student populations. In this unit, students collect data on the racial representation in their classroom or school library collections and compare their findings to their classroom or school population. Students suggest next steps based on their data analysis.

DEEP AND RICH MATHEMATICS

This unit provides a relevant and engaging context for students to dig into data standards and practice. Students begin the process of data collection by defining categories and devising a data collection strategy for the racial representation in library books. This could include sorting books into physical stacks, tallies, tables, spreadsheets, etc. Next they represent their findings in a graphical format and analyze them in order to describe trends and needs within the library collection. The project can be extended by providing students a real or imagined budget that they must work within to select new books from categories that they determine the library needs, as well as an opportunity to communicate their findings and learning to a wider audience.

ABOUT THE LESSON

This unit uses a variety of instructional strategies (notice & wonder, numberless graph, launch-explore-summarize) and is intended to take approximately six to seven class periods.

Lesson 1: Students notice and wonder about race and identity using picture prompts

Lesson 2: Students explore a numberless graph about racial representation in Children's books

Lesson 3: Students devise a plan for collecting data on which races are represented in their classroom library or school library

Lesson 4: Students choose a method to represent the data they collected and analyze the data, potentially comparing the book data to their school population statistics

Lesson 5: Students make a plan for action based on their findings. One option could include choosing new books for the library based on a real or imagined budget.

Lesson 6: Students make a plan for sharing their findings, learning, and actions. Options could include a presentation, letter to administrators, book talks, video, etc.

SOCIAL JUSTICE STANDARDS

- I can express comfort with people who are both similar to and different from them and engage respectfully with all people. (Diversity 6)
- I can plan and carry out collective action against bias and injustice in the world and will evaluate what strategies are most effective. (Action 20)

MATHEMATICS ESSENTIAL CONCEPTS

Virginia State Standards	Common Core State Standards
3.15 The student will a) collect, organize, and represent data in pictographs or bar graphs; and b) read and interpret data represented in pictographs and bar graphs. 4.14 The student will a) collect, organize, and represent data in bar graphs and line graphs; b) interpret data represented in bar graphs and line graphs 6.10 The student, given a practical situation, will a) represent data in a circle graph; b) make observations and inferences about data represented in a circle graph	CCSS.MATH.CONTENT.2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. CCSS.MATH.CONTENT.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. CCSS.MATH.CONTENT.7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. CCSS.MATH.CONTENT.7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

MATHEMATICAL PRACTICES

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Attend to precision.

RESOURCES AND MATERIALS

- Notice & Wonder slideshow
- Numberless graph image
- Library books
- Chart paper or computers for creating graphs
- Book supplier catalogs

LESSON 1 FACILITATION

What is Race?

- Interactive Read Aloud of "Our Skin" by Megan Madison, Jessica Ralli, Isabel Roxas (20 minutes)
    - Prior to reading: What is race? Where have you heard the term "race" before?
    - During reading: Stop and pause at the questions embedded in the book to have kids reflect.
    - After reading: Why is it important to learn about this?
- Notice and Wonder (20 minutes)
    - Use slideshow of images that represent different racial groups such as Black, Indigenous, Latinx, Asian, and white for exploration (Example Slide)
    - Remind students that people in the images self-identified their race.
    - For each group of people, show pictures and ask what students notice and wonder. What is the same or different?
    - Reveal the name of the group and open discussion for anyone who might have something to share or ask.
- Wrap Up (2 minutes)
    - Describe that we will be exploring race and working for social justice within our class this week.

LESSON 2 FACILITATION

Recognizing the Injustice

- Numberless Graph 1 (5 minutes)
    - Show the 2018 Diversity in Children's Books image (Huyck & Dahlen, 2019) with numbers and labels covered. Have students share what they notice/wonder about the numberless image.
- Numberless Graph 2 (5 minutes)
    - Show a second slide in which the same data is represented in a different way. For younger students, this could be a 10 by 10 grid colored to match the percentages shown in the graph. For older students, this could be a pie chart.
- Synthesize With Additional Questions (10 minutes)
    - Is it okay that there are so many books about white people published and so few about ____ published?
    - What might this make people think? About themselves, or others?
    - What are some of the choices that the mathematicians and graphic designers made in preparing the first image? Why do you think they made those choices?
- Compare Books to School Population (5 minutes)
    - Display the grid or pie chart representing book representation next to a similarly formatted graph of your school population.
    - What do you notice/wonder about the two graphs? What should the graph look like?
- Introduce Project (5 minutes)
    - Introduce project of increasing representation. Write the word "representation" down. What is representation?
    - Explain the goal of figuring out characters in the classroom/school library books and make a decision about what we can do based on our findings.
    - Look at the list of races to look for in books represented in the graph from the Children's Cooperative. What do you think of this list? Is there anything we need to add or change? Alternatively, students could develop the categories on their own if you have more time. Changes or additions could also be made as students engage in Lesson 3.

LESSON 3 FACILITATION

Data Collection

- Launch (20 minutes)
    - Revisit the project goal: figuring out the race of characters represented in the classroom/school library books and making a decision about what we can do based on our findings.
    - Work together to categorize about 20 pre-selected books. This set will serve as a model and an opportunity for further teaching and background building. The collection chosen should represent some of the difficult decisions that students will make, such as needing to use the setting or vocabulary as clues, characters whose race is unclear, books with characters of more than one race, etc.
    - Give any instructions needed about how students will get books and materials that are available. It is suggested that you let students make as many decisions about the data collection process as possible.
- Explore (30+ minutes)
    - Students will work in groups to categorize books and record their data. If time allows, this could be done over multiple days in order to categorize a larger portion (or all) of the collection. The teacher will observe, support, and record notes about data collection strategies to share out at the end of the lesson.
- Summarize (10 minutes)
    - The teacher selects several data collection strategies or decisions to highlight for the class.
    - Work together to compile the data from each small group.

LESSON 4 FACILITATION

Data Analysis

- Launch (10 minutes)
    - Explain that students will work in small groups to graphically represent the combined class representation data. Inform students of available materials and any grade-level appropriate requirements.
- Explore (30 minutes)
    - Students will work in small groups to create their graphic representation of the book data. It is suggested that you let students make as many decisions about their graphical representations as possible.
    - Towards the end of the exploration period, allow students to complete a gallery walk in order to look at other teams' graphs. They should be encouraged to begin thinking about what's the same and what's different in the graphs created, and could even leave post-its on their peers' graphs documenting their ideas.
- Summarize (15 minutes)
    - Display graphs in a way that they can be seen by all students.
    - Ask: What do you notice? What do you wonder? Create an anchor chart of student findings about the data set.

LESSON 5 FACILITATION

Call to Action

- Launch (15 minutes)
    - Review by asking: If a new student came into our classroom today for the first time, how would you explain what we've done this week and why it's important?
    - Ask: What should we do about it? Record student ideas.
    - Likely students will suggest getting new books to diversify the library collection. Explain that students have a real or imagined budget to purchase new books for this purpose. Provide access to book supplier sites or catalogs, and challenge students to select books while staying within the provided budget. See additional resources list below.
- Explore (30+ minutes)
    - Students will work in small groups to select books and keep track of the cost. Calculators can be provided.
    - If time allows, possibly on additional days, students can develop a system for synthesizing their lists and finalizing selections as a whole class. For example, the lists could be combined and rated by all students, creating an opportunity for average scores to be compared.

- Summarize (10 minutes)
    - The teacher will select decision making strategies or recording strategies to share with the class.

LESSON 6 FACILITATION

Communication

- Launch (15 minutes)
    - Ask: Who do you think should know about the injustice that we uncovered and our ideas about how to make change? (Possible answers: students, teachers, administrators, school board members, parents, community members, etc.)
    - Ask: How can we communicate what we've done and what we've learned to some or all of those groups? Why is that important? (Possible answers: plan a presentation, write a letter, make a video, create book talks, etc.)
    - Choose (or allow students to choose) one or more methods of communicating about students' work and set up any necessary parameters, teams, and materials.
- Plan (30+ minutes)
    - Allow students time to plan or create their presentation, letters, videos, book talks, etc. Depending on the scope of the product, this may take more than one class period.
- Present (10+ minutes)
    - Provide time for students to share their products and reflect as needed.

ADDITIONAL RESOURCES

The following websites may assist teachers and students in choosing books to diversify their libraries:

- Social Justice Books https://socialjusticebooks.org/booklists/
- We Need Diverse Books https://diversebooks.org/
- Here Wee Read https://hereweeread.com/
- Colours of Us https://coloursofus.com/

References

Cooperative Children's Book Center. (2021, April 16). *Books by and/or about Black, Indigenous, and People of Color (all years).* Cooperative Children's Book Center University of Wisconsin-Madison. https://bit.ly/3aTnYv5

Huyck, D., & Dahlen, S.P. (2019, June 19). *Diversity in children's books 2018*. sarahpark.com blog. https://bit.ly/3utPhTz

National Center for Education Statistics (NCES). (2021, May). *Racial/ethnic enrollment in public schools.* National Center for Education Statistics. https://nces.ed.gov/programs/coe/indicator/cge

Antiracism Must Be an Everyday Practice

Lisett Sierra Garcia
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Abstract

During the ongoing COVID-19 pandemic, we all experienced disruptions and changes to our lives and careers. This article explores how one secondary mathematics teacher responded to those changes and prioritized equity and antiracism throughout. The article comes from a discussion between Lisett, currently a high school mathematics teacher, and Trevor, an assistant professor, and a former teacher of Lisett. The article is written from Lisett's perspective.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What insights about your students' challenges and strengths (or your own) emerged from the pandemic?
2. What did you change to support your students' learning during the pandemic?
3. How did the pandemic reinforce or change your values and commitments around antiracist teaching practices?

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Antiracism is an Everyday Practice

Lisett Sierra Garcia and Trevor T. Warburton

Introduction

The writing that follows is from an interview of Lisett Sierra Garcia conducted by Trevor Warburton via Zoom in October 2021, with occasional follow-up meetings in the months after. We decided to write this after conversations we had about teaching during the pandemic. At the time of the interview Lisett was a high school mathematics teacher in her eighth year of teaching. Prior to teaching high school Lisett had taught for five years at a middle school and has made a career commitment to teach in schools with a diverse student body. Trevor is currently an assistant professor of secondary education and former high school and current university mathematics teacher, as well as a mathematics coach for special education. He focuses on issues of equity and social justice in mathematics education. Lisett was a student in a capstone action research class Trevor taught as he was finishing his PhD and she was finishing her master's degree/licensure program and student teaching. They have maintained regular contact and occasionally discuss various challenges that Lisett encounters in her teaching. Trevor interviewed Lisett about her experiences during the pandemic. Based on that interview the remainder of this article is written from Lisett's perspective, with occasional joint statements. When the first-person singular is used it is from Lisett's perspective. In the conclusion, Lisett and Trevor make connections between her experiences and the TODOS Antiracism Position Statement (TODOS, 2020).

Context

I teach mathematics at a large, urban, diverse high school. The 2019-2020 school year was my first year teaching at the high school and I was fortunate to teach at the high school that the middle school students I had taught would attend. So I got to follow many of my students to the high school. The classes that I teach are Secondary I, Secondary II, and Honors Secondary II (Utah is one of a few states that follows an integrated mathematics model where algebra, geometry, and statistics and probability are taught together each year)[1]. The school is trying out eliminating the tracking that comes with honors courses and so this year there is no Honors Secondary 1. This program is still in progress and each year the next level's honors class (levels include Secondary 1-3 then Precalculus and Calculus) will be removed (i.e., next year there will be no Honors Secondary 1 or 2). It is done one year at a time to minimize effects on students already in an honors track. As a result, the Secondary 1 classes are about 50% Black, Indigenous, and People of Color (BIPOC) students and 50% white; these BIPOC students are primarily Latina/o/x and/or Native Hawaiian/Pacific Islander and the demographics match the demographics of the district (Salt Lake School District, 2022). The Secondary II classes are less representative of the overall student body with the honors courses being disproportionately white and the non-honors courses disproportionately populated with BIPOC students. The school boundaries also include a refugee resettlement area and there is a significant population of refugee students from all over the world. However, most of the refugee students are in the English as a Second Language program, including for content classes, without an honors option. We recognize that while the steps taken have reduced tracking at the school there is still tracking in place. This is especially true in the honors courses, which are disproportionately white and the classes in the English as a Second Language program which are disproportionately BIPOC students, including refugee students.

