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Teaching for Excellence and Equity in Mathematics

Special Issue on Antiracism in Mathematics Education, Part 2

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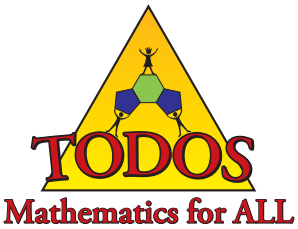

Special Issue on Antiracism in Mathematics Education, Part 2

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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 2

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 second 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 and status 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 antiracism 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 special issue 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 volumes are collaborations across settings, job types, and lived experiences, reminding us that antiracist work needs community instead of isolation. We hope that this special 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

Yuhaniuk, Putman, DaSilva, Loznak, Malchodi, and Rucker are a team of district-level mathematics leaders who engaged building-level leaders in antiracist professional development in their school district, and wrote about their experiences in "Modeling Vulnerability: Confronting White Supremacy in Our Mathematical Policies, Practices, and Ourselves." Through personal reflections and examples from the professional development sessions, the authors consider the impact of White Supremacy Culture on mathematics teaching and offer strategies for change.

Martinez, Carpenter, Johnston, Shirude, and Zhou challenge us to utilize poetry in the mathematics classroom, and along the way propose a perspective on the role of youth authoring "I Am Math Poems." In their article, "Poetic Mathematical Knowledge, Cultural Connections and Challenging Epistemic Injustice," this diverse team of teachers and researchers draw on their experiences inviting youth to author their identities as mathematical human beings, towards creating space for youth to take ownership of mathematics. They offer us the construct of Poetic Mathematics Knowledge (PMK) as a contribution to a holistic antiracist approach in mathematics.

"What's in a Name? Absolute Value & Algebraic Identity" describes how Dickman modified an Algebra 2 project in which students used functions to write their names in Desmos to create space for them to reflect on their own names, and on how names matter and can be a basis for discrimination. Dickman argues that it is not necessary to reinvent mathematics instruction entirely to implement antiracist change, and that carefully designed changes to existing curriculum can have a positive impact.

In the teacher case study entitled "Antiracist Care in a Linguistically Diverse Mathematics Classroom: A Case Study," Wilson and Alasry collaborate to bring the observations of a researcher and the everyday work of a mathematics teacher together. Alasry is a multilingual American-born Yemeni woman, and for some of her students and families the only teacher they will encounter who is an insider to their culture and community. In this article, they coin the term "strategic caring" as a way to build off of notions of critical care that prepare children from minoritized communities to move strategically through challenging academic content.

Fletcher offers a personal account of a mathematics method course redesign to explicitly address issues of equity and racism in "A Reflection on Mathematics Teacher Education Course Design for Equity and Antiracism." The author takes a critical look at her previous course design that left equity at the periphery, guides the reader through the changes she implemented and her rationale for these changes, and reflects on the need for more learning and growth for her and other white educators.

And finally, in "Gatekeeping in Mathematics for Social and Racial Justice: Reflections on a Conversation Among Colleagues," Lolkus, Cordero-Siy, and Harper analyze the conversations they had about gatekeepers to antiracist work in mathematics education. The authors use artifacts from their discussions to identify three types of gatekeepers: personal, conceptual, and public; and offer suggestions for overcoming obstacles created by these gatekeepers to work more effectively towards racial justice.

María del Rosario Zavala and Ksenija Simic-Muller

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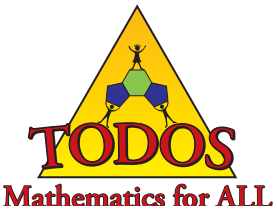

Modeling Vulnerability: Confronting White Supremacy in Our Mathematical Policies, Practices, and Ourselves

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Abstract

School districts' anti-racist efforts often fail to consider the prevailing culture in which this work is situated: one of white supremacy. In this piece, we detail efforts of district-level mathematics leaders to engage building-level leaders in the naming, critically reflecting on, and finally taking action to redress racism in mathematics policy and practice. We share concrete examples of how the characteristics of White Supremacy Culture (WSC) and the levels of racism are at play in decisions around assessments, curriculum pacing guidelines, and course pathways. We hope our story will inspire others to engage leaders in reflection about their role in challenging long-standing inequities and actualizing anti-racism.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. How would you describe the overall mathematics culture in your district/setting?

2. What is your reaction to the phrase 'White Supremacy Culture'? What thoughts, feelings, and/or beliefs does it raise for you?

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Modeling Vulnerability: Confronting White Supremacy in Our Mathematical Policies, Practices, and Ourselves

Heather Yuhaniak, Christina Putman, Lindsey DaSilva, Jennifer Loznak, Catherine Malchodi, and Katrina Rucker

Introduction

Our story is set in a large diverse mid-Atlantic school district that is geographically mostly suburban, with both rural and urban emergent (Milner, 2012) communities as well. It is home to more than 160,000 students PK-12 who are about 33% Latinx, 27% White, 21% Black, 14% Asian and 5% multiracial. The authors are five district-level instructional specialists and one district-level curriculum supervisor who support the work of 70 school-based middle and high school math teacher leaders. Annually, this team provides two full-day summer trainings followed up with monthly professional learning sessions and ongoing job-embedded coaching as requested by individual schools and leaders.

In her renowned TED Talk (Adichie, 2009), Nigerian author Chimamanda Ngozi Adichie speaks to "the danger of the single story" when we are taught incomplete narratives about individuals, groups of people, and the world at large. The main problem, Adichie argues, is that the single story creates stereotypes, which though not wholly untrue, can be incomplete: "They make one story become the only story." Our collective work is grounded in the stories of how we each experience the district, and how they vary along racial/ethnic lines. We invite readers to pause after reading these stories and reflect on how the stories reflect our racialized experiences and those of our children in this district. Do perspectives vary along racial/ethnic lines in your context? If yes, how so? If you don't know, this may serve as an invitation to find out.

Christina, Black[1] District Math Supervisor

A week after the murder of George Floyd, I sent an email to math building leaders asking how they were leading in

[1] We acknowledge the myriad complex and intersectional identities we each hold as educators and chose to focus on race/ethnicity as most salient to this story. The stories of two white authors were purposely not included to make space for the narratives of our BIPOC colleagues.

the context of the dual pandemics (Laing, 2020) of COVID and racial violence. Intended to spark dialogue, it included an article and reflective questions. I received not a single response. A week later, I penned another email:

> "I am the first African American woman to serve in the role of secondary mathematics supervisor in [the district]; a descendant of slavery, and a survivor of racism, because I am still alive. I know systematic oppression, because I have seen and experienced it through subjection to entitlement, privilege, and superiority. Silent complacency and complicity is just as harmful as the aggressive violence captured on video."

I invited building leaders to an open forum to engage in uncomfortable but needed dialogue with the goal of better understanding each other to develop empathy and unity moving forward. I also brought together an inter-departmental team of instructional specialists to co-design and facilitate anti-racism learning for leaders moving forward. This is the story of that work.

Cat, White Instructional Specialist and Katrina, Black Instructional Specialist

Cat: My youngest son, with his beautiful blue eyes and blond curls, has always been described as spirited and mischievous by teachers and administrators. His willingness to stand up for friends who are being teased or bullied has always been celebrated, even when his reactions and/or language may not always be the most appropriate. I am embarrassed to admit that it didn't occur to me that other young boys are reprimanded and disciplined for similar behavior based on their skin color and/or language differences. I wanted to believe that adults would value all students and the unique experiences they bring with them. I have so much more to learn about implicit bias, white supremacy and how both negatively impact our students and their families in our district.

Katrina: While in elementary school my son was seated next to a student on the autism spectrum (he was not aware of this). Her frequent verbalizations often distracted my anxious son. When he shushed her, he was sent to the office and assigned a lunch detention for bullying. He then ate lunch in the main office for nearly two weeks. No one noticed until he brought it to my attention. The principal seemed surprised and merely returned him to lunch. He finished elementary school under the impression that the principal thought he was a "bad" student.

My son was always quiet in school, often overlooked and allowed to struggle. Despite being diagnosed with social anxiety and selective mutism, he was often told that he needed to ask the teachers for the accommodations afforded by his legally-mandated IEP. He eventually began to shield himself from the world by wearing his hood and shutting out distracting and anxiety-inducing noises by wearing earbuds. Despite this being an IEP-endorsed coping mechanism, he was repeatedly reprimanded by his teachers, triggering further anxiety attacks. When anxious, he shut down, unable to speak. A teacher described him as "angry."

Jennifer, Latinx Instructional Specialist

Our district has increasingly begun to utilize racial affinity groups (Warren-Grice, 2021) as part of sessions on advancing anti-racism and racial equity. As a Latinx woman and one of few non-Black people of color in our district, I am often asked to select which of two (BIPOC or white) to join. In either group, I am alone and an outsider because there are few Latinx leaders at the school or district level. Latinx people do not have access to the privilege of White people, though we have privileges not granted to Black/African Americans. Latinx hold dual roles of victims and benefactors in white supremacist culture. At one particular affinity group meeting, as breakout rooms were released, I assumed I would be placed with other BIPOC math leaders. However, I ended up in a room with the only other Latinx leader. The experience was jolting. Stunned by the visual confirmation of just how few Latinx leaders we have in the district, I asked myself what had led them to avoid or be shut out of positional leadership?

Conceptual Framework

Like the Leadership of TODOS (2020), we identify as math educators who "cannot look away or claim a privileged stance because we might prefer to believe mathematics is a culturally or politically neutral subject" (p. 2). Pursuit of equity inherently requires the identification and redress of *in*equity, and we find our district specifically and the field of mathematics generally

to be ripe in this regard. We also associate ourselves with the notion that each action can be only racist or anti-racist (Kendi, 2020). Like many other youth, students in our district flooded social media with their experiences of racism after the murder of George Floyd. They implored adults to dismantle the racist structures undergirding their experiences as students in the district. We knew we must provide leaders with the skills to be able to identify racism, but soon worried that the prevailing culture of the district itself would serve as a formidable foe in this effort. The culture itself literally kept us from being able to see and name racism.

White Supremacy Culture

We utilize the model of White Supremacy Culture (WSC) articulated by racial equity educators Tema Okun and Kenneth Jones, who define white supremacy as how "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" (Okun, 2021, para. 5). This hierarchy is codified in the enactment of the tenets of WSC, including: fear, one right way and perfectionism, either/or thinking and the binary, denial and defensiveness, individualism, progress is more, quantity over quality, and sense of urgency (detailed further in Table 1). This culture and its attendant characteristics have been normalized, rendering it nearly invisible, especially for White educators.

Critical Pedagogy

Our work with school-based math leaders is grounded in the Freirean concept of critical consciousness, or *conscientization*, a process in which participants examine the complexities of teaching and learning in service of creating a more equitable and just world (Freire & Macedo, 1995). Critical pedagogy requires educators to problematize the relationships among classroom practice, knowledge production, and schooling (McLaren, 1998). Teacher-educator Joan Wink (2011) translates Freire's concept of critical pedagogy into a three-step reflective cycle through which educators learn to think more critically about the world around them and their role in maintaining or challenging its mores. In this process, educators (a) name, (b) critically reflect, and finally, (c) take action informed by their reflections. They do so while engaging in a complex process of learning and unlearning driven by the unpacking of past and current experiences. This process is grounded in continual reflection that is deep, honest, and, at times, painful (Wink, 2011). In our summer and monthly learning sessions, we aimed to unearth the racial/ethnic inequities plaguing our mathematics classrooms and guide participants through Wink's three-step process of naming them, reflecting on them, and then taking action designed to interrupt them.