For us antiracism in the mathematics classroom means combatting the systemic racism of the school in any way that we can. This can include both microaffirmations in the classroom, considering the ways that we interact with students and how they interact with each other, as well as larger actions such as detracking to promote equitable course offerings for BIPOC students.

[1] To see what standards are included in each course, see the Utah Core for Secondary 1, Secondary 2, and Secondary 3.

Either way, the focus is to take an active stance that supports BIPOC students against the racism they face.

Equity & Social Justice

We recognize that racism is embedded in the school system through common policies and practices. This can include tracking, access to advanced mathematics and to necessary resources for learning, and pedagogical practices that devalue the lived experiences and voices of BIPOC students. For that reason, even if only in small ways, we must think about antiracism as a daily practice.

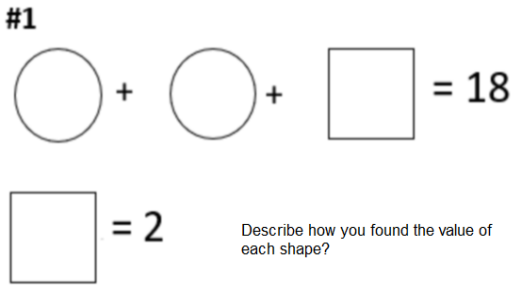
Access

For me, that starts with access. The pandemic really highlighted the lack of access that many students experienced before and during the pandemic. So we need to be thinking about access from day one both in our classes and for the school. For example, the school started an after-school program to support student learning, which was great, but because of the location of the school most of the BIPOC students have to ride the bus (due to neighborhood segregation and the location of the school in a primarily white area), and at first they didn't have a bus for the students. Then when they did get a bus, the opportunity to use the bus, the schedule, and routes weren't well communicated to the students or their families. This was in part because the school doesn't have adequate language support for parents who don't speak or read English. Also, this year we're doing parent teacher conferences via Zoom, but many of our parents of BIPOC students haven't used Zoom very much and so while in theory Zoom is more accessible because families don't have to drive to the school, in practice it didn't go as smoothly as it could have. I ended up giving out my phone number to these families and texted back and forth with several of them since we couldn't get Zoom to work, because the parents were unfamiliar with Zoom and lacked good internet access. It's simple and made parent teacher conferences more accessible. Homework is another area of inequity; a lot of our homework in our department has shifted online, but a lot of the students don't have consistent computer or internet access and expecting students to do mathematics homework on their phones isn't realistic, because of the screen size and the platform wasn't optimized for mobile use. So in many ways paper is more accessible to students.

Student Voice

In my class, I sometimes don't feel like I'm doing enough to address racism, but I believe it needs to be a daily practice. Student voice is something that is really important to me and is something that Gutiérrez (2012) highlights as a key aspect of the power dimension of equity.[2] I try to make sure that every student in the class is heard; one way I've started doing this is through number talks, which I wish I would have started using earlier, because my students are really engaged and have a lot to say. When I do lessons in a number talk style, I post a problem that is more concrete (like visual patterns) and that has multiple entry points for my students. These have been built from more traditional number talks like dot patterns or Fawn Nguyen's Visual Patterns. (See Figure 1 for an example of a number talk, found at http://utahmiddleschoolmath.org/). The students then have time to think about the problem individually and I trust them to be able to make sense of it for themselves. Then I ask them to represent their thinking on paper (in words or images) and turn to a partner so that they can

Figure 1
Example of a Number Talk



[2] Gutiérrez defines equity across four dimensions access and achievement (the dominant axis) and power and identity (the critical axis). Each of these has an explicitly antiracist component that work against systemic racism in different ways.

learn from each other' thinking. Students then get into groups of four and every partnership shares their thinking. During this process I identify specific students that I will ask to share their ideas with the whole class. As a class, we connect the students' names to the ideas that they share, so that they have ownership of the various ways of making sense of the original prompt. Throughout the process every student has an opportunity to be heard and share their thinking with their classmates.

We use small groups a lot and from the beginning of the year we establish group norms collaboratively and work to make sure that everyone gets to collaborate and has a shared responsibility for learning. One of our norms is to make sure that each student can speak and be heard in their groups. I've gotten better at sequencing and scaffolding my instruction so that students aren't expected to jump straight to writing an equation. Instead, I connect what the student can do and are comfortable with and then as a class we build towards the more abstract representations. For example, we will start with a visual pattern or manipulatives and students can often clearly describe verbally how the pattern is growing or changing. I will give them time to think and express in writing as best as they can. I set a timer and students signal if they want more time. Once everyone has something to say, I will ask them to talk with their partners and then with their groups. Discussions are a vital part of my classroom. I will use some writing prompts to help them organize their thinking and communicate more effectively. It's really important that my students feel successful in this class from the beginning and I want them to have opportunities that they've never had before. I also think they need to have multiple opportunities to show what they understand. We believe creating space for student voice prioritizes people and their perspectives over the mathematics. In this way, I communicate to my students that I value them, their thinking, and their perspective. This also ensures that the class moves at a pace that is comfortable for the students.

Beginning of Pandemic

Access to Technology & Resources

In about mid-March of 2020 all the schools in the state sent students home and moved to online learning. At first it was just supposed to be for a few weeks, but it soon became clear that we would finish the year with remote learning. At this point I didn't have any experience with teaching online. I didn't know how to use any of the tools (Canvas, Desmos, etc.) and neither did the students. Everyone was scrambling and there wasn't clear communication to the families about how things were going to work and what the students needed to do. The school was providing Chromebooks, but the school is located in a primarily white neighborhood that is distant from the neighborhoods where most of the BIPOC students live. Many of these students were dependent on public transportation (which was less safe because of COVID) and their parents were unavailable to pick up the computers during regular school hours. During this process the school realized that it would be more equitable to deliver the computers. All of the teachers were assigned a group of students to deliver computers and WiFi hotspots (if needed), but a lot of BIPOC students did not receive their computers. I delivered mine, but I still knew that a lot of BIPOC students had not received computers, so I contacted former students and dropped off their computers as well, including on the weekends and during the evenings when I was more likely to find parents at home. I wanted to make sure that students had what they needed in order to learn.

Promoting Student Relationships

We were supposed to do everything asynchronously, so we created materials and recorded videos and posted them for students to access. With everything asynchronous, I didn't feel like I had a good sense of how my students were doing or what they understood and I was hearing from my students that they felt disconnected from the school. Even though the school asked us not to use Zoom, I started scheduling daily Zoom meetings, usually multiple sessions every day to accommodate different schedules. I never asked for permission and when other teachers found out (months later), I was praised for these efforts by one of the counselors. This was my practice of "creative insubordination" (Gutiérrez, 2016). The meetings were not required, but so many of my students came to the meetings and even students from other classes started coming, too. They wanted to learn and they missed having that connection to the school, to their teachers, and

to each other. I felt like I couldn't do group work in the same way I had in class and it was still hard for me to see what the students were learning like I could in person. I started using Desmos and that helped with being able to see their work and their understanding. I posted the lesson in Desmos (either ones I created or that were premade). I made use of the options within Desmos for students to be able to see their peers' work and learn from it (see Figure 2). Desmos stores and displays the students' work in ways that our online homework system does not; this allowed me to see more of what my students understood (see Figure 3 for an example). I also learned a little bit of coding so that I could give students immediate feedback through Desmos. Desmos allowed them and me to recreate the in-class interactions that we all missed.

This experience also made me appreciate the value of relationships even more. There were students whom I already knew well and I felt like we could maintain relationships in the online setting, but the students who had been in my class only a short time, it was hard to build relationships with them. I felt like it was important to try to balance understanding the challenges of students living in a pandemic with providing quality education. I know teachers were overwhelmed with the situation. but it also seemed like there was a lot of giving up on students and using the pandemic as a reason to do nothing rather than try to correct inequities.

Continuing Challenges and Lessons Learned

Our district is among Utah's most urban districts with one of the highest percentages of BIPOC students. Similar to other parts of the nation, our communities of BIPOC students were highly impacted by the pandemic and so we were the only district in the state that was planning to continue remote learning. Other districts would have a remote option, but the expectation was that most of their students would be in person at the school. I had learned from the previous year how important it was to maintain communication with students, so I made sure that I had good contact information for students. I also started using text (with a Google Voice number to keep my number private following school guidelines) as a way to

Figure 2

Desmos Edit Screen Showing Where Students Would Be Able to See Their Peers' Work (Checking the Bottom Right Box Will Show Students Their Classmates' Responses)