Naming Racial Inequities and White Supremacy Culture

We utilized one of our virtual summer kick-off days with secondary math leaders to give voice to our stories. Cat and Katrina shared their "tale of two mothers" (unabridged in Appendix A), painting starkly different pictures of how their sons had been treated as learners in the district. Sharing these complicated narratives provided building leaders with an entry point to examine how their own experiences were influenced by both race and culture. As Hammond (2015) argues, educators must become more knowledgeable about culture itself and how it plays out in social, economic, and political conditions that give rise to the inequities in our classrooms and school buildings. We utilized Hammond's metaphor of culture as a tree with attendant surface, shallow, and deep elements to engage participants in guided reflection about their culture generally and mathematical culture specifically (see questions in Appendix B). After reflecting, participants shared portions of their responses in breakout discussions structured for deep listening (holding the space; not interrupting, giving advice, or editorializing on anyone's story; maintaining confidentiality about what is shared).

Table 1

Intersection of Leader-Identified District Math Culture and Characteristics of WSC

WSC Characteristic	Overview of Characteristic (Okun, 2021)	Aspect of Math Culture in the District (Padlet Response)
Fear	WSC's number one strategy is to make us afraid. When we are afraid, we lose touch with our power and are more easily manipulated by any promise of safety.	● It's not "cool" to be on grade level; everyone wants to be advanced for fear of not fitting in. ● We cater to a very small population of White and Asian parents out of fear of open conflict with them.
One Right Way & Perfectionism	The belief there is one right way to do things and once people are introduced to the right way, they will see the light and adopt it.	● Status quo, one-size-fits all curriculum and instruction. ● The only way to engage in school improvement is to make BIPOC hypervisible and constantly the focus of these efforts.
Either/Or Thinking & The Binary	Reducing the complexity of life and the nuances of relationships into either/or, yes or no, right or wrong, in ways that reinforce toxic power.	● Low expectations for ESOL students; seen as slower and less capable. Assumptions made that lack of English proficiency means they cannot access advanced math (false binary).
Denial & Defensiveness	The habit of denying and defending against the ways in which white supremacy and racism are (re)produced and our participation in doing so.	● Students get passed from course to course without improving. Teachers blame students and social promotion for their lack of achievement (defensiveness).
Individualism	Individualism is the myth that we should make it on our own without help and a toxic denial of our true interdependence.	● The system is built for families that can access outside resources (tutors) and advocate for the course placement they want.
Progress is More & Quantity Over Quality	The assumption that the goal is always more and bigger. What we can "objectively" measure valued more than the quality of our relationships.	● Nothing is ever enough for the group at the "top": the work isn't challenging enough, there aren't enough options, they want to skip courses, double up on courses, etc. to get ahead. ● The perception that course placement = ability and intelligence.
Sense of Urgency	Applying the urgency of racial and social justice to our everyday lives in ways that perpetuate power imbalance and disregard the need to breathe and pause and reflect.	● To create "equity," schools put students into advanced courses without pre-requisite skills. ● Acceleration is more important than learning; Faster is better. ● Teachers focus on getting through curricula, not on ensuring student conceptual understanding. ● Students are accelerated without mastering content, so math becomes their most-hated subject.

We then invited participants to respond to the question "What is the culture of math in our district?" via a virtual bulletin board (using the app at Padlet.com) for BIPOC participants and another board for White- -identifying participants. After recording their responses, participants viewed the other group's Padlet and engaged in a fishbowl discussion, in which up to 8 participants at a time turned on their cameras to opt in while others observed, cameras off). Participant responses on both Padlets and in the whole-group fishbowl demonstrated interracial/ethnic agreement that the prevailing culture of mathematics in the district was deeply rooted in white supremacy. Table 1 summarizes participant descriptions (both BIPOC and White leaders agreed) of the district mathematical culture linked to the WSC characteristics they typify.

Critically Reflecting on How WSC Operates in the District and Beyond

It was clear from their reflections at this summer kickoff session that our bi-monthly school-year sessions with math leaders needs to involve continued study of WSC and how it shows up in our work. Doing so would provide the opportunity to address several key levers of inequity in mathematics education: district and state assessments, pacing, and course pathways.

Not even a global pandemic would convince national, state and local leaders to forego the usual battery of high-stakes, accountability-driven assessments in the disciplines of language arts and mathematics. Despite being named as "the most effective racist weapon ever devised to objectively degrade Black and Brown minds and legally exclude their bodies from prestigious schools" (Boston Coalition for Educational Equity, 2020, para. 13), standardized tests found themselves delayed rather than waived. This decision to defer yet proceed with administration of local and state assessment timelines forced district specialists to condense and contort the curriculum into a version that distilled only the most essential (read: *tested*) mathematical concepts. Building leaders lamented the lack of time to develop students' conceptual understanding, the questionable validity of giving tests online and using their data to make decisions about student progress and course placement.

We utilized the angst about assessment timelines and presented our team's assessment of how the characteristics of WSC were at play in these decisions (Table 2). Our goal was to help leaders be able to name these characteristics in their own practices and their school policies. After again modeling how to name aspects of WSC in a situation germane to their leadership, we asked building leaders to employ Wink's (2011)

Table 2

Characteristics of WSC Present in Decisions about Mathematics Assessment and Course Pacing

WSC Characteristic	How It Showed Up in Assessment and Course Pacing
Quantity Over Quality	● Things that can be measured are valued. ● Number of included standards promotes breadth over depth. ● Sacrificing conceptual for procedural knowledge.
Priorities and Timelines	● Fear of consequences for not sticking to established timelines despite student progress toward goals.
Sense of Urgency	● Decisions are made quickly rather than thoughtfully and inclusively. ● Sacrifice relationships for (perceived) results.
Individuality & Objectivity	● Desire for individual recognition and credit. ● Prioritizing linear thinking. ● Invalidating those who show emotion.

reflective process to another timely leadership challenge: recommendations for student placement in math courses for the upcoming school year. As noted by leaders in our summer session, the process of recommending students for math classes is steeped in white supremacy. In small groups, they discussed responses to the following: (a) Which WSC characteristics show up in our processes and decision-making about student placement? (b) What is the impact on students and their math identities? Their math pathways?

Our fall session ended with a private reflection in which we forecasted the shift from naming inequities to now reflecting on them more critically and using these reflections to drive action: (a) Critically Reflect: What role do I play? How have I (unknowingly) supported or perpetuated racism and WSC?; (b) Internal/Interpersonal Action: What norms of WSC would I like to challenge in myself? In how I interact with others?; (c) Institutional Action: What norms of WSC are present in my classroom / department / school practices? How can I challenge them?

Our winter session with building leaders focused on naming and reflecting on how the levels of racism (internal, interpersonal, institutional) and White supremacy present in school-based decisions regarding mathematics instruction. We shared detailed examples of school-level mathematical policies and practices that represent the characteristics of WSC and each level of racism (see Appendix C). Small groups used guiding questions to unpack the intent of these policies and practices, and more importantly, their racial-differential impact. We then challenged math building leaders to identify a point of entry to address one instance of internal, interpersonal, or institutional racism over which they had some degree of influence. Finally, we utilized racial affinity groups to process their brainstormed points of entry.

Taking Anti-Racist Action to Challenge White Supremacy Culture

Jennifer's story sheds light on the pervasive nature of white supremacy in our district math culture and its leaders. Hiring leaders who share racial or cultural identities of our students may be moot if we fail to dismantle the racism baked into classroom, school, and district mathematical policies and practices. We collected year-end evaluation data from building leaders in which we asked them to reflect on our shared journey toward critical consciousness, and being able to name, critically reflect upon, and finally, take (anti-racist) action. Table 3 highlights building math leader responses that provide insight into their *conscientization.*

As the school year came to a close, Christina again reached out to math leaders, urging both district and building math leaders to be courageous:

> I wrote an open letter to you to share my personal experience with racism during the time of racial injustice and social unrest within a global health pandemic. I have never been so exposed and vulnerable than I was through that letter and forum. That was the start of my equity journey with you. My mission, which I hope has become our mission, was to address institutional racism within our district and mathematics education. There have been many challenges on this journey. However, I have not allowed that to silence me. Each time we delved deeper into our equity work, you embraced it and wanted more time to learn and apply.

We currently continue this work with math building leaders to answer the question: How can I actualize anti-racism through my work as a math instructional leader? Being able to identify and engage in action to dismantle racism and white supremacy will be a true testament to our leaders developing critical consciousness. We ourselves have not formulated an answer to this question and will instead engage leaders in ongoing co-construction of individual and collective answers.

Table 3

Year-End Evaluation of Building-Level Leader Learning

Response	I used to think...	But then I learned...	So I will...
1	that this is something really hard to bring up.	there are baby steps to get us there.	begin some PD at least once a month to bring up conversations.
2	I was walking on broken glass and needed to stay quiet as a middle-aged white man.	I need to be an active advocate and ally.	work with my department to help them engage in productive change.
3	all schools in our system offered a very similar experience for their students.	students, families and teachers don't always believe this is true.	work hard to pave a pathway for all students to receive the same opportunities that they would get in any school, regardless of socioeconomic status, race, family life, culture, race, etc.
4	math and anti-racism were not really connected.	that they are very much connected and show many ways that there is institutionalized racism in our system.	be an advocate for all students and continue conversations with teachers to recognize when racism is occurring and how to stop it.
5	that because I built relationships with students and looked at the data of my Black and Brown students constantly that I was doing good work.	I have not done enough for my students to truly be anti-racist.	I have more to do with my students in and out of my classroom to ensure that I am doing what is best to be anti-racist in every aspect of my teacher world and my personal world.
6	there wasn't much I could do in my role to be actively anti-racist.	certain practices and policies that I have interpreted as "business as usual" are actually rooted in white supremacy culture.	examine practices and policies within my control (and hopefully some that are not!) with an anti-racist lens and make changes accordingly.

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. How do the characteristics of WSC show up for you personally? Professionally?
2. How does WSC show up in mathematical policies and practices?
3. What role do you play in perpetuating WSC?
4. In what ways does your mathematics program foster or perpetuate internalized racism? Interpersonal racism? Institutional racism? Structural racism?
5. What does anti-racism look like in district-level mathematics leadership?
6. How can we develop building level math leaders' ability to teach and lead in ways that are anti-racist?
7. Before I read this article I used to think…., but then I learned from reading the article…., so now I will….

Appendix A

	A Tale of Two Mothers	
Theme	Katrina Rucker Black Instructional Specialist Wife, mother of two boys	Catherine Malchodi White Instructional Specialist Wife, mother of two boys
Black son faces punishment while white son seen as quirky individual	While in elementary school my older son was seated next to a student who was on the autism spectrum (he was not aware of this). The young lady repeatedly spoke aloud to herself, which was distracting to my son (who was also struggling with the early onset of anxiety). When he shushed her, she reported it to the teacher who sent him to the office where he was assigned a lunch detention for bullying. He then ate lunch in the main office for nearly the next two weeks. No one noticed until he brought it to my attention. I reached out to the principal, who stated that he was only assigned one day of detention and was surprised that he had been eating in the office each day. She indicated that he could return to the cafeteria the next day. No follow up conversation between the adults in the school and my son took place. He finished the rest of his time in elementary under the impression that the principal did not like him because she thought that he was a "bad" student.	My younger son has always had a very "spirited and unique personality" and was voted most likely to be a famous person/celebrity in class superlatives. He tends to "speak his mind" and will not allow other students to tease or bully his friends without stepping in to "voice his opinion". I have been told that he doesn't always use the most appropriate language when responding, but that his heart is in the right place. He also enjoys "helping out during class" and is often asked to pass out papers, deliver notes to the office, or help other students. He tends to get fidgety after sitting in class for a long time and this seems to really help him to settle in and focus Last year, my son was accidentally mistaken for a girl by his principal during a school assembly and she later called him down to apologize in person and gave him a handwritten apology note. I have always felt that his school really took the time to get to know him and have always looked out for his best interests.
Racialized adult responses to students' early manifestation of anxiety	My son has struggled with severe social anxiety. This began to surface in 6th grade, when he became a selective mute. A condition that causes a child to become unable to speak while in school, yet completely normal at home. None of his teachers brought this to my attention, however, I figured it out myself while attending an afterschool event when I noticed a change in his behavior. I inquired about the behavior and was told that the team would have a "kid talk" and follow up with me. My request was made in January, but I was not granted a meeting until May. The condition and his grades had gotten much worse by then.	My older son has struggled with anxiety and depression. This began to surface as early as kindergarten and his teacher was incredibly flexible with his schedule so he could attend outside food therapy sessions as well as celebrate his successes with it by allowing us to host an end of the year pizza party for the class. His food aversions would surface throughout his elementary school years and the teachers would always be accommodating in terms of allowing him to stay in at lunch/recess or to go to the nurse as needed. They would reach out and let us know if he seemed a little anxious about something so we would know what was going on. He felt very connected to his teachers and would often stop by to visit them before or after school.
Racialized adult responses to students' formalized	My son was diagnosed with social anxiety and was given a 504-plan [plan under Section 504 of the Rehabilitation Act of 1973 that prohibits discrimination against public school students	My older son was later diagnosed with ADHD and supports were put in place to elevate his learning environment with preferential seating, frequent reminders, check-ins, etc. We met with