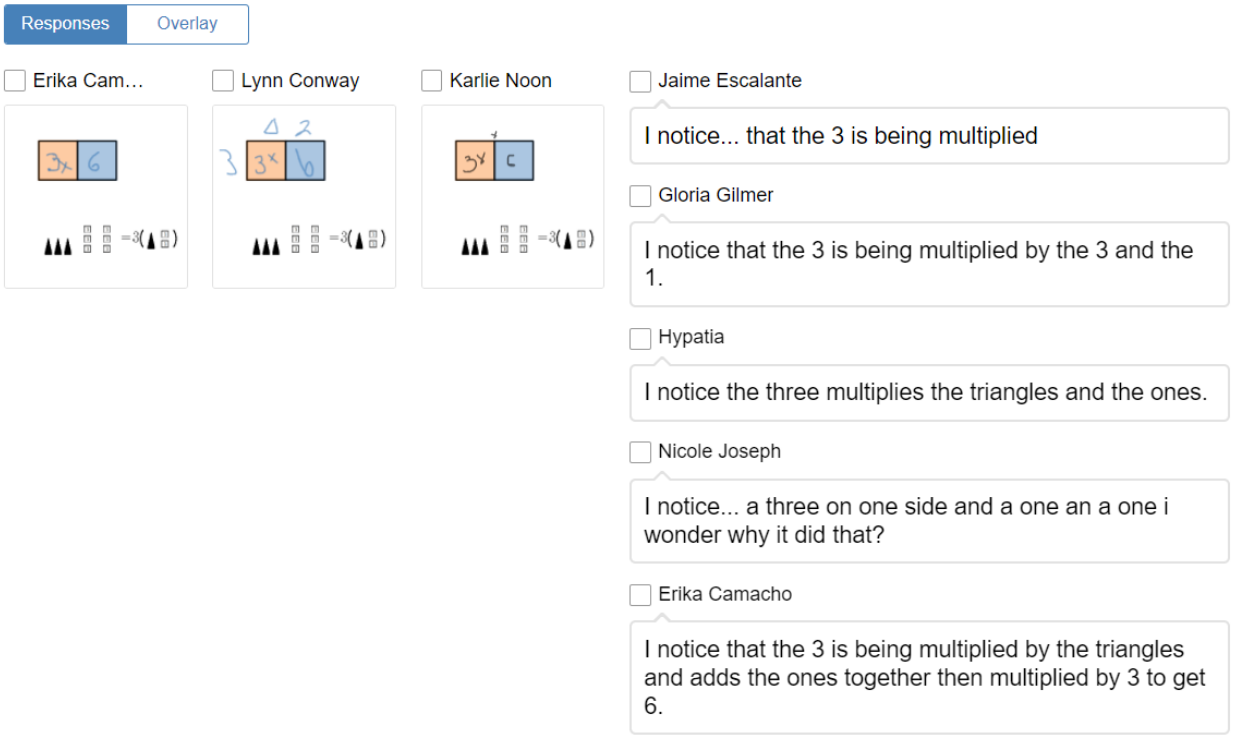
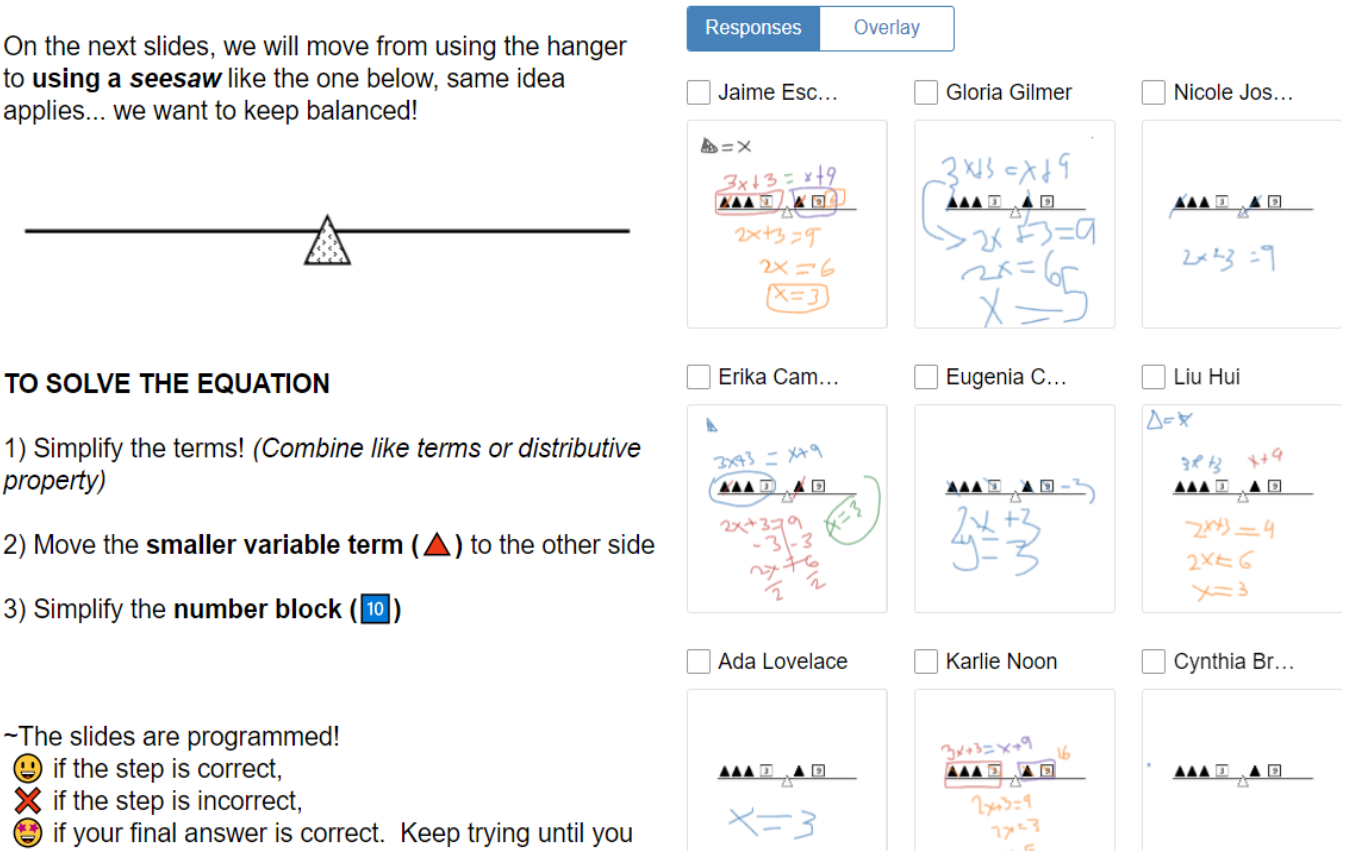


Figure 3

Desmos Screen Showing Anonymized Student Visual Work



communicate more easily with students and for them to communicate with me. I got better at teaching with Desmos so that students could still see each other's thinking. I saw that many of my students were giving better explanations on Desmos about their thinking than they had when we were in person. I think in some ways doing mathematics online reduced some of the social pressure that students can feel when they are in person. They felt more free to be themselves without worrying about what others were thinking. Overall, I feel like teaching went fairly well. I loved to see the students, but not all of them felt like they could keep cameras on and I helped some to get headphones so that they would be able to focus better. The big challenge this year was that I felt like teachers were underappreciated and even villainized. At the beginning of 2021 the state legislature passed a bill to award all teachers in the state a bonus, which was a nice recognition, but then they added a provision that specifically and excluded only our district. We believe this district was targeted because of the higher percentage of BIPOC residents, although this was never stated, but other schools were not targeted in the same and the wording of the bill was carefully crafted to apply only to our district. The state legislature didn't like that we had continued with remote instruction. I felt and still feel like we needed some time to heal from everything, but we were never given any time to heal. Our humanity and social-emotional needs were never acknowledged. We eventually did restart some face-to-face instruction, but we divided the students alphabetically so that fewer were in class at a time, and even then many of my students opted to continue remote learning to protect family members or themselves.

Returning to In-Person Teaching

Now this year (2021-2022) we are back to fully in-person school and possibly the only district in the state that is

requiring masks[3]. I feel like the students coming back this year are really coming back just amazing in what they understand and can do. I still emphasize the importance of communication so I gather contact information on the class name tents, since I know the information in our system is often inaccurate. One of the most important changes that I'm doing this year is to focus on what I call "priority standards." It's hard and makes me nervous to let go of some of the other standards, but I really believe that if we take the time to really focus, and go deep on these standards that the students will get more out of the class and raise their achievement (Gutiérrez, 2012). They will learn more and see themselves as more capable mathematically. This means that we have more time for students to stop and really think about what they are doing. There is time for them to fail and try again and learn from that. I think that process is really important for their learning, to make time go slow rather than rushing through so that we can "cover" everything. This deeper learning means I can have higher expectations and make sure that every student is valued and heard.

In my class, I think it is really important that students feel good about who they are. It's important to me that they feel mathematically capable and that they like math. I know that many of them don't like it. I had them draw emojis to represent their past experiences in mathematics classes and there aren't a lot of happy emojis. But I need them to like mathematics. I know if they like it, they will continue and that means doing things differently, taking our time on things and connecting with how my students think; also taking the time to build relationships and maintain communication. It's important that they know that they have a teacher who really cares about them, who makes sure that they feel good about themselves and also care about the mathematics.

Challenging Deficit Thinking, Confronting Racism, Hurdling Barriers

I hear or worry that "kids are behind, kids are behind." I don't believe that and I don't say that in my class. The kids are not behind. It is a norm in my class to not focus on what students are missing. I think they've come back this year really amazingly. I still think access is really important and we are still doing things on computers, but we don't have enough computers for our students. So I've "borrowed" a computer cart from another department and have been checking computers out to my students after school so that they have that at home to work on. Even some students who aren't in my classes will come to me to check computers out. For me it's just about making sure the students have what they need to be successful.

I know the students have been through a lot and I think there is a lot of unresolved social-emotional trauma. I've noticed this year that there are a lot more fights at school. I've seen, and students have told me about, a lot more racism. The racism is more and more in your face than it was in the past. That is something that I worry about and I try to support students when they experience that. For instance, last year a student shared with me an incident that happened while in line to take a school picture. She, an Asian-American student, was harassed with several racial slurs, like "I don't want to get her virus" or "I don't want her to eat my dog." When the student brought this up to me, I had no idea how to confront this situation. First of all, we were not back in person yet, and this student had already experienced something so horrible from the very few peers she was finally able to see. She immediately shared that she did not want to come to this school at all and experience incidents like this one ever again. Incidents like this one keep BIPOC students from connecting to our school and by extension our math classes.

I followed up with my administration, but unfortunately, I was never told how this was followed up. I did get her in a support class for new students, and I think this class has helped her establish a connection in the school. I now see her in the hallway and she tells me that she has found a very close group of friends from that class that makes her feel included and part of this high school.

My BIPOC students have shared with me their feeling of not belonging in certain math classes. I have them explain to me and they often say that these math classes have few students like them and that they place great value in speed, computations and memorization. In these classes, my BIPOC students feel they are not ready. In an effort to take an antiracist approach, I directly address this

[3] Shortly after I wrote this, the Utah state legislature struck down our county mask mandate.

with them how math is more than that and have really learned to focus more on process than answers. I believe that this supports students to see and believe their own intelligence and that they are mathematically capable. I shared what I have seen my students do last year in our online platform and how my past students have developed the ability to explain their thinking about mathematical concepts and how this is much more valuable. Their recent lessons with visual patterns have shown them the importance of having everyone talk and having their voices heard. In these ways I try to increase their feelings of belonging in a math class.

Conclusion

Connections and Recommendations for Antiracism

Parents & Caregivers[4]

While everyone was scrambling, especially at the beginning of the pandemic, there were missed opportunities for the school to clearly communicate and partner with parents. Instead, the responsibility fell to Lisett, as one of the few BIPOC teachers in the school, to look out for the needs of many BIPOC students and their families. Lisett had taught many of these students in the past (in middle school) and had already established relationships with them and their families. As a result, she would reach out to them and they would reach out to her to make sure that communication was clear and that students and their parents knew what was going on in the school and the classroom.

All administrators and teachers can partner with parents and caregivers through consistent, transparent communication and that communication needs to go both ways. School faculty and staff need to be accessible to and hear families, especially BIPOC families whose voices have long been ignored in schools. The lack of communication could have been addressed by recognizing the language needs of families and asking parents what parent teacher conference options would work for them.

Humanity

Lisett's teaching practices reflect an asset-based belief that all of her students are capable and can contribute meaningfully to their own learning and the learning of their peers. Number talks are used to be quickly accessible to everyone. Small groups provide opportunities for everyone to participate. Giving all of the students time to develop their ideas values the processes the students take to develop and explain their mathematical ideas and communicates that Lisett trusts them to make sense of and communicate mathematics. Lisett recognized that the students desired and needed connections to their peers and to the schools and found ways to provide those connections without requiring them for students who were unable to access or participate. Through the pandemic and political extremism, racism has become more acceptable in public. As students return to school in person, racism will follow them. BIPOC students will need support and understanding from school personnel and antiracism will need to be a school-wide emphasis and cannot be left only or primarily to BIPOC faculty and staff.

These practices require flexibility, awareness, and a willingness to listen to our students, especially BIPOC students whose humanity is often masked by outdated (and racist) policies and practices. We must also fundamentally believe and trust our students and choose practices that value and center their humanity. The entire pandemic has underscored the need for leadership to provide for the humanity of school faculty and staff. For teachers to support the social and emotional learning of their students they also need time and support to take care of their own social and emotional needs. This is especially true for BIPOC faculty and staff who often are given or take on additional responsibilities to look out for BIPOC students and experience racism in the school system.

Assessment

Lisett recognized that assessment would have to change in this setting and would need to take into account the different events going on in students' lives. This required creativity and shifting practice to find ways for students

[4] Headings in this section refer to key ideas in the TODOS (2020) Antiracism Position Statement.

to show what they can do and understand in flexible ways. Sometimes this meant making creative use of technology to provide students opportunities to show their thinking to Lisett and to each other. At other times, this meant using paper and pencil in order to make the process accessible to students without technology. At all times, it means highlighting what students know and can do.

Technology

The pandemic has highlighted the already existing inequity of technology for schooling. At a minimum this includes reliable internet access and a computer. While the school provided these, Lisett made sure they got to the students who needed them. As schools have and continue to return to in-person classes, this digital inequity will not disappear. However, we fear that our collective focus has already shifted amid deficit views of students being behind. Instead, we need a continued recognition that systemic inequities persist and an asset-based focus that students can and have learned important lessons through the challenging circumstances they have faced.