Disability accommodations	with disabilities] and placed in all supported classes. He immediately complained that the behaviors of many students became distracting to him and his grades suffered. Despite his selective mutism, he was often told that he needed to ask the teachers for modifications and request his accommodations. As a result of his rapid decline, I was consistently urged to put an IEP in place without an explanation for doing so and how this would change the necessary accommodations and support.	the staff and determined that he would benefit from a 504 plan and that seemed to really provide the support he needed without overwhelming him. His teachers were very responsive and always looked out for him.
Racialized adult perceptions of student expressions of their anxiety	My son was always quiet in school. He was often overlooked and allowed to struggle. He eventually began to shield himself from the world by wearing his hood. He also shut out distracting and anxiety inducing noises by wearing earbuds. Despite his IEP [an Individual Education Program that provides specialized instruction for students with disabilities] which stated that he was allowed to do so as a coping mechanism, he was repeatedly reprimanded by his teachers which led to further anxiety attacks.. When anxious, he shuts down and is unable to speak. A teacher described him as "angry."	My older son tended to be more quiet and reserved in school and teachers always praised him for being sensitive and kind. They seemed to understand how his anxiety would occasionally make him appear more withdrawn in social settings and were able to connect with him. I was often told that he had an "old soul" for such a young child and what a pleasure it was to get to know him.

Appendix B

Levels of Culture Reflection: Mathematics

Surface Culture: This level, the leaves, is made up of observable and concrete elements of culture such as food, dress, music, games, literature, stories, and holidays.

Mathematical Surface Culture Questions

- What kinds of math courses were you enrolled in in school - honors, on-level, remedial?
- What do you remember about the racial or gender makeup of the students in your mathematics courses? The instructors?
- How did you know you were learning or achieving in your math courses?
- Did you have access to a tutor? Did you serve as a tutor for others?
- What was the most advanced math course you completed?

Shallow Culture: This level, the trunk, is made up of the unspoken rules around everyday social interactions and norms, such as respect, courtesy, attitudes toward elders, concepts of time, personal space, nonverbal communication, eye contact, ways of handling emotion, and gestures/animations.

Mathematical Shallow Culture Questions

- What messages or attitudes were shared by your family members about mathematics?
- What family stories about school, academics, or mathematics are regularly told or referenced? What message do they communicate about core values?
- What motivated you to complete (or not) your math homework? Did you work on it until it was done, or devote a given number of minutes to it and then stop?
- What types of emotion do you associate with mathematics - joy, fear, satisfaction, frustration?

Deep Culture: This level, the roots, is made up of tacit knowledge and unconscious assumptions that govern our worldview, such as notions of fairness, definition of family, spirituality, competition, cooperation, decision making, and connection with nature.

Mathematical Deep Culture Questions

- What did your family or community lead you to believe a mathematician looks like?
- Were you led to believe that certain students “belonged” in certain mathematics courses? Did you think you belonged?
- What core beliefs drive you as a mathematics educator?

Appendix C

Examples of Mathematical Policies and Practices that Reflect WSC and Racism (Session Slides)

	Experiences of White & Asian Students	Experiences of Black & Brown Students	Question for Math Leaders
Institutional Racism/WSC	• Placement decisions driven by the idea that "more is better" (compacted courses). Defer to parent pressure about student course placement (*fear of open conflict*) • Provide access to sophisticated and substantive math • Give students the benefit of the doubt; lack of success → more support, not judgment around work ethic, improper placement	• Placement decisions driven by the desire to provide more access to accelerated courses (noble intent with troubling impact). Feeling that staff know what is best for students (paternalism) • Given more rote or basic tasks to gain "necessary skills" that are seen as gateway to "higher math" • Default is often enrollment in interventions (double period, Math 180); blame work ethic, improper placement	• How has institutional racism shown up in your setting? • What district or school level policies are at play? • What is the intent of these policies? Do they yield the intended impact? If not, why?
Interpersonal Racism/WSC	Messages to Students: • Myth of the "model minority" → Asian students are supposed to "be good" at math • Course placements support this myth- White and Asian students placed into courses with peers in the same racial/ethnic group despite their interest or abilities • Grade-level course is not a viable option for White and Asian students	Messages to Students: • "If you can't handle it, we'll have to move you back" (to grade level course) • "You can always move back…." • "It's okay to retake it in high school. At least they're getting exposure now" • "I know what's best for these students" (and parents defer because of cultural beliefs and /or feeling intimidated by the educational system)	• What messages are conveyed to students about their math achievement? • What is the intent of these messages? What is their impact on students?
Internalized Racism/WSC	White/Asian- Internalized Superiority / Dominance • "The faster I solve the problem, the smarter I am" (*individualism & competition*) • "Only students like me belong in this (accelerated) course" • "This course and pathway will impact my whole future" (pressure to excel at a young age to ensure later success in college and career) • "I'm *supposed* to be good at math. Why don't I get it?" (*perfectionism*)	Black/Brown- Internalized Inferiority / Racism • "I can't do it fast, so I must not be good at math" • "Students like me don't belong in this course" (should be in grade level course) • Disassociate with math to preserve identity: ○ "I'm not a math person" ○ "I don't care about math" ○ "Math isn't important to me or my future"	• What is the long-term impact of these internalized messages on both Black/Brown and White/Asian students?

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.

Poetic Mathematical Knowledge, Cultural Connections and Challenging Epistemic Injustice

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Abstract

This article focuses on poetry as a shared point of mathematical reflection, connection, and culture while discussing the importance of the driving force behind liberatory action. Specifically, a math-inspired poetry template will be discussed across multiple learning contexts to highlight the richness of poetry and math. We put forth the idea of Poetic Mathematical Knowledge to provide an entry toward transformational mathematical teaching and learning rooted in resistance, healing, and liberation. Insofar to say that antiracist mathematics must move beyond superficial activities and must focus on the wholeness of students and their communities.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. How do your students reflect on mathematics?
2. What are the connections between mathematics and poetry?
3. What role does poetry serve in the knowledge and understanding of anti-racist mathematics teaching and learning?
4. How (and why) do you identify and acknowledge multiple forms of culture and knowledge in your classroom?

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Poetic Mathematical Knowledge

Ricardo Martinez, Cayley Carpenter, Katie Johnson, Shraddha Shirude, and Zhlenji Zhou

"I do consider myself a poet, mathematician and scientist."

- High School Student

Anti-racist mathematics must address the root causes of societal injustices for the inclusion of social justice in mathematics to have a lasting and sustained impact. When mathematics teachers think anti-racist mathematics teaching, do they think about a single social justice lesson connected to a particular topic, or are they thinking of ways the mathematical learning can help students better understand and challenge racism and other structural forms of oppression? Individual lessons on social justice are essential but they are only a small piece of what is needed to create spaces for students to liberate themselves. Imagine doing a math lesson on racism in the United States in your classroom or even a year dedicated to how mathematics can be used to show and understand racism. Yet did you ask yourself how racism impacts your classroom and the lives of your students? Enter anti-racist teaching, which requires an ideological shift, a commitment from teachers to improving the lives of students and their communities in and outside of the classroom. Anti-racist mathematics is not just a lesson it is the teacher's pedagogy, an acknowledgment that racism is real and present in every classroom, the classroom environment, the multiple power dynamics of student relationships in and out of the classroom, and a commitment to eliminating racism and other forms of structural discrimination. Teachers must work towards both having a commitment to social justice and a critique of societal oppression, what Solórzano and Bernal (2001) call transformational resistance. Our approach suggests that even though inclusion of social justice lessons in mathematics classrooms is a meaningful way to teach mathematics, students deserve more than one or two lessons to grapple with societal issues. Students deserve experiences that help them better understand themselves, their classmates, their community, the larger socio-cultural context, and mathematics. Discussing the root causes of societal injustices and connecting them to the context of your students as a teacher can be difficult without an ideology of anti-racism but it is needed if we want to strive towards actions that challenge racism.

The I Am Math Poem activity (IAMP) highlighted in this article presents an entry to paradigms that seek to engage anti-racist mathematics at the epistemic level in moving beyond performative social justice mathematics. The epistemic level represents the foundational knowledge (or action) used to construct new knowledge and meaning-making. For example, in mathematics, we have axioms like the communicate property that helps us build and discover new mathematical theorems, where axions can be viewed as the epistemic level. Epistemic justice are acts of justice built on a solid foundation, requiring an understanding of injustice to ensure acts of social justice do not perpetuate previously unacknowledged and unknown forms of injustice (Medina, 2012). In other words, we want to ensure our work, and the work of anti-racist mathematics, starts from a place that is not rooted in injustice to ensure we are not perpetuating unknown harm. IAMP addresses epistemic injustice by using poetry to allow teachers to understand better how students see mathematics, and by providing an activity that was developed to help students form collectives engaged in positively transforming the world. IAMP was created as part of a summer critical youth mathematics program for Black, Native, and Latinx high school-aged students to collectively identify and begin to dismantle problems across their own school district. The program will be referred to in this paper as REALM, Reflection Equals Action in Liberatory Mathematics (see Martinez, 2020 for more details about the program).

The use of poetry allows for a deeper exploration of self, mathematics, and the social world. IAMP is one example of Poetic Mathematical Knowledge (PMK), discussed later, as a first step towards contributing to anti-racist mathematics. During REALM, after utilizing the IAMP template (see Appendix), one young person wrote "I do consider myself a poet, mathematician, and scientist" after they wrote the following poem:

I am from stars
from where my father taught me,
to add teddy bears.

Celebrating the difference between me, my friend Victoria
And a rainbow is like math,
When trying to learn Algebra
Or enjoying the Pythagorean theorem
And fighting to solve decimals.

We are from math and monopoly
Hidden numbers, I spy glitter
Seeing patterns everywhere, especially at the beach
And when I smell vanilla
Even when smelling poop

Math is me, beautiful
And math is you honest and funny
From negative to positive infinity
Math is all of us, as we become scientists

For, I am math
and
Together we will change world hunger

Pause and take a moment and ask yourself what you know about this young person after reading their poem. Ask yourself how your students may be similar or different. How do you and/or your students reflect on mathematics? Which line(s) stood out to you? What connections between math and poetry are you seeing? What other question comes to your mind?

In the next section, we introduce a concept called "Poetic Mathematical Knowledge" to highlight the union of mathematics and poetry before diving into the IAMP template. In discussing how poetry can function as an embodiment of and vehicle for anti-racist praxis (action and reflection), along with the benefits of poetry in general, we want to situate PMK as a critical lens to view mathematics and poetry.