Final Thoughts

This pandemic has increased focus on our most vulnerable students. These BIPOC students need to know that we believe in them, their potential, and their growth, that we value their thinking, and that we value who they are. Students more than ever need to feel like they belong in our school and that we are their community. Our students cannot carry the label of "being behind" if we want them to move forward with resilience and hope. During the pandemic they have learned mathematics, they have approached mathematics in new ways, and have returned to school with important knowledge and skills. The narrative of "learning loss" seeks to strip that away from them (TODOS, 2021). We must continue to enact antiracism despite the difficult times we face and teachers need appreciation and support to move forward and support our students.

References

Gutiérrez, R. (2012). Context matters: How should we conceptualize equity in mathematics education?. In Beth Herbel-Eisenmann, Jeffrey Choppin, David Wagner, & David Pimm (Eds.), *Equity in discourse for mathematics education* (pp. 17-33). Springer.

Gutiérrez, R. (2016). Strategies for creative insubordination in mathematics teaching. *Teaching for Excellence and Equity in Mathematics, 7*(1), 52-60.

National Council of Teachers of Mathematics (1989). *Curriculum and evaluation standards for school mathematics*. Author.

Salt Lake School District (2022). *District Demographics*. https://bit.ly/3mxjCMv

TODOS: Mathematics for All (2020). *The mo(ve)ment to prioritize antiracist mathematics: Planning for this and every school year*. Author. https://bit.ly/3j5Yvip

TODOS: Mathematics for All (2021). *Where is Manuel? A rejection of 'learning loss'*. Author. https://bit.ly/3ts20FQ

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. What can university faculty and others learn by taking time to listen to teachers' experiences?

2. What parallels did you find in the pandemic-driven instructional challenges Lisett faced or in her commitment to addressing them?

3. Does the school where you live or work have some form of "tracking"? Do the demographics of the "honors" level deviate noticeably from the general school population?

4. Of the many strategies Lisett used, which one or two could you most readily see yourself using (or continuing to use) in your situation, even after the pandemic is completely over? Why? Is there a strategy she did not discuss that you use or could imagine using? Explain.

5. How could you use these or other strategies to make antiracism a daily practice?

6. Lisett mentions prioritizing some standards over others. Is this something you have faced as well? Explain. Does it feel similar in spirit to how the NCTM's first volume (1989) of standards called for "increased attention" to some topics and "decreased attention" to others?

7. Has this article given you different thoughts about what antiracism is and how it should be manifested in your context?

TODOS
Mathematics for ALL

The mission of TODOS: Mathematics for ALL is to advocate for equity and high quality mathematics education for all students—in particular, Latina/o students.

Five goals define the activities and products of TODOS: Mathematics for ALL

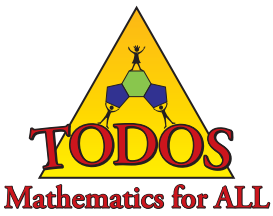
1. To advance educators' knowledge and ability that lead to implementing an equitable, rigorous, and coherent mathematics program that incorporates the role language and culture play in teaching and learning mathematics.

2. To develop and support educational leaders who continue to carry out the mission of TODOS.

3. To generate and disseminate knowledge about equitable and high quality mathematics education.

4. To inform the public and influence educational policies in ways that enable students to become mathematically proficient in order to enhance college and career readiness.

5. To inform families about educational policies and learning strategies that will enable their children to become mathematically proficient.



Grappling With the Messiness of Becoming Antiracist Educators Through Learning our Historias

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Abstract

We use vignettes from two research projects to illustrate how we seek to engage with the messiness of becoming antiracist educators. We show how we center historias in mathematics to affirm individual experiences and create opportunities to disrupt white supremacy in math education. We find that such work is complex and nuanced, requires deep and critical engagement from researchers and prospective elementary teachers, and entails creating authentic relationships that allow for vulnerability and foster solidarity within and beyond institutional contexts.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. How have aspects of your own identity impacted your experiences as a math learner?

2. How have you thought about supporting students to grapple with issues of race and racialization in mathematics?

3. How do you create opportunities in your mathematical learning community to make space for vulnerability and solidarity with your students?

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Sandra Zuniga-Ruiz (sandra.zunigaruiz@sjsu.edu) is an Assistant Professor in the Teacher Education Department at San José State University. Her work is informed by her experiences growing up in a predominantly Mexican immigrant community, her desire to become educada in mathematics, and her commitment to support and serve the next generation of educators teaching in the barrio.

Anselma Martinez Gomez (anselma.gomez@alisal.org) is a 6th-grade maestra in east Salinas, California. She has been working with K-12 students for 3 years, and this is her first year teaching in her own classroom. She aims to create an inclusive and culturally responsive classroom environment for all of her students.

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Grappling With the Messiness of Becoming Antiracist Educators Through Learning our Historias

Mallika Scott, Sandra Zuniga-Ruiz, Anselma Martinez Gomez, and Tai Phan

We, four non-Black women of color - maestras, mothers, daughters, learners, immigrants - come together to share our historias in our conceptualization of antiracist work in mathematics education. We are intentional about our use of the word "non-Black" to disrupt the continued erasure of Black people through general terms such as POC. We use "historias" in contrast to stories as we understand historias to be collective and historical beyond the individual person. We all have lived and worked in highly segregated communities composed of majority non-Black people of color with a multiplicity of intersectional identities. Tai is the daughter of Vietnamese immigrant parents, an aunt, and a 5th-grade teacher. Anselma is an immigrant mujer from Michoacan, Mexico, a daughter, sister, and a 6th-grade maestra (teacher). Sandra is the daughter of an immigrant mother, the mother to a brilliant happy child, and an educator committed to justice. Mallika is the daughter of a South Asian immigrant mother and a White father, a single mother to two beautiful sons, and a teacher educator. In this paper, we tell stories from projects in two different communities where Mallika and Sandra were researchers/educators and Tai and Anselma were co-participants and pre-service educators. Through our collective historias, we illustrate how we conceptualize what it means to take an antiracist stance in mathematics education.

We each come from communities that have tended to hold colorblind ideologies where there are few opportunities to name racism explicitly. Our multiplicity of identities come with privilege and marginalization that can be messy to recognize and untangle. In our work in education, we seek to engage in antiracist teaching in ways that honor the complexity of our identities while also working to fight and challenge the anti-Blackness that pervades our society. For us, working toward antiracism in mathematics education entails centering historias to affirm individual experiences and to provide opportunities to recognize and disrupt ideologies of white supremacy (Marshall & Chao, 2018; San Pedor & Kinlock, 2017; Sengupta-Irving et al., 2013). We present vignettes from two research projects to illustrate how historias can become a resource for prospective teachers to grapple with the messiness of disrupting dominant ideologies and to learn to see children more fully and to connect with them as human beings.

Through these vignettes, we hope to illustrate the opportunities for learning that can become possible when we create spaces that support aspiring teachers to share their own experiences with mathematics and collectively use them as a resource to make sense of intersections of identity, ideology, and mathematics. These experiences with mathematics are fraught with the tensions inherent in living and working within systems that we are hoping to change. We aspire to support teachers to make sense of the ways these systems are highly constraining, while also exploring our agency as individuals to shape our own historias. Inviting historias in this way requires ongoing attention to the relational aspects of learning communities to create spaces that allow for vulnerability and foster a sense of solidarity. We consider this work to be an ongoing process of becoming antiracist educators -- a journey of learning and growing that is never fully finished.

Centering Historias: Mallika & Tai

Mallika and Tai met over Zoom in August 2020 in a math methods course that Mallika taught in the first-ever Ethnic Studies cohort in our university's K-8 teacher credentialing program. Tai opted into this cohort and was a student in the course. Over the course of the semester,

our math methods community became very close; as Tai wrote in a course reflection, "Although this class was through Zoom, I truly felt that our class had an amazing bond. We supported, cared, encouraged, cried, and laughed with each other." This strong sense of community became possible because we collectively created a space where we could share with more vulnerability than is typical in academic environments. Mallika intentionally chose to be vulnerable about the challenges she was experiencing as a single mother and early career faculty member during a global pandemic, and she created opportunities for Tai and other members of her cohort to be vulnerable with her and with each other. For example, students each kept an online journal where they were invited to share both academic and personal reflections and we took time during our class sessions for personal connection and to discuss the many upheavals in our lives from acts of racial violence to evacuations from wildfires to the anxiety of the 2020 election. Creating this type of close community where students could be open, honest, and vulnerable with each other built a foundation where students could engage in difficult and intimate conversations about the ways ideologies of white supremacy impact mathematical learning, both for themselves and for children in classrooms.

Mallika's Research Vignette

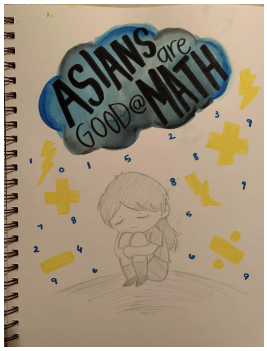
To illustrate the ways that personal experiences can become a window into exploring how identity, ideology, and mathematical learning are intertwined, we use examples from Tai's work during the methods course. I reached out to Tai to collaborate on this paper because her work exemplifies the learning that can become possible through engaging with our own historias. Given our different time constraints and work responsibilities, we decided that I would take the lead on writing, with Tai providing input and feedback along the way.

At the beginning of the course, students write a letter about their experiences with math and create an accompanying art piece. With this cohort, I took a question I had used before ("What messages did you receive about yourself and about mathematics during your journey?") and added the prompt, "How were these messages related to aspects of identity (e.g. race, class, gender, (dis)ability, cultural or linguistic background etc.)?" This question was intended to help students begin to use their own experiences as a resource to make sense of how mathematics is entangled with identity and with larger social forces. Tai started her letter by writing:

> My math journey was quite a rocky one if I do say so myself. I came to the United States at the age of four from Vietnam. I am pretty sure you know that Asian stereotype: Asians are good at math. Well, I am definitely not one to fit into that category. It also does not help that I could not speak and understand English at the time, so this made matters worse for me when the teacher tried to communicate with me. I was absolutely horrible at multiplication tables. I felt that this made me despise math even more so because it was just constant memory drilling. It was even more difficult for me because I grew up in a family of math scholars. When they saw my grades in math, they would punish me and make me do tons of worksheets while yelling at me when I got the wrong answers.

With this assignment, I was struck by the creative ways Tai conveyed the powerful emotions math evoked for her and connected these with her experiences in school, her personal background, and ideologies embedded in the racial narrative that "Asians are good at math." Evident in her letter and artwork (see Figure 1) are the ways her experience was impacted by intersecting aspects of identity, including her racial identity, her linguistic background, and her positional identity within her own family. In addition, Tai connected her experience to curriculum and pedagogy when she highlighted the emphasis on memorization. As a follow up assignment, students interviewed someone in

Figure 1
Tai's artwork



their lives about their experiences with mathematics. Tai chose to interview her best friend who also identified as Asian and had to navigate the same racial narratives. She described the ways her friend, as the oldest child of parents who did not speak English, began at a very young age to manage bills and to research and apply for programs like Medi-Cal/Medicaid that could help support his family. In describing their contrasting experiences, Tai wrote that they "both experienced the Asians are good at Math stereotype; but, he turned that into a positive drive in his life and strived for a higher math education." Interviewing her friend added nuance to Tai's thinking about racial narratives and individual agency, and it provided an opportunity to consider the role of mathematics beyond educational institutions, in the everyday lives of people she knows.

Across these two assignments, Tai made connections between personal experiences, specific math contexts, and ideologies such as racialized hierarchies of mathematics ability (Martin, 2013, 2019). This type of reasoning was evident across Tai's participation in the methods course. For example, a few weeks later, in a journal reflection on readings and a video about anti-Black racism and white supremacy in the mathematics classroom, Tai intertwined her own personal experiences with issues of systemic racism in mathematics. She began by commenting: "Many teachers do not realize that they bring in their personal biases into the classroom. I have personally experienced this myself as a student and it is painstakingly detrimental to my studies. I cannot imagine what Black students have to endure." Here, Tai drew on her own experience with bias to empathize with Black children while also implicitly acknowledging the ferocity of anti-Black racism in US schools by naming her limitations in knowing their experience. Tai used her personal experience to critically reflect on mathematics education and to find solidarity with children as mathematical learners (Scott & Philip, under review).

As Tai engaged in this type of reasoning and began having new experiences with mathematics in the course, her own relationship with mathematics began to shift. In her closing course reflection about what she learned she wrote:

> I was so scarred from my haunting past of "Asians are good at math" that I restricted myself to grow. [...] I now feel that I am capable in taking on all types of mathematical problems. In the past, I thought that in order to be considered good at math, you needed to get 100% on all the timed multiplication tests. Now, I believe that everyone has the capabilities of being good at math when we allow them to share aloud their opinions and ideas.

While Tai again used strong language to connect her past negative mathematical experiences with ideologies about mathematics, she also showed a new sense of agency and competence with mathematics. She even returned to the topic of multiplication tables from her opening letter as she named a more expansive view of mathematical competence than she experienced in school. Reading Tai's final reflection was emotional for me because it seemed like she experienced a form of healing in our mathematics community, and it felt deeply meaningful to me to be part of her journey. When I asked Tai to share some of her thoughts after reading this vignette and reflecting on her experience in the course, she commented on the ways the course helped her push against the pervasive deficit thinking in math classrooms: "One biggest thing that I never want to bring into the classroom is detrimental thinking. I have encountered so many educators that said 'Oh, they won't be able to do that.' Well, how will you know if you never try? Children have the ability to surprise you with what they know."

Matemáticas Pláticando: Anselma and Sandra

Anselma and Sandra met when Sandra was a graduate student and Anselma was an undergraduate student at a Hispanic Serving Institution, intending to become an elementary teacher. As the years progressed, both Anselma and Sandra got to know one another better, and built trust and care for one another, using their lived experiences to connect and reimagine children's mathematical experiences grounded on the enseñanzas de nuestras madres, para un futuro mejor (teachings from our mothers towards a better future). The support for one another came from having difficult conversations about immigration, being labeled ESL learners and having immigrant mothers who work *en el campo* (in the fields). This vignette is written through Sandra's point of view as she was the main writer with Anselma providing feedback

and input throughout the process. The collaborative nature provided opportunities for Anselma to see the writing process as well as to capture authentically her historia.

Sandra's Research Vignette

For my dissertation study, I engaged in a six-month long project with four self-identified prospective Mexicana maestras (Inez, Anselma, Luz and Jenni [all pseudonyms except Anselma]) who had a commitment to educational justice. I had known the mujeres (women) for some years and we had built a relationship in various capacities. My role was to be both a researcher and a participant of this space. One of the goals was for us to engage in *pláticas* (critical conversations) about learning mathematics and justice with explicit attention to race. Knowing who they were was an integral component to the design and goals of this learning community. That is, there were issues I was attending to based on what I knew from our previous experiences. For example, the prospective maestras had narrow and proceduralized math experiences, thus developing more expansive views of mathematics was part of the design process to think about justice and racial equity. It also meant historias were centered in our pláticas to create opportunities to be both vulnerable and in solidarity with one another.

During our second plática, I wanted the prospective maestras to engage with the idea of mathematics as a cultural activity. The women discussed the Oksapmin counting system and the study done in Brazil about candy sellers (Saxe, 1981, 1988). The goal was for the women to expansively view mathematics as an everyday activity. Furthermore, I aimed at disrupting the binary of math/non-math people, centering the use of mathematics in our everyday lives and expanding narrow ideas of math.

At the end of the check-in, I asked the women if they had any other thoughts about identity and mathematics. Inez shared that she was thinking about her father and his own mathematical identity. This sparked Anselma's reflection. She asked,

> "Is that like identidad? How your math identity changes. Because that is what I was thinking. My mom no termino la primaria (didn't finish school) and she barely reads. But with numbers, with mental math and money. She is really good at that. She used to sell fruta (fruit). She goes on to sell temporada de maiz (corn season), y luego vendían eso en el pueblo con medidas (they would sell in town with measurements). She was really good at that. Y le pregunto, ¿cuánto es un litro? (I ask her, how much is a liter?) And she would be like es más o menos esto (approximately this). Y yo ni se que es un litro! (And I don't even know what a liter is) Pero, it's like, a ella se le introdujo, hizo experience (But, it's like, she was introduced, she had the experience). Is that her identity with math? And my identity is more like school?"

Anselma was starting to grapple with what it means to be a doer of mathematics and who gets to do it. Through her personal reflection about her mother and her own mathematical experiences, the juxtaposition of "Is that her identity with math? And my identity is more like school?" framed Anselma's new understanding of mathematics identity as situated. Furthermore, such conversation began to center the community and experiential knowledge Anselma's mother possessed as she navigated harvesting elote and selling it. Anselma continued:

> "I have never thought about it, yeah, I love math and all that. Pero tambien (also) now that I think about my mom. I am not like her. The reason why I went to math was because I came here. In Mexico I was not into math. No le di importancia (I didn't care for it). I would do the math because I had to. It was the only subject que le entendia (that I understood). It was a review, you are good at it, me la crei (I believed it) and I stuck with it. I am so good at math, but I had to work extra for that. I would stay after school, I would go to tutor in the morning. At 6 am I was already at my high school! And people would tell me I was good at it, and I would then work hard for it so I could be good at it! Aahh! So maybe I am not as good at math as I thought."

Again, through reflecting about the experiences of her family, she began to see the multiplicity of meanings between being good/not good at math (Yeh & Rubel, 2020). While such binaries are indeed problematic, it is the beginning of the messy and complex (re)learning that needs to happen as we engage in critical conceptions of mathematics. For Anselma, this meant challenging the notion of being good at math and connecting to her schooling experiences in the US and in Mexico. Disrupting ideologies such as these is a powerful first step

to engage in understanding the racialization that happens in mathematics since race is rarely explicit (Philip, 2011). Furthermore, for Anselma, being positioned as a "math person" supported her in continuing her studies in high school and college. During her initial interview, Anselma shared about the challenges she experienced as a labeled "ESL student" and how math became her safe place and what motivated her to go on to college. This alludes to the complexity of attending to the disruption of such ideologies while honoring Anselma's lived experiences.

As part of the check-in during the following plática (Plática 3), Anselma brought up her belief of being good at math as a natural gift, as she didn't realize how much effort she had put in her math classes. She then posed the following question to her co-participants: *Is math a gift or something we work for?* In the coming days, Anselma wrote in her reflection: I see a connection between what we've discussed to how my relationship with math is not as "good" as I thought. My identity as a math "lover" was created by forcing myself to understand it and prove my other teachers wrong about how "smart I was.'" This shows how Anselma's understanding of her relationship with math had become more nuanced – her use of "good at math" was expanding to include her position both in math and in her other classes. Anselma was beginning to connect ideas about being good at math as an innate ability, smartness and how that positioned her a particular way in the eyes of her "other teachers" who positioned her in a low status because of being an ESL student. These ideas are inherently connected to racialized hierarchies about who is considered smart and who can do mathematics. This illustrates the messiness of unpacking ideologies that are rarely explicit and uphold white supremacy.

As the pláticas continued, the women continued to problematize understandings about race and liberatory mathematics. For Anselma, having opportunities to discuss these complex issues helped her understand more about the race and racialization embedded in her everyday life and the challenges that may arise. During one of her pláticas she explained, "No se nos inculca hablar de esto (we are not raised to speak about this [*referring to race, racialization, anti-Blackness*]) . I can talk about language, nationality but not race. So como sacamos lo que aprendemos aqui? (how do we move beyond this?)." For Anselma, pláticas were a safe space to talk about such issues but there was a need to move beyond the space towards action. During her final interview, when asked about race and mathematics education, Anselma responded,

> "Me toma mucho trabajo hablarlo y decirlo, yo digo viva la raza. Como de revolución–pero eh, race? (It takes a lot of work to speak about it and say it, I say "long live the raza/race" as a form of revolution, but race?) That's different. Que es raza? (What is race?) Nos estamos racialized but we are all humans. These factors are created, it is a social construct, but it is there, people use it, it exists. We have created it. Como nos desasemos de eso? (How do we get rid of it?) Before, I would not consider it [*referring to race and math*]. I would not – no le miraba la relacion (I did not see the relationship). Pero de las pláticas, it is important. Let's think about humans, not just statistics."

Later in the interview, she commented, "We see people in math and we think they are the most inteligentes (smart). Mostly in math it is male, and when we learn math, son ancestrales blancos (white ancestors)" concluding, "Here in los Estados Unidos we are all segregated." Anselma continued to share about her local community that is segregated and the narratives that are constructed about a "worse school" (the one she attended) which happen to be predominantly Latinx while the "good school" is predominantly White. Anselma was understanding the many layers embedded in a racialized society that perpetuates hierarchies of groups of people. While anti-Blackness was part of our conversations in the pláticas, it did not come up for Anahi when speaking about race, justice, and mathematics learning during the final interview. Yet, Anselma was making new connections between white supremacy and mathematics, laying the foundation for digging more deeply into specific aspects of racism in schools such as anti-Blackness.

Anselma continued to understand and solidify her commitments to better educational opportunities for her future students while holding on to the challenges that may arise. During one of the platicas the women were asked how one could reimagine education. Anselma shared about the importance of cultivating opportunities for children to speak up and have a voice:

> "And it goes back to eh… cómo enseñarle a los niños (how to teach children). Esta falta de confianza, de esta voz (this missing confidence and voice) it starts

> from there, it starts from the beginning. Matemáticas ~~s~~iempre es algo bien individual (Math is always very individualistic). And that was the subject that gave me confidence to be where I am at right now, even though, because fue el trabajo más individual (it was the most individual experience)… But for the other subjects I felt intimidated from the rest. In math, en mi propia burbujita porque nadie me molestaba. (in my own bubble, no one bothered me) … For me, I loved that. I was encouraged to do that, math approved that isolation. So I guess we would go back to mathematics and make it more like you having a voice and not just you."

Through her reflection, Anselma connected her own experiences in schooling with those of her future students. Anselma was not only critical of the ways that she did not develop a voice because of the individualistic nature of mathematics, she was also aware of the need for children to develop that voice. This was the beginning of seeing children's humanity and the value of creating dignity affirming learning communities. While these conversations were the beginning of this never-ending learning trajectory, Anselma noted during her final interview that her commitment to justice has grown and this is the beginning of what she calls "cultivando el hambre de aprender" (cultivating the hunger to learn) for all her students.

Thinking Across Our Stories

Tai and Anselma illustrate the power of reflection and of the willingness to be vulnerable with past experiences. For Tai, that meant digging into racial storylines about mathematics that are prevalent in our society and the effects these may have on people who do not fit into the mold. These ideologies along with being othered for being an "ESL" student constrained and dehumanized Tai. In contrast, Anselma grappled with how she was perceived as "good at math" while also being an ESL student. For Anselma, leveraging her smartness in mathematics helped to counterbalance her dehumanization in classes where she was expected to speak perfect English. Both examples illustrate the complexity of the multiplicity of identities that the women possess. Mathematical identity does not simply reside in a vacuum but rather it is shaped by our experiences, and intersects with other identities. The positions of both of these women are important: they stand at opposite ends of the spectrum of mathematical identity, but there is (re)learning happening as they reflect on their past experiences. Furthermore, their historias opened possibilities of learning who they are and who they seek to become as educators. Exploring their own historias also created new ways to view and think about children. Tai thought about the ways anti-Black racism is embedded in our society and she developed a strong commitment to bringing an anti-deficit lens into the classroom. For Anselma, centering children's hunger for learning and voice helped her imagine new possibilities of learning for the children. Ultimately, both women demonstrate agency in navigating dehumanizing and inequitable systems and structures.