Poetic Mathematical Knowledge

The process of writing and performing poetry is a deeply reflective process where writing poetry can shed light on oppression, can be healing (Walkington, 2021), and can be an act of resistance (Baxley & Sealey-Ruiz, 2021). Poetry allows people to communicate complex structural issues in society in that "poetry has a particular way of sustaining and healing our souls by serving as a tool of resistance (Baxley & Sealey-Ruiz, 2021, p. 313)." Specifically for young people, opportunities to perform poetry are spaces of agency and identity development where young people share frustrations and insights on life (Davis, 2018). In talking about the needs of women, Lorde (2000) states, "poetry is not a luxury. It is a vital necessity of our existence. It forms the quality of the light within which we predicate our hopes and dreams towards survival and change, first made into more tangible action. Poetry is the way we help give name to the nameless so it can be thought (p. 372)." What Audre Lorde captures arrives at an investigation of epistemic injustice through the process of poetry, in that writing poetry allows people to develop their voice (LaBonty & Danielson, 2004). Hearing poetry performed allows for the sharing of lived experiences, which can build empathy, and can create a collective understanding and acknowledgment of systemic issues in society. The communal sharing of poetry "works as an offering of the spirit on behalf of the collective members, as each person shares aspects of themselves with the group (Ayala & Zaal, 2016, p. 3)." During poetry readings, both the performer of the poem and the listeners of the poem equally benefit from the process, making poetry a healing event (Walkington, 2021) for all.

The blending of poetry and mathematics is rarely seen such that it is easy for people to separate the mathematician from the poet and the healing power of poetry from mathematics. In support of poetic modes of knowledge construction, Taylor (1997) states:

> Poetic knowledge is not necessarily a knowledge of poetry but rather a poetic (a sensory-emotional) experience of reality. … Poetic knowledge is a spontaneous act of the external and internal senses with the intellect, integrated and whole, rather than an act associated with the powers of analytic reasoning … In other words, it is the opposite of scientific knowledge. (p. 5).

In our view, PMK is poetic knowledge that is scientific as it embraces the tensions between scientific (mathematical) knowledge and "non" scientific (mathematical) knowledge to center the relational and transformative nature of mathematics. We want mathematics to be a reflective, collective, and healing experience for students, similar to the benefits poetry offers young people.

PMK is important in mathematics education because it contributes to the classroom environment by giving students the space to show who they are. Anti-racist mathematics is impossible in a classroom where the teachers do not know the students and their desires to challenge injustice. For example, the poem shared earlier shows the young poet's care for world hunger. Poetry allows students to be seen by their peers and teachers while allowing them to see their teacher when they, too, become mathematical poets. We recommend that teachers use IAMP with their students and not shy away from sharing their poems.

IAMP seeks to bridge the more artistic, spiritual nature of poetry with the common (limited) view of mathematics as rational and logical. Mathematics and poetry allow students to practice using mathematical terms such that students gain a new appreciation of mathematics (Keller & Davidson, 2001); they can be used to pose mathematical questions about real-world issues related to societal injustices (Lesser, 2019); and can be used to reflect upon the possibilities of mathematics education (Martinez, 2021). Furthermore, PMK allows for poetry to be influenced by mathematics to gain a deeper awareness of how mathematics can function in paradigms of anti-racism in education. In parallel, PMK allows mathematics to influence poetry, where mathematical terms can enable students to reflect on their lives and the mathematical world.

On multiple levels, the goal of drawing on PMK in the classroom through an activity such as the IAMP is to grapple with mathematical spiritual wisdom defined as "the cultural, historical, spiritual, and logical forms of mathematics that are collectively created to interconnect us to other forms of mathematics (Martinez, et al., 2021, p.77)." IAMP is an example of how mathematical poetry can be utilized to improve how students see themselves as mathematicians and poets connected to a larger interconnected social context and introduce another dimension of creativity to mathematics classrooms. The IAMP template (see Appendix) was designed to learn more about students through various prompts, which are offered as a starting point but open for students' interpretations.

IAMP provides multiple opportunities to just learn about your students. The activity can be done in at least two ways. You can give students the template as is and let them fill in the blanks, or you can ask them the questions ahead of time when they do not know their answers will be inserted into a poem, not unlike the word template game MadLibs. Five years of teaching experience using IMP with youth and preservice teachers shows that giving them the template is more engaging, but you must remind students that they do have the power to change words and interpret each prompt however they want.

Each fill-in-the-blank prompt was designed to learn more about students and their thoughts about math. For example, three lines of the activity directly ask students to identify *a high school or college math class, a math concept that you enjoy doing, and a math concept that you do not enjoy doing.* This not only provides the teacher with information about how students are feeling about math but also provides students with opportunities to learn about each other's feelings about math. Shraddha used IMP with their high school students by having each of them share their poems with the whole class, where one student a week would share their poem. More recently, students were excited about the poems and requested if they could have two students read their poems each week. This shows students wanted to learn more about each other by sharing their poems (PMK).

We can see that many IAMP prompts, such as *an object from growing up*, *a game you like playing, your favorite place growing up, your future career, a positive characteristic that describes, something in this world you want to change,* and *a cultural figure of your people* give students a rare opportunity to share who they are, their culture and their aspirations, and relationships that matter to them, in a mathematics learning context. As one youth stated, they like the activity and the "feeling of being able to express who I am and what makes me me." One of the REALM youth shared their thoughts on IAMP, saying "finding the similarity between math and everyday life really opened my eyes to see how math can be applied to every aspect of our lives - even our feelings. In that case, I do consider myself a poet because to me mathematics is like poetry." Here we see PMK in that the IAMP activity allowed a young person to see mathematics as part of their everyday life, including their feelings. We cannot commit anti-racist mathematics if we do not know how to communicate our feelings about societal injustice.

The template ends with a yearning for transformation by allowing students to think about the future and what

they want to change about it. In the K-12 classroom, it is crucial to ensure any social justice lesson the teacher wants to do aligns with the interests of students if the teacher seeks to have an anti-racist classroom. The prompts in the template were simultaneously designed to pull generative themes from students. Generative themes in the sense of Freire (1978) emerge from the people. In our case, as teachers, they come from our students and are a starting point to make connections between their experiences and the socio-political context of their everyday lives (Ayala & Zaal, 2016). If we are committed to anti-racism in mathematics education, we must allow students to explore what they care about, not just the issues the teacher values. Students cannot be empowered with scripted social justice, and it is inherently disempowering if students do not have a say in what they are learning.

We want to highlight the prompt *cultural figure of your people* by explaining how and why the language was selected because it may sound awkward. Nine out of ten times, I (Ricardo) am asked to clarify "cultural figure," but it is an important opportunity. It is essential first to unpack the phrase *"your people,"* which came from the language of the youth. Your people or finding your people reflects the importance of finding people with the same values and interests. During REALM, all youth were either Black, Native, and/or Latinx, yet even within the same racial group, the youth were looking for their people. For example, a group of Latinx youth bonded over Anime and Manga, so for them, your people was more about Manga than being Latinx. The prompts intend to center culture, hence the phrase "cultural figure." IAMP seeks to center ethnicity, the cultural-historical reality of people, while shifting away from using race as a classification for individuals.

IAMP was originally part of a ten-day, forty-hour math experience, where prior to the activity, youth had engaged in conversations about the multiplicity of culture, such that youth had no issues with the prompt. If anything, they were allowed to flourish, as seen in the earlier poem, where their cultural figure was a rainbow. A rainbow for this young person was an opportunity for them to share their pride – the culture they chose to speak of was LGBTQ culture. When using IAMP with individuals with limited views of culture, the prompt "cultural figure of your people" becomes an opportunity for them to learn through a moment of struggle. Based on my experience using this template in the classroom where all students are white preservice teachers, it is essential to let them work on IAMP for about three minutes and then make an announcement of what is meant by *"cultural figure of your people."* I tell students culture is more than being a person of color or being a non-person of color and that there are sub-cultures and countercultures; even with sub-cultures, they have their sub-culture. I then tell students that, at times whiteness makes it easy not to acknowledge the culture you (white people) have. I follow up by telling them that they are more than just white people. This is a needed step if we want to engage in anti-racist education because viewing culture as being only skin color is how white supremacy erases the culture of people who are white. But, if you decide to modify the template, we recommend changing the prompt to "an important person from your culture," and making sure to unpack what is culture.

IAMP, like any social justice or critical lesson, is not the key to empowering students because no magic empowerment activity exists. Only students can empower themselves, and as facilitators of mathematical knowledge, all we can do is create opportunities for students to empower and liberate themselves. IAMP provides one way of leveraging PMK to create experiences for students to see themselves as poets, mathematicians, and more. PMK then becomes a source of resistance and healing for students to challenge injustices. Thus, as students share what they want to change in this world and begin working with others, they can engage in mathematical learning that feeds their needs.

IAMP can also be used with pre-service teachers to gain a deeper understanding of mathematics. For me (Cayley), math has always been a hard subject. As a student in an elementary mathematics methods course, writing this poem, reading my poem, and hearing the poems written by my classmates gave me insight into their lives, their culture, and their feelings about math. Each person's poem was unique and special. It shows us their feelings about math and tells a story of who they are. Our poems differ because we all have different experiences growing up, and that is something that can be celebrated through IAMP and PMK. These experiences of math and poetry shape who we are and who we become.

Educators impact students' lives enormously and can affect what words they choose for the blanks. We can either make math a positive or negative experience which will be reflected in our students' poems. Finally, we as educators need to know as much about our students as we can, and the IAMP activity helps us do that and can help students learn about the teacher when teachers share their poems. Using IAMP with pre-service teachers allows them to explore PMK while gaining an activity they can do with their future students. A pre-service elementary mathematics teacher was asked if they would use this activity in their future classroom and replied, "Yes [because] it allows students to realize what is important to them and how powerful their presence in the classroom can be." This shows the benefits and impact IAMP has on students and future teachers.

Poetic Mathematical Knowledge and Anti-Racism in Mathematics

The blending of poetry and mathematics is also something we rarely see because we tend to separate the mathematician from the poet. IAMP is one way to create positive images of the unification of mathematics and poetry by allowing students to be poets in mathematical learning spaces. In speaking on the poetic-aesthetics, and creative images Keating (2012) states they "are interrelated to intuitive-emotional knowledge and conscious awareness (p. 53)." The intuitive-emotional knowledge and conscious awareness of poetry is the same ideological posture of the poet-mathematician under paradigms of PMK and, in general what we should see in mathematics.

PMK is the tension between mathematical knowledge and knowledge perceived to be non-mathematical. Understanding how to commit anti-racist mathematics requires an analysis of how mathematics is not only used but how it is lived. Anti-racist education must take into account the lived experiences of those living and resisting societal injustices. Those who experience injustice have a more robust understanding of the problems and have unique solutions to address the root causes of the problem. Speaking of the importance of spaces for Black women preservice teachers, those in the margins, Harmon and Horn (2021) state, "[b]y sharing experiences, individuals can build hope by better seeing the systemic nature of the racism they encounter, helping to depersonalize it. (p.113)." Poems and poetry events are moments where experiences are shared and personal reflection allows people to depersonalize what they have experienced, to better understand systemic issues. PMK seeks to make mathematics another learning experience for people to empower themselves by giving students opportunities to reflect on the world of mathematics and by having them share their contributions (poetry) with society. PMK provides teachers, future teachers, and students with marginalized identities an opportunity to share their expertise, knowledge, and collective hope.

Ultimately, it is vital for all of us as mathematics teachers to epistemically understand the root causes of problems impacting our students and their communities. IAMP and other poetic-mathematical explorations allow students to reflect upon what they experienced to understand issues in their lives. More so, mathematics without poetry, music, and the arts is a limiting scope that fails to encompass emotional-spiritual knowledge in the teaching and learning of mathematics. PMK centers creatively where "[t]he creative work of musicians [poets] and composers inspires us to think about how our own work can foster change (Aronson, et al., 2021, p.273)." In line with Lorde (2000), PMK is a vital component of our existence and builds on our hopes and dreams toward survival and the realization of change. The amalgamation of mathematics and poetry creates a safe space where students and teachers can reflect and grow as people committed to changing unjust educational systems. PMK seeks to be a healing process in exploring self, mathematics, and others in creating new knowledge that is performed and shared with others. As a result, a central goal of PMK is the interconnectedness of all people, meaning it requires a commitment to anti-racist practice and being from all of us.