Mallika's and Sandra's Journey of Becoming

Mallika and Sandra met during their graduate studies several years ago. As two women of color in a mostly White space, we gravitated to one another and supported each other in our academic journeys. Mallika had begun graduate school several years before Sandra, completed her studies in May 2019, and then moved away for a job, no longer sharing the same academic spaces. In April 2020, we reconnected when we found ourselves attending the same virtual conference about justice in education. Our joy in finding each other during such a difficult moment sparked the beginning of a deeper collaboration in which we started to think across our different projects to explore issues of justice, mathematics, and teacher learning that are close to both of our hearts. Thus, our relationship has evolved throughout the years with a strong and explicit commitment to support one another, to learn with each other, and to contribute to more just educational opportunities for our students and communities.

We offer these stories from our projects with the hope of showing the power of treating historias as an opening to consider identity and ideology in the mathematics classroom and to begin to imagine new possibilities for children. This work is messy and personal, and we have found in our own journeys that academic spaces rarely provide space and support to engage with that messiness. In this current moment, when antiracism is receiving more attention, we are simultaneously hopeful and apprehensive. Teacher education can often emphasize the

development of specific knowledge and practices, without giving as much attention to the relational work or complexity of justice-oriented teaching (Bartolome, 1994; Philip et al., 2018). The personal mathematical experiences of Tai and Anselma help to illustrate the wide variety of mathematical journeys and the potential for deeper thinking and for healing when we create learning environments that honor hese diverse experiences as valuable resources for learning. Their historias demonstrate ways to push back on essentialized categories such as "English Language Learner" to allow for more nuanced and complex understandings of ourselves and of children. In addition, inviting personal experience as a resource can counter the tendency in teacher education to reproduce white supremacy by maintaining firm boundaries between the personal and academic and narrowly defining appropriate ways of knowing and being. Creating spaces where novice teachers feel comfortable sharing vulnerably about their personal experiences and find solidarity with each other and with children requires deliberate and ongoing attention to the relational, as was evident in the vignettes we shared. Whatever your role in education, we invite you to consider how your own historia with mathematics and the historias of the people you work with might provide openings to think more deeply about the ways white supremacist ideologies impact mathematical learning. We also invite you to be in community with others in ways that expand beyond the narrow ways of knowing and being that often dominate academic spaces to support people to bring their full selves to mathematical teaching and learning.

Our efforts toward becoming antiracist mathematics educators remain a work in progress needing ongoing reflection and revision. The narratives we've shared suggest the need for more interdisciplinary and integrated approaches to antiracist education, both in teacher preparation and in K-12 classrooms. For example, while Tai thought deeply about how racialized hierarchies of mathematical ability impacted her own experiences and were related to specific mathematical contexts, the methods course did not offer her opportunities to make sense of how the racial narrative of "Asians are good at math" is intertwined with capitalism, immigration, the Cold War, and anti-Blackness in education (Martin, 2019; Shah, 2019). We have found mathematics to be a particularly challenging space to make these connections because of the entrenched history of the discipline being treated as objective, apolitical, and acultural (Agarwal & Sengupta-Irving, 2019). Collaborating with educators across disciplinary boundaries could allow for deeper exploration of the ways white supremacy is embedded across systems and connected to the larger sociopolitical context. We hope the stories we have shared here can spark future collaborations that span different contexts and disciplines to further explore connections between identity and ideology through learning our historias.

References

Agarwal, P., & Sengupta-Irving, T. (2019). Integrating power to advance the study of connective and productive disciplinary engagement in mathematics and science. *Cognition and Instruction*, *37*(3), 349-366. https://doi.org/10.1080/07370008.2019.1624544

Aguirre, J. M., Mayfield-Ingram, K., & Martin, D. B. (2013). *The Impact of Identity in K-8 Mathematics Learning and Teaching: Rethinking Equity-Based Practices*. National Council of Teachers of Mathematics, Inc.

Bartolome, L. (1994). Beyond the methods fetish: Toward a humanizing pedagogy. *Harvard Educational Review*, *64*(2), 173-195.

Marshall, A. M., & Chao, T. (2018). Using mathematics autobiography stories to support emerging elementary mathematics teachers' sociopolitical consciousness and identity. In S. E. Kastberg, A. M. Tvminski, A. E. Lischka, & W. B. Sanchez (Eds.), *Building Support for Scholarly Practices in Mathematics Methods* (pp. 279-296). Information Age Publishing.

Martin, D. B. (2000). *Mathematics success and failure among African-American youth: The roles of sociohistorical context, community forces, school influence, and individual agency*. Routledge.

Martin, D. B. (2003). Hidden assumptions and unaddressed questions in mathematics for all rhetoric. *The Mathematics Educator*, *13*(2), 7-21.

Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record*, *111*(2), 295-338.

Martin, D. B. (2013). Race, racial projects, and mathematics education. *Journal for Research in Mathematics Education*, *44*(1), 316-333. https://doi.org/10.5951/jresematheduc.44.1.0316

Martin, D. B. (2019). Equity, inclusion, and antiblackness in mathematics education. *Race Ethnicity and Education*, *22*(4), 459-478. https://doi.org/10.1080/13613324.2019.1592833

Philip, T. M. (2011). An "ideology in pieces" approach to studying change in teachers' sensemaking about race, racism, and racial justice. *Cognition and Instruction*, *29*(3), 297-329. https://doi.org/10.1080/07370008.2011.583369

San Pedro, T., & Kinloch, V. (2017). Toward projects in humanization: Research on co-creating and sustaining dialogic relationships. *American Educational Research Journal*, *54*(1), 373S-394S. https://doi.org/10.3102/0002831216671210

Saxe, G. B. (1981). Body parts as numerals: A developmental analysis of numeration among the Oksapmin in Papua New Guinea. *Child Development*, *52*(1), 306-316.

Saxe, G. B. (1988). Candy selling and math learning. *Educational Researcher*, *17*(6), 14-21.

Scott, M., Philip, T.M. (year) "We ask so much of these tiny humans": Supporting beginning teachers to honor the dignity of children as mathematical learners. [manuscript submitted for publication]

Sengupta-Irving, T., Redman, E., & Enyedy, N. (2013). Re-storying practice: Using stories about students to advance mathematics education reform. *Teaching and Teacher Education*, *31*, 1-12. https://doi.org/10.1016/j.tate.2012.10.007

Shah, N. (2019). "Asians are good at math" is not a compliment: STEM success as a threat to personhood. *Harvard Educational Review*, *89*(4), 661-686.

Yeh, C., & Rubel, L. (2020). Queering mathematics: Disrupting binary oppositions in mathematics pre-service teacher education. In N. Radakovic & L. Jao (Eds.), *Borders in mathematics pre-service teacher education* (pp. 227-243). Springer.

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. Anselma uses a very interesting phrase, *cultivando el hambre de aprender.* How are you thinking about "cultivating the hunger to learn" in your learning community?

2. Tai's experience with racial narratives shaped her mathematical experiences profoundly. What new insights do her experiences offer us as teachers and teacher educators? Given that narratives and racialized hierarchies of ability remain prevalent, what might we as teachers and teacher educators do to address the harm they may cause for students?

3. Tai and Anselma both grapple with the ideology of narrow definitions of mathematics, what other ideologies exist in mathematics that uphold white supremacy? How are you thinking about addressing them in your learning community?

"DARE to Reach ALL Students!"

TODOS Mathematics for ALL

How Four White MTEs Attempted to Acknowledge, Act, and Hold Ourselves Accountable for Incorporating Antiracism Into Graduate Courses for Teachers

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Abstract

In this paper, we (four white Mathematics Teacher Educators) present a cycle of acknowledgement, action, and accountability where we grapple collectively with how to support mathematics teachers in interrogating characteristics of white supremacy culture. In putting this lens on our course design, we realized the need to interrogate our own practices as mathematics teacher educators (MTEs) and more personally embark on self-work as we unlearn racist, yet culturally normative, practices. In that vein, we discuss our shared tensions, doubts, and concerns, and how we interrogated our own teaching practices, which we continue to do in an ongoing process.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What do you think of when you hear the phrase *white supremacy culture*?
2. How do you see white supremacy culture influencing your personal and professional lives?
3. What do you think it means to engage in cycles of acknowledgement, action, and accountability? Share how you may have been doing this.

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How Four White MTEs Attempted to Acknowledge, Act, and Hold Ourselves Accountable for Incorporating Antiracism into Graduate Courses for Teachers

Robin Keturah Anderson, Travis Weiland, Lorraine M. Males, and Kelsey Quaisley

Introduction

In this paper, we (four white mathematics teacher educators, MTEs) present a cycle of acknowledgement, action, and accountability (TODOS & NCSM, 2016) in the process of grappling with supporting mathematics teachers in masters-level courses to interrogate white supremacy culture (Jones & Okun, 2001). Table 1 includes the characteristics of white supremacy culture that we grappled with most prevalently, with examples on how they showed up most prevalently in our work in noticing and addressing these characteristics in mathematics education. For the entire list, see the Appendix. We adopt Okun's (2021) description of white supremacy which, "refers to the ways in which the ruling class elite or the power elite in the colonies of what was to become the United States used the pseudo-scientific concept of race to create whiteness and a hierarchy of racialized value in order to disconnect and divide [people from each other, the natural world, and ourselves]" (p. 2).

During our collective process, we realized that we first needed to begin to interrogate the characteristics of white supremacy culture in our own practice as MTEs and within the institutional structures where we operate. While we collectively interrogated our practices, we also found instances of opportunities to take up self-work to unlearn racist, normative practices that perpetuated in our personal and professional lives. In the spirit of modeling vulnerability (Moore, 2021) we present this piece knowing that "vulnerability is a de/colonial move. Since colonizers want and enact control, vulnerability allows for letting go of control-based narrative to expose tender, raw parts of ourselves" (Boveda & Bhattacharya, 2019, p. 17). To do so, we begin by **acknowledging** our collective positionality (Aguirre et al., 2017) and situate this work with the call from TODOS (2020). Next, we describe the actions we took to enact the interrogation of white supremacy culture into our coursework and how these actions lead us to deeper acknowledgement and self-reflection. Finally, in our attempt to hold ourselves **accountable**, we share steps we have taken collectively and individually to continue to develop towards being antiracist mathematics teacher educators.

Table 1

Characteristics of white supremacy culture we grappled with most prevalently

Characteristic	How It Shows Up	Examples	How It Disconnects and Divides
Sense of Urgency	• Focusing on results over process • Sacrificing collaboration and dialogue for results	Overuse of direct instruction Strict pacing guides	Promotes anti-democratic and anti-dialogic communication rather than collaboration and devalues the process of doing things and the time it takes to do something well for all stakeholders and the community.
Quantity over Quality	• Focus and value placed on production of measurable goals and products. • Devaluing of process	Overly focused on summative assessments	Ignores value of unmeasurable goals such as relationships, community building, dialogue, reflection, democratic decision-making and the importance of process in accomplishing tasks and measurable goals.
Worship of the Written Word	• Does not take into account or value non-written information sharing	Prioritizing the written form of mathematics and communicating over other forms	Limits how people can communicate, advantaging some people over others.
Power Hoarding	• Power is centralized, with no value in sharing • Rationalizes centralization of power to make quick decisions and do what is best without inferences from ignorant others	Teacher as expert Eurocentric mathematics	Creates cults of personality and false gods, people who hold power and should not be questioned because they have a higher understanding of reality than others leading to dictatorships and fascism over democracy.
Individualism	• Accomplishments are earned by individuals • Collaboration is not valued • Responsibility and accountability are centered in the individual	Providing learning opportunities only at the individual rather than the collaborative/community level Classroom environments that do not lend themselves easily to collaboration, such as desks in rows facing the teacher at front A single teacher is held solely responsible for students learning	Disincentivizes collaboration and organizations are not held accountable for the climates they create, instead blaming individuals.