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. What new connections do you see between mathematics and poetry (e.g., see bottom of https://www.ams.org/programs/students/math-poetry), and how is poetry connected to moments of anti-racist reflection and action?

2. In what other ways has poetry been used in the teaching and learning of mathematics?

3. After completing the I Am Math Poem template yourself, which prompt was the most difficult for you to respond to?

4. What other forms of art might help students reflect and connect with anti-racist mathematics?

Appendix

I Am Math Poem Template

I am from _____'s
(Your favorite shape)

from where my _____ taught me,
(Family member)

to add _____
(An object from growing up)

Celebrating the difference between me, my friend _____
(The name of one of your friends)

and _____ is like math,
(A cultural figure of your people)

When trying to learn _____
(A High School Math or college Class)

or enjoying _____
(A math concept that you enjoyed doing)

and fighting to solve _____
(A math concept you did not like doing)

We are from math and _____
(A game you like playing)

Hidden numbers, I spy _____
(A real-world object that matches your favorite shape)

seeing patterns everywhere, especially at _____
(Your favorite place growing up)

and when I smell _____
(Something that smells nice)

even when smelling _____
(Something that smells bad)

Math is me, _____
(A positive characteristic that describes you)

And math is you _____ and _____
(A characteristic that you like in others) (Another characteristic that you like in others)

From negative to positive infinity
(a characteristic that you like in others)

math is us, as we become _____'s
(Your future career)

For, I am math

And

together we will change _____
(Something in this world you want to change)

What's in a Name? Absolute Value & Algebraic Identity

Benjamin Dickman
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Abstract

Although many well-intentioned organizations and institutions emphasize the importance of antiracism and social justice in mathematics education, there remains a lack of practitioner-oriented curricular materials exhibiting how these long-overdue shifts can manifest in classrooms. This article describes how modifying a project on absolute value functions in an Algebra 2 course was able to incorporate Learning for Justice social justice standards and weave in identity work, while supporting students' mathematical learning in a manner consonant with the four essential actions and four key areas identified in TODOS position statements.

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What's in a Name? Absolute Value & Algebraic Identity

Benjamin Dickman

Introduction

In Summer 2020, my institution – an independent K-12 girls day school in the northeast United States – required courses for the 2020-21 academic year to include Learning for Justice (LfJ), then known as Teaching Tolerance, social justice standards (Learning for Justice, 2020). Learning for Justice describes its social justice standards as a road map for anti-bias education across K-12, spanning four domains: Identity, Diversity, Justice, and Action. (For more, see https://bit.ly/41cVpNL.) Moreover, my school announced its coeval intention to form an "Anti-Racist Task Force" (ARTF), drawing from members across constituencies, and for which Pedagogy & Curriculum would be one of the three areas of focus. As I sought to implement the LfJ standards into an Algebra 2 course, and as I served as one of the two faculty members on the ARTF – working alongside current students, parents, administrators, alums, fellow faculty and staff, and trustees – it became clear that there is a dearth of comprehensive curriculum that supports teachers to enact both social justice and mathematics goals as a daily act. It is true that some materials exist to support teachers' weaving social justice into their classrooms; however, a comprehensive curriculum or text for Algebra 2 does not yet exist. Still, I needed a way to align the overall school goals with my own classroom activity. This is a story of one assignment from the [virtual] classroom, developed from my own experiences as a teacher with antiracism in mathematics education; in particular, a project on identity that covers the eight key actions and areas described by TODOS (NCSM & TODOS, 2016; TODOS, 2020). TODOS & NCSM (2016) named 4 essential actions: eliminating deficit views of mathematics learning; eradicating mathematics as a gatekeeper; engaging the sociopolitical turn of mathematics education; and elevating the professional learning of mathematics teachers and leaders with a dual focus on mathematics and social justice. TODOS (2020) built on this to argue for specific attention to how those actions manifest in four areas of our work, underscored by the COVID-19 pandemic and endemic racism: how we utilize technology, how we authentically engage parents, how we rethink assessment, and how we attend to students' social and emotional needs while teaching mathematics.

Personal Practitioner Context

For seven years I have taught an upper school elective course on mathematical problem solving and posing, and this has enabled me to bring in a number of topics and strategies at the intersection of mathematics and social justice. Some examples include learner-generated social justice math trails that focus on students jointly mathematizing their surroundings (e.g., Toliver, 1993; Maldonado's contribution in Chao et al., 2019); participating in the 2019 Park City Mathematics Institute's social justice working group, and co-authoring an article building on those experiences, on embedding joy and identity in the study of mathematical induction through a puzzle-based project while proposing the notion of *mathematical code switching* (Dickman & Nauman, 2020); and finally, engaging students in original research on such individuals as the Mississippi Woman's College (MWC) Putnam Examination participants. The story of the MWC team defying stereotypes associated with their institution and their gender when they came in third place in 1939 as a team should be more well known, yet there is nearly no information on this in the history of this competition's first seventy-five years (cf. Gallian, 2017). During the seven-year time period, I taught one year of another upper school elective course on probability and statistics, and we similarly engaged across a variety of social justice mathematics topics.

Matters have been different, however, in my teaching of Algebra 2. Nationally, this is a course that generates a wide range of responses across at least four categories: real-world everyday use (e.g., are rationalizing the denominator or synthetic division topics that belong in a modern curriculum?); the acknowledgment that algebra content knowledge is vital for getting past certain barriers such as standardized tests and college admissions; pedagogical inertia given that the Algebra 1–Geometry–Algebra 2 sequence towards Calculus is widely adopted and over-relied on as a prerequisite due to modern

mathematics courses value placed on abstraction (Gutiérrez, 2013, p. 10); and, as distinct from the other three areas, actual *joy* that comes from viewing algebra as the study of patterns, rather than, e.g., unmotivated mandates to solve for x. This is complicated further by a paucity of classroom-ready materials for practitioners at the algebra-justice intersection – although not a complete absence (cf. Berry et al., 2020) – and the contention, by some, that Algebra 2 should be replaced with an alternative such as data science, statistics, or more general coursework on quantitative literacy.

I believe that there are many ways in which social justice efforts can be realized in the context of Algebra 2. These include encouraging students to critique the systems in which they are participating, and supporting their development of critical consciousness. As a white teacher at a predominantly white institution (PWI) in an affluent area of the United States working with privileged students, I am particularly interested in supporting students to develop critical consciousness through their Algebra 2 courses, for the four reasons outlined by Kokka (2020, p. 779):

1. Participation in a diverse democracy requires critical consciousness, and the privileged are also called on to do social justice work.
2. Critical consciousness development requires higher order critical thinking, which all students need.
3. Critical consciousness can help privileged individuals create social change; without it, they may abuse their power.
4. Current structures of power dehumanize everyone, including privileged students, who face unique challenges, and therefore benefit from learning about how these systems harm them.

Fittingly for my own context, Kokka concludes this section by writing, "Lastly and importantly, independent schools who serve many privileged families are showing increased interest and engagement with social justice pedagogy" (p. 779). Given my own LfJ standards guideline and the ARTF recommendations, I felt that it would be time to shift from what Gutiérrez (2016) calls "flying under the radar" to "using the master's tools" (cf. Lorde, 1984):

> With *Use the Master's Tools*, we find ways to do what is in the best interest of our students and justify it with language that is valued in our schools or in professional documents. We can ask ourselves, "Can my work be seen as related to my "School Improvement Plan" or "Response to Intervention?" (p. 55)

My own views on the traditional course sequence aside, I felt the imperative to enact change subject to the constraints that an Algebra 2 course presents, while both recognizing that these constraints can promote creativity (Stokes, 2005) and that there may be a pedagogical future in which this course name, and much of its learned content, is rendered obsolete. Thus, it was within this context that I modified our first Algebra 2 unit, on the study of absolute value functions, to merge content knowledge with the four strands from Learning for Justice – identity, diversity, justice, action – among which identity was to be centered as we began a new school year without an established, in-person familiarity between instructor and (most) students. In the next section, I describe the project and how it functioned; and indicate briefly the ways in which I believe it aligns with the essential actions and areas highlighted by TODOS.

Absolute Value Functions and Graphs Intersect With Identity

Although the Common Core State Standards for Mathematics (Common Core State Standards Initiative, 2010) contain relatively little on absolute value functions, it has been my experience that they provide a natural segue between linear functions and higher degree polynomials, while presenting an opportunity to reinforce earlier ideas around, for example, piecewise-defined functions, connecting symbolic and visual representations through graphing, and naming graph features. For example, an absolute value function, which we define here as a function that maps x to $a|x - h| + k$ for fixed parameters a, h, and k, shares many features with quadratic functions: zero, one, or two x-intercepts; y-intercept; opening upwards or downwards; three parameters; a vertex or turning point; a single decreasing region and a single increasing region.

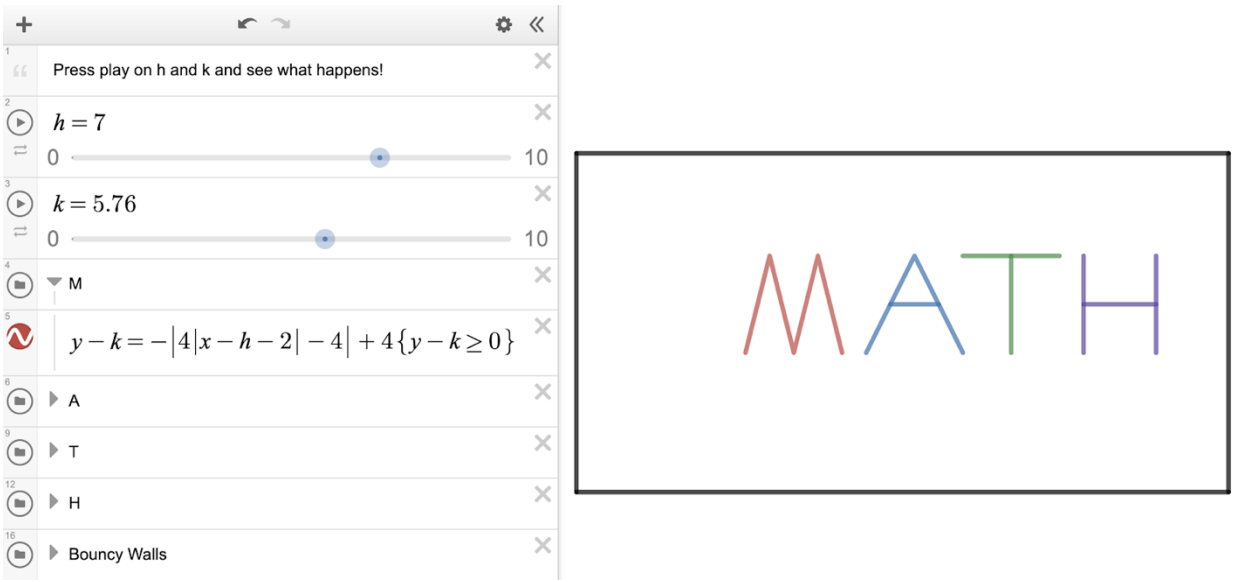
Modifying a Project

One of the three primary questions posed in the call for papers for this special issue of *TEEM* is, "What are the tensions and resolutions arising from engaging in antiracism work?" One of the tensions that I feel acutely

as a mathematics teacher – even, or especially, as one who has been aiming to infuse social justice into mathematics courses for years – is that a directive to modify mathematics courses to make them (somehow) antiracist does not come with a manual. What does it mean to teach the mathematical content knowledge of absolute value functions in an antiracist way? The resolution that I converged to for this unit was to modify a pre-existing project (Figure 1) in which students were asked to graph the word MATH using a combination of functions – including absolute value functions – and bounce it around within a graphed box in Desmos by using playable sliders.