Progress Is Bigger, More	• Progress is only considered in terms of more people, capital, services, projects, etc.	School-level achievement measures determine "quality" schools	Quality improvement is ignored in favor of expansion and carrying capacities of ecosystems and sustainable approaches are ignored
Objectivity	• Focus on logical thinking and finding one truth • Emotions are irrational and should be ignored/and suppressed • Belief that people can separate themselves from their lived experiences	Privileging western notions of mathematics as the only form of mathematical epistemology Mathematics is about finding the right answers and there is only one right answer	Dehumanizes by denying people's emotions and lived experiences and ignoring the possibilities of multiple truths and different lived experience
Right to Comfort	• Avoiding difficult issues • Belief that people in power should not be troubled with emotional or psychological discomfort	Teacher-centered instruction A focus on classroom management over learning	Allows people in power to ignore discomfort of others and disincentivizes them from addressing issues causing discomfort and instead place blame on individuals for bringing up issues rather than interrogating roots of discomforts and systemic causes.

Acknowledgement of Positionality

By acknowledging our positionality, we seek to continually interpret and present what transpired during our collaboration through our racialized ways of knowing and being. We, the authors, identify as white, cisgender, middle-class teacher educators at public research-intensive universities. By naming these social identities, we acknowledge the unearned power, access, and privileges that are granted to us by society and know that many we seek to teach and support do not have these privileges. We also see our collective work as white MTEs as critical to disrupting the comfort that is unduly enjoyed by white individuals within society. We acknowledge we are all at different stages of interrogating whiteness and white supremacy culture within our personal and professional lives and our experiences are not reflective of all white, cisgender, middle-class teacher educators. Instead, by leaning into vulnerability and discussing our shared understandings, tensions, doubts, and concerns, we hope it might help others who want to begin conversations around what it means to do antiracist work and to learn from and with other MTEs, especially those that possess unearned power, access, and privileges

The murder of George Floyd and protests during the summer of 2020 impacted each of us greatly and pushed us to try and do more to reflect on and challenge whiteness and white supremacy culture in our lives and in particular in our roles as MTEs. We were emboldened by the calls of national mathematics education organizations such as TODOS (2020) when they explicitly named that "We are mathematics educators. We cannot look away or claim a privileged stance because we might prefer to believe mathematics is a culturally or politically neutral subject. All levels of teaching mathematics are imbued with the same racism and violence that permeates all schooling" (p. 2). Though emboldened, we struggled with where to begin or how.

We have each been involved in the collective work of the Mathematics Teacher Education Partnership's Equity and Social Justice Working group (Males et al., 2020) and in the Fall of 2020 we were introduced to the recently released *A Pathway to Equitable Math Instruction* resources and guide (Baldwin et al., 2020). Though the resource was new, it was already coming under attack in various news outlets. We began to explore the resource, which is intended for use in district- or school-based

teacher professional learning communities. In doing so, we saw its potential for use in university-based teacher education settings as well and a subset of the working group began collaborating on this. In particular, we were drawn to reading and reflecting on the first resource within *A Pathway to Equitable Math Instruction*, known as Stride 1[1], which proposes a 5-step cycle (engage, reflect, plan, act with accountability, and reflect) to support teachers to interrogate white supremacy culture (Jones & Okun, 2001; see Appendix for more detail on characteristics of white supremacy culture) in their previous schooling experiences and their current teaching practices. Our collaboration originally started with the discussion of the implementation of *A Pathway to Equitable Math Instruction* in our courses, but multiple discussions led to conversations about our positionality as white MTEs. In turn, our conversations then began to shift to how our work with teachers is constantly impacted by the ways whiteness operates in the world around us. In what follows, we present shared tensions, doubts, and concerns that acted as turning points, which moved our discussions away from course design and towards our individual and collective self-work to unlearn racist practices.

Action

Through our conversations around the integration of *A Pathway to Equitable Math Instruction* (Baldwin et al., 2020) and the characteristics of white supremacy culture (Jones & Okun, 2001), we acknowledged we wanted to explicitly tackle issues of systemic racism and white supremacy culture in our courses. Each of us had previously done work individually and together in thinking about systemic racism and white supremacy culture in our daily lives, but we struggled with how to translate such reflection into our role as MTEs. Throughout the Spring 2021 semester, we met frequently to discuss the design and refinement of our courses and during these discussions our conversations often drew us to question how we, as four white people, who have never been the victim of racism, could address systemic racism and white supremacy culture in an authentic, meaningful way. We continually doubted ourselves in this work with the worry that we could easily end up doing more harm than good. We hoped by working together we could act as sounding boards and critical colleagues (Lord, 1994) for one another. While our original intention was to work together to support one another in collectively (re)designing our courses, we found our collaboration quickly turning to the work of unlearning racist practices by naming, interrogating, and at times addressing how we as MTEs perpetuate white supremacy culture within our courses.

As we met and discussed our courses, we came to realize more and more how deeply embedded white supremacy culture characteristics were in the courses we were teaching themselves and our own instructional practices. According to Okun and Jones (2001), "culture is powerful precisely because it is so present and at the same time so very difficult to name or identify" (p. 1). Our decisions to ask teachers in our classes to interrogate the characteristics of white supremacy culture and our conversations with each other helped to make the characteristics of the culture of mathematics teacher education in which we were operating more easily identifiable and in turn we noticed that these characteristics were rooted in white supremacy culture. To better articulate how we saw white supremacy culture within our courses we provide three examples of turning points in our conversations that unearthed the tensions, doubts, and concerns that help us begin to unlearn normative racist practices.

Turning Point 1: Go Beyond Monolithic Engagement

As we began collectively (re)designing our courses, our first conversations were guided by how to introduce the characteristics of white supremacy culture to our students. While discussing the logistics of introducing the characteristics was important, our conversations quickly turned to how we, and our students, have a variety of comfort levels, and previous engagement, with issues of racism. We discussed how we were extremely nervous about how the students would take it or where they might go. Our nervousness and desire to know how discussions would unfold illuminated how *right to comfort*, a characteristic of white supremacy, was pervasive in the

[1] See http://equitablemath.org for more information on Stride 1.

ways we discussed facilitating our courses. Our desire to be comfortable perpetuated white supremacy as it disconnected some students from the learning experiences by not allowing them to share divergent ideas that might cause discomfort. We were also concerned about the extent to which our Teachers of Color would benefit from discussing white supremacy culture. We ran the risk of promoting one way of engaging in work around white supremacy culture, the normative, white participant's way. Promoting one way of engaging in interrogating white supremacy culture promotes *objectivity*, a characteristic of white supremacy culture, that dehumanizes individuals by denying their alternate lived experiences thus further disconnecting them from fully engaging in our courses.

At the time of these initial discussions, we often felt paralyzed and unsure how to proceed. We knew this work was important, but also knew we could cause harm by engaging our students in one way of interrogating these characteristics within our courses. We have pushed each other to model vulnerability when engaging in these conversations with our students, thus allowing ourselves to share with our students where we are at on our journeys as we develop as antiracist MTEs. We also see opportunities to develop as MTEs when working with Students of Color so that we do not create experiences that tokenize, stereotype, or position them as spokespersons for their race. As we continue to unlearn these racialized practices, we ask ourselves, how do we broaden engagement in our courses to allow Students of Color, and students with varied lived experiences, to fully engage in dismantling white supremacy culture within their classrooms?

Turning Point 2: De-centering Ourselves as MTEs

Another turning point occurred when we discussed the tension of how to engage with our students in reflecting on their teaching practice. The conversation started when Robin shared how they felt it was critical to support practicing teachers in identifying white supremacy culture characteristics. For instance, in Robin's courses, students engaged in weekly critical praxis journaling but Robin felt at a loss on how to meaningfully respond to students' reflections as they grappled with white supremacy culture in their practice. Robin's confession pushed the group to collectively realize that our understanding of feedback was deeply embedded in *individualism* and *power hoarding*, characteristics of white supremacy culture. Our conversations about feedback highlighted elements of *individualism* in that we positioned ourselves as the only source of feedback even though we felt unprepared to provide it. By maintaining this individualistic notion of feedback, we did not allow for collective sensemaking between ourselves and our students which increased the divide and disconnect between our students and the classroom community. We also realized that relying primarily on feedback from an instructor divided and disconnected students because it maintained the instructor's position of power as the only individual capable of pushing teachers' reflections. These conversations both challenged us to unlearn harmful assumptions of the novice/expert binary often perpetuated in academic settings, and pushed us to question the influence of our whiteness in these interactions. There is an inherent colonizing perspective in how we position ourselves as MTEs telling others how to teach and we collectively struggled to de-center that perspective. As we pushed each other to move beyond the binary we looked for opportunities to draw upon the expertise of our students and realized that we must develop pedagogical strategies that allow for collective sense-making. To continue the work of unlearning we ask ourselves, how are we de-centering ourselves within our courses?

Turning Point 3: Impact of White Supremacy Culture

At one point early in our collaboration, Lorraine and Kelsey shared how they were grappling with the amount of reading and writing they assigned to their students. In our discussions of the amount and type of coursework, a turning point occurred in the focus of our collaboration when we realized that the university culture caused this underlying tension. As we were all teaching graduate-level courses at research-intensive institutions, we were afraid that asking students to read and write less would mean that our courses were not rigorous enough according to the standards we have been enculturated in by our society and our institution. We were worried that our students or our peers at our institutions might think we were not doing our jobs or that we were lazy. Talking amongst ourselves about these collective anxieties helped

us to realize that we were grappling with multiple instantiations of white supremacy culture within the large university system, a system historically designed by and for affluent white men with the support and resources to dedicate more time to studies. We found ourselves in constant tension with the idea that if we decreased the amount of reading and writing then we were not doing enough for our classes. This feeling of enough is directly tied to *progress is bigger, more*, and *quantity over quality*, two characteristics of white supremacy culture that rewards more work assigned rather than the value of the interaction and experiences themselves. Upholding these two characteristics through assigning copious amounts of reading and writing disconnects and divides the students as their understanding is measured only through quantity of engagement rather than harder to measure interactions that would promote community and collective experiences. Wanting to resist perpetuating these characteristics, we began to look for opportunities to recenter course experiences to focus on discourse and collective/shared understandings among peers. As we continue to unlearn, we ask ourselves, how do we push back against the established norms for coursework that we have unconsciously accepted and embedded within our work as MTEs?

Accountability

Our collaborative journey led us to realize and grapple with the impact of white supremacy culture in our roles as MTEs and in our lives. Knowing that "actions are hollow unless there is accountability" (NCSM & TODOS, 2016, p. 5), we have planned to, and were successful at times, with continuing our collaboration to keep ourselves accountable to each other. After completing our courses, we planned to continue to work together to transform our courses. Unfortunately, as the next semester began, we failed to keep up our weekly check-in meetings. We got bogged down in planning and grading in our own courses and were able to quickly check in with one another only occasionally through other meetings or activities. Basically, we succumbed to the influence of *individualism* focusing on our own courses which we are positioned as independently responsible for by our institutions and the *sense of urgency* to make sure we were providing timely feedback and continuing to come up with new experiences for students. This led us to be somewhat disconnected from each other and our collective work. While we did not continue our weekly meetings, we did continue to interrogate our own beliefs and practices, including being explicit with our students about how we are engaging in this work with them (i.e., attempting to mitigate the damaging effects of *individualism*). In addition, we have started to broaden our professional learning and research opportunities together.