Figure 1

Screenshot of 'MATH' graphing project shared with previous Algebra 2 students



The assignment was modified so that while the core graphing and slider aspects remained, space was made for students to tell their own name stories, include their own names in their graphing task, and reflect on how names matter. The media resources provided space to reflect on the reasons that names are meaningful, and how some names are Americanized in schools, dehumanizing people (for example, see the *Facundo the Great* link in the "media resources" in the Appendix). The full assignment is also contained in the Appendix.

Crucially, students learned about names and name stories from a variety of media (text and video) and read an additional article on name-based anti-Black hiring discrimination (see Appendix for these resources). Outcomes from final graphs and students' corresponding write-ups contain information about the past (e.g., being named after a recently deceased family member in keeping with Jewish traditions) and present (e.g., a student of color who uses one name with family and close friends and another with classmates and educators at our PWI). Moreover, we used parts of our own course discussions to look at some of the eponymous mathematical objects (e.g., the recently-retired R.A. Fisher Award and Lecture, the UT building formerly known as Robert Lee Moore Hall) and critique them. As a concrete example, we discussed the renaming of a building that previously held the name of R.L. Moore, an avowed segregationist mathematician (UT News, 2020). In our virtual format, we looked at Moore's wikipage, which refers to his "having been one of the most charismatic and inspiring university teachers of mathematics ever active in the United States" (Wikipedia, 2021). This description appears in a section titled *Unusual Teacher*; reconciling it with the descriptions in the next section, *Racism*, led one student to edit the former section in real time to express her view that he was a racist – a perspective I share. This change was promptly reverted, yet demonstrates, in my estimation, an example of an empowered learner acting with agency – as well as the systemic racism built into a platform such as Wikipedia.

The systems-level problem was ironically exemplified in maintaining a glowing description by *not* allowing the straightforward mention of Moore's racism in the section on his unusual teaching, and instead relegating it solely to the disjoint section to follow. Attempts to separate mathematical theory – and, in this case, the "unusual" mathematics teaching – of an individual from their racist actions is *not* antiracist; it is also unfortunately common in the world of academic mathematics (Bingham, 2020).

The project described here allowed students to produce mathematical ideas based on their own identities, and in some cases to modify the project further; for example, Figure 1 shows how a single *nested* absolute value function can be used to produce the letter M. As another example, some students played around with fonts, e.g., using bubble letters. By building a project that was generally enjoyed and still covered requisite content knowledge, we have a project that both positions students to get through the "gates" that presently exist while simultaneously not upholding irrelevant mathematics for its own sake: the personalization allows students to see themselves in the mathematics, and this is a project that can be implemented even if/when gates like the SATs are eradicated. The personalization went beyond sharing one's own name and into ensuring that students' names must be known by one another and their instructor, and, in many cases, students wrote about their identities in ways that diverged from typical mathematics write-ups, for example, by interacting with their own families to learn the origin of their names, and by engaging in storytelling around the ways in which many of them evolved in thinking about their own names over time. These name stories – shared from families to students, from students to instructors, or from students to other students – work towards a valuing of identity that is too scarce in mathematics courses. Pairing this with a reading on anti-Black name discrimination and a video on anti-Hispanic name discrimination, as well as looking at the ways in which mathematical eponyms can function as vessels for the continued racist legacy of their namesakes, opened up a space not typical in an Algebra 2 course.

Upon analysis and reflection, I can see how the assignment that was implemented makes space for myself and my students to address each of the four areas underscored in the TODOS (2020) position statement of what we need to attend to in our struggle towards antiracism in mathematics. The knowledge of Desmos' calculator needed to graph one's name, move it around with sliders, and ensure that it bounces off of the surrounding box all require a nontrivial level of *technological* sophistication. The Desmos calculator was accessible to all my students, and provided them with sliders to manipulate the graphs in ways that regular calculators would not have – the technology definitely *added* to the exploration. The assessment of the activity made space for valuing ways of knowing beyond traditional mathematical content standards needed to create the moving graph: I could assess the students' understanding of absolute value functions and their graphs while also commenting on and valuing their breadth of knowledge around their name stories and critiques of racism in naming buildings, awards, etc. What I also noticed was that students have the opportunity to provide feedback to me as to whether I showed how I valued learners' identities as a part of a new school year in which relationship building was a particularly difficult challenge due to a distanced virtual learning environment as combined with the events of the preceding months, such as the murder of George Floyd and the protests that followed it. Finally, as mentioned earlier, numerous students discussed their families (a category broader than "parents") in articulating their name stories: this sometimes meant explaining family traditions or discussing family members after whom students were named, and it also provoked, in many cases, discussions with family members that may not have otherwise organically arisen. This was significant to me, because rarely do activities in Algebra 2 provide space for students to bring in their families and familial knowledge.

Conclusion

Those who deride antiracism in mathematics education too often paint caricatures of radicalized indoctrination, describe misperceived ideological shifts towards "Marxism" or "Communism," or inaccurately invoke the term "Critical Race Theory" – not as a framework for legal scholarship but rather as a catch-all term into which they can pack privileged discomfort – in manners entirely untethered from day-to-day realities of K-12 teaching and learning. The project on absolute value functions described here is a low floor, high ceiling task – and so, too, is identity work. The floor is that we pronounce student names correctly; the reality is that many white

teachers do not, or change students' names to be easier to say, or don't see how they are complicit in racist actions when they say to students, "Wow, that's a hard one to say!" or proclaim themselves unable to get the pronunciation correct. But, we *can* learn about, and value through our actions, student identities. We can ensure students, entrusted to our care as educators, are learning about the experiences of others in the world, and we can discuss reality in a manner that enables young people to build towards a more just world while recognizing that their inherent value as human beings cannot be degraded by structural forces working against them. And the whole time, they can be learning core mathematics content. Asking students to graph their names, research and write name stories, and read about the ways in which racialized names result too often in individuals' further marginalization does not constitute the ceiling of identity work.

There is a growing sentiment among many mathematics educators that antiracism and social justice should be incorporated into mathematical learning. Yet efforts to do so are pushed off for a variety of reasons: a lack of clarity around what it means, concretely, to incorporate antiracism and social justice into mathematics education; a sense that these shifts need to be paradigmatic, or that the entire education system needs to be dismantled and rebuilt before meaningful changes can be enacted; or an ill-founded belief that antiracism and content knowledge are somehow philosophically competing against each other, such that attending to one comes at the expense of the other. But movement towards antiracist mathematics education is not a binary: it is not, and cannot be, all or nothing. Rather, we have to do all we can when we can. It is my most fervent hope that the reader comes away from this project description feeling clearer about what antiracism and social justice in mathematics education can look like, and understands that classroom and community change can be effected now—even as one works in other capacities towards societal shifts.

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Appendix: First unit project
What's in a name?

Below is the assignment that students received, verbatim, for our first unit project:

Consider the following graph of the word MATH:
https://www.desmos.com/calculator/atzno2qtaa

Clicking play on *h* and *k* will make the word MATH bounce off of the walls.

Your assignment is to create a graph that does the same, but to use your name rather than the word MATH. Please use at least one absolute value function (this may require some creativity, depending on the letters in your name!). In your submitted write-up of 2-4 pages, you will be asked to reflect on your own name story as well as to describe the process that you went through in creating your Desmos graph.

Relevant Media:
1) Name Stories: http://www.edchange.org/multicultural/activities/name.html
2) Names Do Matter: https://www.learningforjustice.org/magazine/names-do-matter
3) Facundo the Great: https://reimaginingmigration.org/facundo-the-great/
4) Anti-Black Hiring Discrimination: https://www.vox.com/identities/2017/9/18/16307782/study-racism-jobs

TEACHING FOR EXCELLENCE AND EQUITY IN MATHEMATICS

¡Atención, TODOS!

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Antiracist Care in a Linguistically Diverse Mathematics Classroom: A Case Study

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Abstract

In a case study of one high school mathematics teacher in a Midwestern public high school, we present findings on the ways in which she draws on her cultural wealth as a Middle Eastern woman to make her teaching both effective and caring across multiple racial-ethnic groups. While many of her students share her ethnic background, her classroom is linguistically and culturally diverse. Her effectiveness is explained not by role model effects alone, but by three specific features of her practice: reflection, responsivity, and a quality we have termed strategic caring.

Discussion And Reflection Enhancement

1. How would you describe a caring secondary mathematics teacher? Think of five action words that exemplify what a math teacher does to care for their students.

2. What are some ways in which secondary math teachers can be anti-racist in their practice, especially in schools where many students face poverty and are learning English as adolescents?

3. In racially and linguistically diverse schools, how are so-called “achievement gaps” in mathematics related or unrelated to the work of teaching?

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Antiracist Care in a Linguistically Diverse Mathematics Classroom: A Case Study

Melody Wilson and Nafissah Alasry

Introduction

Antiracism in Mathematics Education

A major goal of antiracist mathematics education is to eradicate the role mathematics has played in denying educational access to children of color (TODOS, 2020). This can be addressed in a variety of ways, such as opening up universal access to advanced mathematics classes (Berry, 2018; Venzant Chambers, 2009) and attending to the mathematics identities of learners whose racial-ethnic groups have been marginalized in the U.S. educational system (Martin, 2000; Nasir et al., 2008). We characterize Middle Eastern immigrant students as minoritized students of color because of the ways in which they are being affected by xenophobia in schools (DeNicolo et al., 2017) as well as the danger faced by immigrant youth of being low-tracked and academically sidelined (Valenzuela, 1999). As a Muslim woman living in the U.S., Nafissah (this paper's co-author) has only to glance at her Instagram feed to see current news stories such as "'It was hurtful': Prayer space inside West End Islamic Center vandalized" (Montilla, 2022) and "Scarborough's Muslim community unsettled as police search for motive in drive-by shooting injuring five men" (Macdonell et al., 2022).

Many studies on minoritized youth have pointed to the influence of student-teacher racial/ethnic matching in students' educational outcomes (Cherng & Halpin, 2016; Gershenson et al., 2018). Moving beyond a simple role model effect, scholars point to the critical consciousness that is often part of the worldview of teachers of color before they ever enter a teacher preparation program (Kohli et al., 2019). Others have shown that teachers of color tend to have higher expectations for students of color than white teachers do (Gershenson et al., 2016). In other words, when seeking to learn antiracist dispositions and practices, educators and researchers have good reason to study the practices of excellent teachers who match their students' racial-ethnic identities. Here, we offer a case study that illustrates how antiracist teaching is practiced in one culturally and linguistically diverse classroom. Our research questions are: (1) How does a Middle Eastern mathematics teacher draw on her own cultural and experiential wealth to practice antiracist teaching in the context of a linguistically diverse high school? (2) Using a portrait of this teacher, what does culturally connected care look like (Howard, 2002; McKinney de Royston et al., 2017) in a mathematics classroom?

Notes from Melody

When I first encounter Nafissah, her students have just left her classroom; she is alone for the ever-so-brief lunchtime break. As soon I enter, she turns and wheels her teacher's chair over to an empty student table, inviting me to sit. Her hazel eyes are luminous, fixed on me as she gives me her full attention. She is wearing a hijab, a long Tommy Hilfiger tunic, and jeans. Today is pep rally day; she simultaneously embodies the modesty valued by her Middle Eastern heritage culture and the stylish flair of a young American woman celebrating with high schoolers.

Her energy is palpable; her speaking voice is deep and rapid. "My parents actually came here in the '60s, but I was born here. I always say I'm so blessed because of my background. It's the scariest coincidence that I happen to be, and my family happens to be, from [Yemen,] the country of the majority of our ELL students." Eight years ago, there were just ten Middle Eastern students in the graduating class of Mapleton[1] High School (MHS); today Middle Easterners make up half of the student body. "And it's not gonna stop, because this war is not stopping," Nafissah tells me. I exclaim on what a resource she must be for her school. "I am gold!" she laughs.