Writing this article helped to draw us back together to reflect more deeply on our collaboration. In doing so, we identified tensions that make our continued collaboration so difficult– the institutional structures and obligations of our universities. As academics at research-intensive institutions, we know the advantages and rewards that come with *individualism* and *quantity over quality.* Furthermore, as two of us are early career faculty, we constantly feel the pressure to produce for tenure, which relates to *worship of the written word*–what is often the most-valued product of our work is written publications. In other words, the very same characteristics of white supremacy culture we seek to problematize and de-center in our own classes are strong and alive in our institutions and lives, negatively impacting our ability to engage fully in this work. Coming together to write this article also sparked continued conversations which allowed us to continue to problematize the ways white supremacy culture impacted us and our work as MTEs and to reflect before then seeking to put that into written words. A parallel could be made here to Freire's (1970) literacy work in which he describes reading and writing the world. Our discussions helped us read the world and we hope that our writing of this article helps us write the world in some small way. Another unexpected benefit of writing the article was the dialogue it opened with the editors and reviewers who further pushed our thinking and reflection. In many ways, they became a part of our group discussions, challenging us to continue to interrogate white supremacy culture in our work.

Though our continued collaboration on the master's courses that brought us together has not continued in the same manner, we have continued to work together on other efforts to consider how to bring this work into all the courses we teach and even across the departments in which we hold appointments. One thing we were

successful in was beginning to realize and document just how much the characteristics of white supremacy culture impact us and our work, as evidenced in many of the ideas manifesting in this article. We continue to grapple with this. Each of us has shared experiences with each other, such as where we have noticed characteristics of white supremacy culture in our daily work. We continue to struggle with what to do with those reflections. We are cognizant that staying in the state of perpetual struggle could desensitize us, thus we are emboldened to move beyond this state of struggle. It is one thing to identify characteristics of white supremacy culture in our daily work, but it is another thing to do something about it. We see our work moving forward to go beyond identifying characteristics and instead take action because without action nothing will change. Because we also see action as an important step in our personal development as antiracists, we are hopeful that moving past struggle will result in progress because learning occurs when discomfort, and struggle, are present.

Our hope in sharing our experiences publicly is to show challenges with this work and perhaps draw others into it that are not sure how to begin. What we describe here is not a victory narrative. We have tried to be vulnerable with the very real challenges that we encountered that resulted in some failures and some successes. We continue to interrogate white supremacy culture into our teacher education courses, teaching practices, and academia in general, with our new knowledge and with the understanding that we are still learning. Our biggest takeaways from this work and advice to others thinking about how to start is that it must be collaborative and it is a continual journey. As we collectively, and individually move forward, we use the questions at the end of the turning points above to continually audit our practice.

- How are we de-centering ourselves within our courses?
- How do we broaden engagement in our courses to allow Students of Color, and students with varied lived experiences, to fully engage in dismantling white supremacy culture within their classrooms?
- How do we push back against the established norms for coursework that we have unconsciously accepted and embedded within our work as MTEs?

As we reflect on our next steps, we are constantly drawn to the larger programmatic and institutional issues that were highlighted for us through this collaboration and collective reflection. One particular tension that we have focused on collectively is the institutionally perpetuated expert/novice divide. In particular, we live this tension in our roles as MTEs who are positioned as experts with terminal degrees teaching others how to do something they themselves have not done in many years and often in very different contexts. Therefore, we are holding ourselves accountable by committing to interrogate and transform this particular issue through a multi-institutional research project to develop mathematics teachers who are prepared to identify and combat white supremacy culture through community-based practices with the hopes of dismantling the power dynamic often created within academia between student and instructor.

We would like to close by again acknowledging that this work must be collaborative. We cannot change culture or institutional structures as individuals. We need collective action. Thus, we invite you to reflect on how you will join a collective group to continue to unlearn racist, normative practices that continue to marginalize students within mathematics education spaces. We also specifically call on white MTEs and mathematics educators to join this collective action. With this call, we borrow the concerning question from a colleague of Color: “Is this a fad for my White colleagues– one that will soon pass, leaving the same arrangements of privilege and disadvantage behind?” (Spencer, 2016, p. 230). We (white MTEs and mathematics educators) must collectively sustain this work by not only supporting our colleagues of Color, but acknowledging our positionality and responsibility in doing so.

References

Aguirre, J., Herbel-Eisenmann, B., Celedón-Pattichis, S., Civil, M., Wilkerson, T., Stephan, M., Pape, S., & Clements, D. H. (2017). Equity within mathematics education research as a political act: Moving from choice to intentional collective professional responsibility. *Journal for Research in Mathematics Education*, *48*(2), 124–147. https://bit.ly/3C6CWtg

Baldwin, R. Basket, R., Battle-Holt, B., Broussard, J., Carstens, L., ChenFeng, A., Chun, D., Cintron, S., Duong, A., Franco, J., Kang, C., Morales-Van Hecke, M., Rabanera, A., Shacklett, M., Wadlington, D., & Yang, J. (2020, September). *A pathway to equitable math instruction.* https://equitablemath.org/

Boveda, M., & Bhattacharya, K. (2019). Love as de/colonial onto-epistemology: A post-oppositional approach to contextualized research ethics. *Urban Review*, *51*(1), 5–25. https://doi.org/10.1007/s11256-018-00493-z

Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.

Jones, K., & Okun, T. (2001). White supremacy culture, *Dismantling racism: A workbook for social change groups*, ChangeWork. https://bit.ly/3zKKOz2

Lord, B. (1994). Teachers' professional development: Critical colleagueship and the role of professional communities. In N. Cobb (Ed.), *The future of education: Perspectives on national standards in education* (pp. 175–204). College Entrance Examination Board.

Males, L.M., Sears. R., & Lawler, B. R. (2020). Equity and justice issues in the preparation of secondary mathematics teachers. In W. G. Martin, B. R. Lawler, A. Lischka & W. Smith (Eds.), *The power of a networked improvement community to transform secondary mathematics teacher preparation* (pp. 57 - 87). Information Age.

Moore, A. E. (2021). "My job is to unsettle folks": Perspectives on a praxis toward racial justice. *Teaching and Teacher Education*, *102*, article 103336, 1-11. https://doi.org/10.1016/j.tate.2021.103336

NCSM & TODOS. (2020). *Mathematics education through the lens of social justice: Acknowledgment, actions, and accountability*. https://bit.ly/3JgR1Wm

Okun, T. (2021, May). *White supremacy culture - Still here*. White Supremacy Culture. https://bit.ly/3vnHPKf

Spencer, J. (2016). Moving from the outside in, or what white colleagues need to do to get it right with their white students. In N. M. Joseph, C. Haynes, & F. Cobb (Eds.), *Interrogating whiteness and relinquishing power: White faculty's commitment to racial consciousness in STEM classrooms* (pp. 223-240). Peter Lang.

TODOS: Mathematics for All. (2020). *The mo(ve)ment to prioritize antiracist mathematics: Planning for this and every school year*. Author. https://bit.ly/3j5Yvip

Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. How can you interrogate the ways you perpetuate characteristics of white supremacy culture in your teaching practice?

2. How can you push against the characteristics of white supremacy culture embedded in the institutional structures of K-12 schools, universities, and teacher education spaces where they are situated?

3. How can MTEs collectively work to dismantle white supremacy culture?

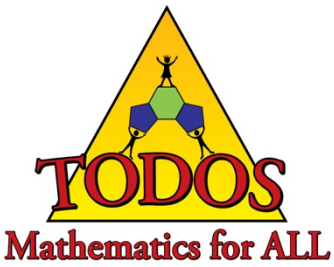
4. How can we build sustainable supports for MTEs to continually work to de-center the characteristics of white supremacy culture in mathematics teacher education?

Appendix

Characteristics of white supremacy culture

Characteristic	How It Shows Up	How It Disconnects and Divides
Perfectionism	● Mistakes viewed as personal ● Focusing on what is wrong over what is right ● Focusing on others' inadequacies ● Little focus on reflection or lessons learned	Preserves "power and the status quo" because "as long as we are striving to be perfect according to someone else's rules, we have less energy and attention to question those rules and to remember what is truly important" (p. 8). In addition, we are led to believe "that we can determine whether others are showing up as perfect and demand or expect that they do so." (p. 8) according to our (students/teachers/ administrators) differing cultural norms
Sense of Urgency	● Focusing on results over process; speed is valued ● Sacrificing collaboration and dialogue for results	Promotes anti-democratic and -dialogic communication rather than collaboration and devalues the process of doing things and the time it takes to do something well for all stakeholders and the community; People who can produce quick answers are perceived as more mathematically capable
Defensiveness	● Criticism is not allowed or disincentivized ● Ideas that challenge norms are difficult to raise	Promotes the status quo by protecting power as it exists, suppressing new ideas, perspectives, innovation, and transformations in favor of one's by the people in power, resulting in an oppressive culture
Quantity Over Quality	● Focus and value placed on production of measurable goals and products. ● Devaluing of process	Ignores value of unmeasurable goals such as relationships, community building, dialogue, reflection, democratic decision-making and the importance of process in accomplishing tasks and measurable goals
Worship of the Written Word	● Does not take into account or value non-written information sharing	Limits how people can communicate, advantaging some people over others (i.e., literally silencing people)
Paternalism	● Decision making process is not clear for those not in power, but is for those that do and their viewpoint is held above others and they believe others need them to make decisions for them	Decision making is anti-democratic, pedantic, and not transparent subjecting some people to only be able to accomplish what was made available to them by those in power
Either/Or Thinking	● Everything is treated as a binary; right or wrong, friend or foe, etc. ● Ignores the possibility of both/and	Creates division and conflict (shifting focus from issues to allegiances) by creating categories that do not exist in reality (i.e., dividing people and things unnaturally)

Power Hoarding	● Power is centralized, with no value in sharing ● Rationalizes centralization of power to make quick decisions and do what is best without inferences from ignorant others	Creates cults of personality and false gods, people who hold power and should not be questioned because they have a higher understanding of reality than others leading to dictatorships and fascism over democracy;
Fear of Open Conflict	● Conflict viewed as impolite, negative, emotional, or ignorant and/or avoided or ignored ● Those pointing out conflicts are positioned as the cause of conflict	Conflict is ignored and problems are not solved, leaving wounds to reopen repeatedly; People who challenge power structures and status quo are blamed for problems rather than interrogating the structures creating the conflict
Individualism	● Accomplishments are earned by individuals ● Collaboration is not valued ● Responsibility and accountability are centered in the individual	Disincentivizes collaboration and organizations are not held accountable for the climates they create, instead blaming individuals
Progress is Bigger, More	● Progress is only considered in terms of more people, capital, services, projects, etc.	Quality improvement is ignored in favor of expansion and carrying capacities of ecosystems and sustainable approaches are ignored
Objectivity	● Focus on logical thinking and finding one truth ● Emotions are irrational and should be ignored/and suppressed ● Belief that people can separate themselves from their lived experiences	Dehumanizes by denying people's emotions and lived experiences and ignoring the possibilities of multiple truths and different lived experience
Right to Comfort	● Avoiding difficult issues ● Belief that people in power should not be troubled with emotional or psychological discomfort	Allows people in power to ignore discomfort of others and disincentivizes them from addressing issues causing discomfort and instead place blame on individuals for bringing up issues rather than interrogating roots of discomforts and systemic causes



2021-22
ELECTED LEADERSHIP

Linda Fulmore President	Mathematics and Educational Equity Consultant Cave Creek, AZ
Florence Glanfield President-Elect	University of Alberta Edmonton, AB
Sylvia Celedón-Pattichis Vice President	University of New Mexico Albuquerque, NM
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Nicole Lindgren Director	Buncombe County Schools Asheville, NC
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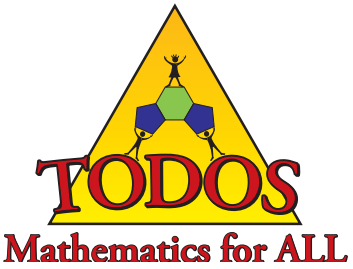
María del Rosario Zavala Director	San Francisco State University San Francisco, CA

APPOINTED LEADERSHIP

Nora Ramirez Appointed Executive Director	Mathematics Education Consultant Tempe, AZ



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