[1] "Mapleton" is a pseudonym

A generation ago, Middle Eastern families had built a large community in the neighboring town, an inner-ring suburb of a large Midwestern city. Nafissah grew up there, in a close-knit Yemeni-American enclave (for more context on this community, see Sarroub's 2005 ethnography). Now, refugees from Yemen are settling here in Mapleton, with new families arriving every month.

Notes from Nafissah

My oldest sister married right out of high school. My next-oldest sister was the first to take college classes—but not until she was 24 years old. In those days, if a woman from my community went to college, she was expected to become a teacher or a nurse. But by the time I graduated from high school in 2007, community norms had begun to change. Girls were going to school for different things: accounting, pharmacy—everything. I vividly remember telling my precalculus teacher that I was planning to be a math teacher. I was shocked by her reply: "You're too good to do that. That's such a shame that you'd waste your time doing that, when you know you can be an engineer." There were moments, in college, when I considered becoming an accountant; I knew I could make a lot more money. But ultimately, I stuck to teaching. And there was more to this decision than just cultural expectations.

My fifth-grade teacher influenced the course of my life with one simple act of kindness. Our class was going on a field trip, and I told him I couldn't go. My mother didn't see the point of paying $10 for a field trip; she was born and raised overseas, and $10 was a lot to her. My teacher said, "You're going to come, and I'm going to pay for it." That little $10 gesture was life changing for me—the fact that a complete stranger would care so much. I still think of it all the time.

Today, as a teacher, it brings me joy to know that I'm impacting my students. They have become doctors, lawyers, teachers—and they still stay in touch with me. When I hear from them, I think, "It's not just math I taught you; I taught you life skills." This is why, even if I won the lottery, I would still teach.

Literature Review

Nafissah refers to herself as a "teacher who cares." So, as a backdrop to this study, we first look to the literature on care theory in education. We then supplement this with literature specific to a Middle Eastern immigrant cultural context.

Nel Noddings (1984), who introduced care theory into the field of education, proposed that a person who cares for another desires that person's well-being and acts to promote that well-being. This idea been refined and expanded by scholars who study communities of color and immigrant communities, who recognize that the meaning of care is embedded in local and cultural contexts (Bajaj et al., 2017; Gay, 2018; Howard, 2001, 2002; Ladson-Billings, 2009; McKinney de Royston et al., 2017; Milner, 2020; Valenzuela, 1999). These scholars have pointed out that care takes on specific contours in communities that have been historically marginalized. Care in these communities is grounded in knowledge of out-of-school life (DeNicolo et al., 2017), and directed at community change (Ladson-Billings, 2009; Milner, 2020). Shevalier and McKenzie (2012) connect teacher caring with social justice, emphasizing that "all they do as teachers—lesson planning, teaching, classroom management, so forth—is not just nuts-and-bolts of the profession but is truly a manifestation of the care and ethics" (p. 1102) which is the key to securing a just society.

We coin the term *strategic caring* to describe this energetic program of preparing students for future success—in a specific content area, in academics more broadly, and in life. This is the kind of caring described by scholars who have studied culturally responsive pedagogy (Gay, 2018; Howard, 2001; Milner, 2020). It is not just a warm emotion; it is focused toward making learning happen. This driving motivation is connected to issues of power and privilege, as elucidated by Delpit (1988): Caring teachers open up opportunities for their students by pushing them to be literate in the mainstream "culture of power" (p. 4) while also protecting and sustaining pride in the students' home cultures.

Reflection is also central to the ethic of care in teaching. For Shevalier & McKenzie (2012), reflection distinguishes those teachers who care *for* students from those who merely "care about" students. This kind of reflection constantly asks, "Is our response adequate? Could we have put what we said better? Has our act helped or hindered?" (p. 1093). While reflection may

overlap with (and is essential to) strategic caring, we note it separately because of its internal nature.

Given Nafissah's Middle Eastern cultural heritage, we draw additional theory from Franceshelli's (2016) study on Middle Eastern childrearing practices in the UK. In the families she studied, Franceschelli observed a mingling of seemingly opposite ways of caring. On one hand, parenting in these families was characterized by a strictness which was exercised with the children's future good in mind (much like the strategic caring described above). But this was combined with what Franceschelli terms *responsivity*. Responsivity is characterized by "reciprocal understanding, empathy, mutual support and communication" (p. 190) between parents and children. This relational dynamic is what transformed parental strictness, allowing it to be received by children as care. It should be noted that both Franceschelli's study and the current study focus on Muslim immigrant communities in largely non-Muslim countries, not Muslim families living in their countries of origin. The dynamics of living in a country where these families' way of life is accepted with ambivalence, at best, complicates childrearing practices; the "strictness" we observe may be read (at least in part) as a cultural survival mechanism, rather than being indigenous to Middle Eastern cultures themselves.

Methods

Data Collection

After meeting through a school ethnography project at MHS where teachers, staff, and students were observed and interviewed about the school's relationship with its Yemeni-American families (Bellino et al., 2020), Melody collected data from Nafissah over the course of two semesters in 2020. The data consisted of three class observations which were documented in detailed field notes, two formal interviews which were transcribed, and informal text messaging and email correspondence.

Coding and Data Analysis

Because of the time-intensive nature of Nafissah's job as a classroom teacher, Melody undertook the task of coding the data, coached by two university professors. Using NVivo software and constant comparison, codes were applied to sections of text ranging from a few words to a paragraph. Following Charmaz (2006), all codes consisted of gerund phrases, each naming the action or process described in a section of text. Since Nafissah is the main participant in this study, all codes referred to her actions. The two interview transcripts (approximately 16,000 words) and Melody's field notes (approximately 8,500 words) yielded a total of 616 coding references, which were then organized (and re-organized, as coding progressed) into categories. Nearly every sub-category contained data from all five data sources.

The analysis process consisted of iteratively grouping the codes into face-value categories and then matching these categories to theoretical constructs in the existing literature. Categories were combined and recombined until their hierarchical structure was logically robust and well-connected to preexisting theory. Our data fell into three overarching categories of teacher action: responsivity, reflection, and strategic caring (as defined in the literature review section, above). No unit of data was assigned to more than one category—although, as we will show, these three types of teacher action are intertwined.

Author Collaboration

It was midway through the process of data analysis and writing that we decided to co-author this paper, moving away from a traditional researcher-participant model toward a collaborative model of research praxis. This move was inspired by Irvine's (2003) injunction to include teachers as co-researchers into their own practice, as well as the current researcher-practitioner partnerships of Vossoughi, Escudé, and colleagues (Vossoughi et al., 2021; Vossoughi & Escudé, 2016). Our own model for collaborative research is still developing. At first our collaboration resembled traditional member checking, but over the course of several revisions, Nafissah's ownership of the project has grown. For example, in the final version of the paper we have written more in Nafissah's voice and included contextual information based on her own reading of media accounts of anti-Islamic violence in the U.S. and Canada.

Results

The number of coding references for each category were: responsivity (95 references); reflection (168 references); strategic caring (353 references). In each code category, we found certain examples of teacher action that stemmed

from Nafissah's cultural knowledge. We also found other examples that needed no insider knowledge but represented her broadly humanizing approach to teaching.

Responsivity

Fifteen percent of the data segments were coded as responsivity. Approximately the same proportion of coding references in the interview data and the observation data were assigned to this category, meaning that Nafissah both *described* having this kind of relationship with her students and was also *observed* enacting it. One example of responsivity was her regular requests for students' written feedback in the form of essay questions:

> My fourth hour, their last [essay assignment] was up to a month ago: What did you want us to do more of? And they said a lot more partner work, a lot more group work. And so when I started implementing [that] they said, 'You really did listen to us!' (Interview, 03/04/2020)

Nafissah's knowledge of Middle Eastern culture enabled her to be uniquely responsive to other student needs. Not only did she offer after-school tutoring; she also understood what her Middle Eastern girls might need from her so that they would be allowed to stay for tutoring:

> I say, 'I need you to stay after.' 'No, I can't stay, my parents won't—' 'I know. Don't be embarrassed, I was there. Let me call. When I talk to them, they're going to feel a lot more comfortable.' (Interview, 03/04/2020)

Other teachers at MHS did not appear to understand the need for this kind of parental contact. Although Nafissah empathized with these teachers, she also noted that they were missing important cultural knowledge:

> It's almost like if I was a different teacher and I wasn't who I am, and you said, 'I can't stay after, my parents won't let me.' I'm like, 'What do you mean you can't stay after? You're literally staying for tutoring, I don't understand, you're lying.' That would be my reaction. (Interview, 03/04/2020)

Reflection

Twenty seven percent of the data segments were coded as reflection. Some of this reflection would be familiar to math teachers in any community. For example, during the pandemic when teaching virtually, Nafissah thought constantly about the best way to do formative assessment. Her typical in-person method was to circulate around the room, listen to students' conversations, and look at their mini white boards in preparation for the brief whole-class discussions that were peppered throughout the hour. Now, she had to choose between having students upload handwritten work (which would have to be graded) and assigning auto-graded online work through an application such as IXL (https://www.ixl.com/math). While she felt that handwritten work would give her better information about student understanding, she was becoming overwhelmed:

> I could just assign two [Math IXL] lessons every week. [The software] checks it for them, submits the grade, and I'd be done. But then there's this heavy conscience that I have that I'm like, 'No.' It's just not who I am as a person. So, if that online work is not going to match [my learning goals], I'm going to have to give them a [hand-written] worksheet that's going to match a lot better. But guess what that means? I'm going to have to go through the worksheet and grade it. (Interview, 10/19/2020)

This example shows how reflection becomes intertwined with strategic caring—the energetic determination to make learning happen which she exhibited here by choosing to assign handwritten work.

In other moments of reflection, Nafissah drew on her heritage as a daughter of Arabic-speaking immigrants. This was especially true with her "bridge" Geometry class, which was made up of students who had finished MHS's intensive English language program but had not yet scored a 4 on the WIDA English language exam (Wisconsin Center for Education Research, n.d.):

> Every sentence I speak comes with thought before it. My mind works double when I'm teaching [multilingual students] because when I say something, the minute I say a word that they don't know, I have to go back and say a different sentence to help them better understand it. … But it's only because *I've trained my mind over the years*. … I've trained my mind with my father to say things like, 'Oh Dad, this is what that means. Oh, detergent—Dad, it's the soap for the clothes.' (Interview, 03/04/2020, emphasis added)

This example shows how Nafissah reflects about being an English learner, both in the moment of teaching and outside of the classroom. She constantly trains her mind (outside of the classroom) to think about what she is saying (inside the classroom) from the perspective of someone who is learning English.

Strategic Caring

Perhaps the most startling result was the strong focus on strategic caring evident across our data set (57% of all coding references). Within the strategic caring category, our four largest sub-categories were: scaffolding mathematical learning (22%), equipping students for success (21%), energetic caring (10%), and parent-like caring (4%). One example of equipping students for success was a workaround that Nafissah implemented for calculator use during virtual learning:

> Like when they said, somebody had mentioned how hard it was to use a calculator [included in the software] on the test. So two weeks ago I implemented: 'They're for a dollar, I want you to get those basic calculators.' And how I can get students to do things is I keep track of everything. So that following Wednesday I said, "Okay so hold up your calculator"—[I'm] scanning—mark down who doesn't have it. … And then I'll send him a text message reminder, 'You know you're still going to have to try to go and get it. If you can't, tell me, I'll get one for you.' [Out of] 180 students, I think 178 of mine have calculators, because they have to put it on their screen every time. (Interview, 10/19/2020)

Note the combination of demand ("You know you're still going to have to try to go and get it") and support ("If you can't, tell me, I'll get one for you") that Nafissah used to make sure her students had working equipment to use.

In an example of strategic caring that drew on her heritage culture, she served her Middle Eastern girls in a particular way:

> And a lot of my students, my female students, will say, 'It makes me so happy to see you with your hijab, with your head scarf, and you're a teacher. And it gives me hope that—I'm from a culture that almost says, 'No, you're going to be okay as a housewife and you'll be fine.' … And they'll always say, 'You're a role model to me because you look just like me and you did something.' So I'll talk a lot about college and what I did and what I went through and how it benefited me. (Interview, 3/04/2020)

Note the nuanced way in which Nafissah expresses love for her heritage culture, while also pushing back against a static or essentialized view of the culture as it is sometimes expressed (see Paris & Alim, 2014). Nafissah is constantly navigating between differing cultural and generational norms, both for the sake of her students and in order to construct her own identity. She is American-born but raised in a Yemeni family and community; she is a living bridge between worlds.

Concluding Thoughts

From Nafissah

I draw on the strengths of my culture in the way that I teach. My culture has formed my approach to things: being considerate of each other's differences, building a family-like environment, emphasizing the importance of trust and respect. My culture is centered around a feeling of caring for others like family, and that's what I try to build on.

I have a strong reason for staying in the Mapleton district: to be a voice for our Middle Eastern students, as well as all of our other students of color. This is social justice work: building an environment in your classroom where students can say, "Hey, I didn't understand what you said, and I'm not embarrassed to say it out loud." Where kids are not going to make fun of each other because they pronounced a word wrong. I was where those students are, and I have found my voice. And now I am working to help them find theirs.

From Melody

In 2019-2020, Nafissah's "bridge" class took a pre/post-test in Geometry—a test given school-wide to all Geometry students. After seeing the scores, other teachers were mystified as to how Nafissah's students had done so well in such a vocabulary-intensive subject. I was not surprised at all, after attending her classes. I saw every student speaking and writing about mathematics. And over the course of a few years, enrollment in Precalculus at MHS has jumped from 60 to 80 students, 30 of whom are classified by the school as ELLs. In concrete, everyday ways, Nafissah is eradicating the role

mathematics has played in denying educational access to children of color. In doing so, she is challenging multiple stereotypes imposed from various directions: long-standing (and virtually universal) stereotypes about girls' ability in mathematics, nationwide stereotypes of multilingual students as "slow" or "behind" (see Gitlin et al., 2003; Venzant Chambers, 2009) and more current and specific stereotypes about Muslim immigrants as dangerous or anti-American (Bajaj et al., 2016).

For generations, scholars of color have urged mainstream educators and educational researchers to start listening to teachers of color (Brown, 2014; Delpit, 1988; Ladson-Billings, 2009; Milner, 2020). As a white teacher and researcher, I can testify that there is no substitute for this. And I thank those teachers for their continued grace toward those who want to learn—the grace that Nafissah has extended to me in welcoming me into her classroom.

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Discussion And Reflection Enhancement DARE Post-Reading Questions

1. What surprised you about the ways in which this teacher focuses her energy and attention?
2. What positive aspects of her practice are facilitated by this teacher's identity as a Middle Eastern woman of color?
3. What can teachers of other racial-ethnic and gender identities learn from this teacher?
4. Name one way in which you incorporate or plan to incorporate reflection into your teaching practice.
5. Name one way in which you incorporate or plan to incorporate responsivity into your teaching practice.
6. Name one way in which you incorporate or plan to incorporate strategic caring into your teaching practice.

Designing a Mathematics Teacher Education Course for Equity and Antiracism

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Abstract

In this manuscript, I reflect on the redesign of my graduate elementary mathematics methods course—a redesign necessitated by the pandemic and the shift to online learning that created an opportunity to make equity and antiracism central to the course. I describe my earlier, unsuccessful attempt to add equity as a course topic—an "additive approach" to antiracist pedagogy (Kishimoto, 2018). I then reflect on my Fall 2020 iteration of the course, in which changes to course goals, content, and assessments allowed for an integrated approach to antiracism and equity, working towards TODOS' (2020a) call to prioritize antiracism in mathematics teaching and learning.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions:

1. What do you think of as equitable and antiracist teaching practices in K-12 mathematics classes? What do you think of as equitable and antiracist teaching practices in mathematics teacher education?

2. In what ways have the teacher education courses you have experienced prepared teachers to implement antiracist teaching practices? In what ways did these courses perpetuate "Whitestream (Gutiérrez, 2018, p. 2" practices and the status quo? In what ways are antiracist teaching practices being implemented in your classroom or at your school? In what ways are Whitestream practices and the status quo being perpetuated in your classroom or at your school?

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Designing a Mathematics Teacher Education Course for Equity and Antiracism

Nicole Fletcher

> *"The work we do in our classrooms may feel like a small drop in the ocean, but we know that what we teach our students can help turn the societal tide." (Torres, 2019, para. 16)*

When my university shut down in-person activity in March 2020 due to the COVID-19 pandemic, I did the best I could as a first-year faculty member to move my courses online within a matter of days and to help my students make it through the semester, all while I evacuated New York City, quarantined in my family's basement, and tried to help my family and myself survive the pandemic. Due to a failure in government leadership to adopt timely widespread public health measures to contain the virus, COVID continued to spread, so in summer 2020, I redesigned my in-person courses and buckled up for my first full semester of virtual instruction. George Floyd's murder by police in late May 2020 and the protests that followed were a call to action to do more relating to equity and to bring antiracism into my course, something I had not explicitly done before. In this manuscript, I reflect on the redesign of my graduate elementary mathematics methods course—a redesign that was born out of the necessity of pandemic online teaching but that created an opportunity to make equity and antiracism central to the course.

I begin this manuscript by sharing my initial attempt to add equity as a course topic, and then I share my course redesign process, which involved shifting course goals, content, and assessments to integrate equity and antiracism throughout the course. In developing an understanding of antiracism as identifying inequitable power and policies, confronting racial inequities, and working towards racial equality (Kendi, 2019), I have learned that equitable mathematics teaching and learning cannot exist without antiracism. As a white woman who recently finished her fourth year (at the time of publication) as a faculty member at a predominately white institution and who is not an expert on antiracist pedagogies, I have had both "hits" and "misses" on this journey. (I note that I am not an expert because I think it is important for people new to this work to realize that engaging in antiracist pedagogies is not only for people who specialize in this area.) It is my hope that sharing this reflection will open a feedback loop for those who wish to share insights and ideas and that others will join me on this imperfect but imperative journey towards integrating equity and antiracism into mathematics education courses.

Who I Am and How I Got Here

I grew up in Washington, DC in my childhood and in Prince George's County, Maryland during my preteen and teen years. I attended a public elementary school in DC that was diverse in race and nationality and then attended majority Black schools (public middle school and Catholic girls high school) in Prince George's County. I grew up around activists and was an activist myself from a young age—I campaigned for local politicians in New York City with my grandfather at 6 years old, and by 6th grade I was adamantly pro-peace and anti-war and was inspired by my grandmother, who immigrated from Italy as an adult and was actively involved in a number of social causes, to march on Washington against the Gulf War in 1990. I started noticing racial microaggressions occasionally when I was in high school, but I did not really become aware of racism as a current phenomenon or begin to develop an understanding of the systemic nature of racism in modern society until college. I also had the misconception that racism was more of a conservative problem and a southern states problem. It was not until much later that I started understanding the insidious nature of racism and its pervasiveness across systems, political ideologies, and geographic regions.

I became involved in equity work early in my professional career, moving from teaching in a general education nursery classroom at a private school to working as a special education teacher in kindergarten and first grade in New York City Public Schools. My interest in equity eventually brought me to mathematics education—I saw firsthand that young children were not being given access to high-quality mathematics teaching and that teachers were ill-equipped to provide that

teaching, and I wanted to help change that. I started learning about the role of race in equity and mathematics education when I took Dr. Erica Walker's Mathematics and Multicultural Education course in graduate school. Gutiérrez's (2009) conception of equity as having four dimensions—access, achievement, identity, and power—has been influential to my work along with the idea of "rehumanizing mathematics" (Gutiérrez, 2018), moving beyond "simply supporting students who are Indigenous, Black, and Latinx to do well by Whitestream standards" and towards "developing practices and measures that feel humane to those specific communities" (p. 2). Learning about the ways that school systems, by design, have maintained racial inequities throughout history, teaching within these systems, and seeing these inequities in action, have motivated me to work towards creating more equitable schooling opportunities for children.

I now work as a teacher educator at a predominantly white, private university in a wealthy area of Connecticut with preservice elementary teachers, 90% or more of whom are white women who are local to our geographic region. All of our preservice teachers take a service-learning course based in an elementary school in a nearby city that serves primarily Latinx and Black children, and some of our students go on to work in schools with many students of color. It is in this context, during the "twin pandemics of racism and COVID-19" (TODOS, 2020a, p. 2), that I've come to understand the meaning of Kendi's (2020) statement "There are only two choices: racist or anti-racist." These two choices, and Kendi's (2019) argument that "there is no neutrality in the racism struggle" (p. 9), have helped me to understand that if I am not actively working against racism, in all spheres of my life, then I am complicit in allowing racism to continue—that silence and inaction work in support of racism. (And I believe that white people need to stop expecting "DEI" [diversity, equity, and inclusion] work to be taken on solely by Black, Indigenous, and People of Color [BIPOC], often with little or no compensation. I believe that white people need to do our share of antiracism work and reflect on the ways our engagement in DEI or antiracism work is often centered around our comfortability.) I have learned that for white people to be antiracist, "they must acknowledge and understand their privilege, work to change their internalized racism, and interrupt racism when they see it" (National Museum of African American History and Culture, n.d). I have been speaking out in my personal life against anti-Black violence for a long time, but I had not brought that same energy for addressing racism directly into my professional life. I knew that my teaching needed to become explicitly antiracist and that my course needed to work towards "dismantl[ing] systems and structures that maintain racism within teaching and learning mathematics" (TODOS, 2020a, p. 2). And I realized that as a white woman mathematics teacher educator, I needed to model and facilitate the work of becoming an antiracist mathematics teacher for my students.

Attempt One—Adding Equity as a Course Topic

I started teaching my elementary mathematics methods course, a required course for our elementary education master's program, in fall 2019 (an in-person course in the "before times" prior to COVID). At that time, I added equity and culturally relevant pedagogy as a self-contained topic to the existing list of course topics (see Table 1)—what I now recognize to be an "additive approach" to antiracist pedagogy (Kishimoto, 2018). All of the existing topics seemed important, and addressing equity in the course was certainly important too, so I tried to squeeze it all into my first iteration of the course.

Unsurprisingly, it was a dizzying 14-week semester. We covered so much ground that nothing could be explored in-depth. I had not identified clear goals relating to equity, but I knew I wanted students to come away from the course knowing that all students are capable of learning mathematics, that many traditional teaching practices contribute to inequitable mathematics outcomes, and that mathematics needs to be relevant to students' lives. I added two equity-focused readings to the syllabus, but during discussions of these readings and how they might integrate ideas from the readings into their mathematics teaching, students' ideas were limited to surface-level changes such as using names representing various cultures in word problems. It felt like class discussions about the equity-focused readings never moved beyond a superficial level. Despite my attempts to use the readings to frame discussion of the importance of an asset-based orientation towards children, students continued referring to children as "strugglers" and "high flyers," and the mathematics lessons students designed continued to use traditional mathematics teaching methods that perpetuate existing structures and inequities.

Table 1

List of Topics for the Fall 2019 Iteration of My Elementary Mathematics Methods Course

- Counting and early number
- Place value
- Addition and subtraction
- Equality
- Multiplication and division
- Fractions
- Decimals
- Percents
- Ratios
- Algebra
- Geometry
- Measurement
- Formative assessment
- edTPA (teacher certification assessment portfolio) math task
- Classroom discourse
- Standards for mathematical practice
- Equity
- Culturally relevant teaching

My assessment of this first attempt to bring equity into the course was that it felt slapped on top, superfluous, and not integrated into the course in a meaningful way.

Attempt Two—Redesigning the Course With a Focus on Equity and Antiracism

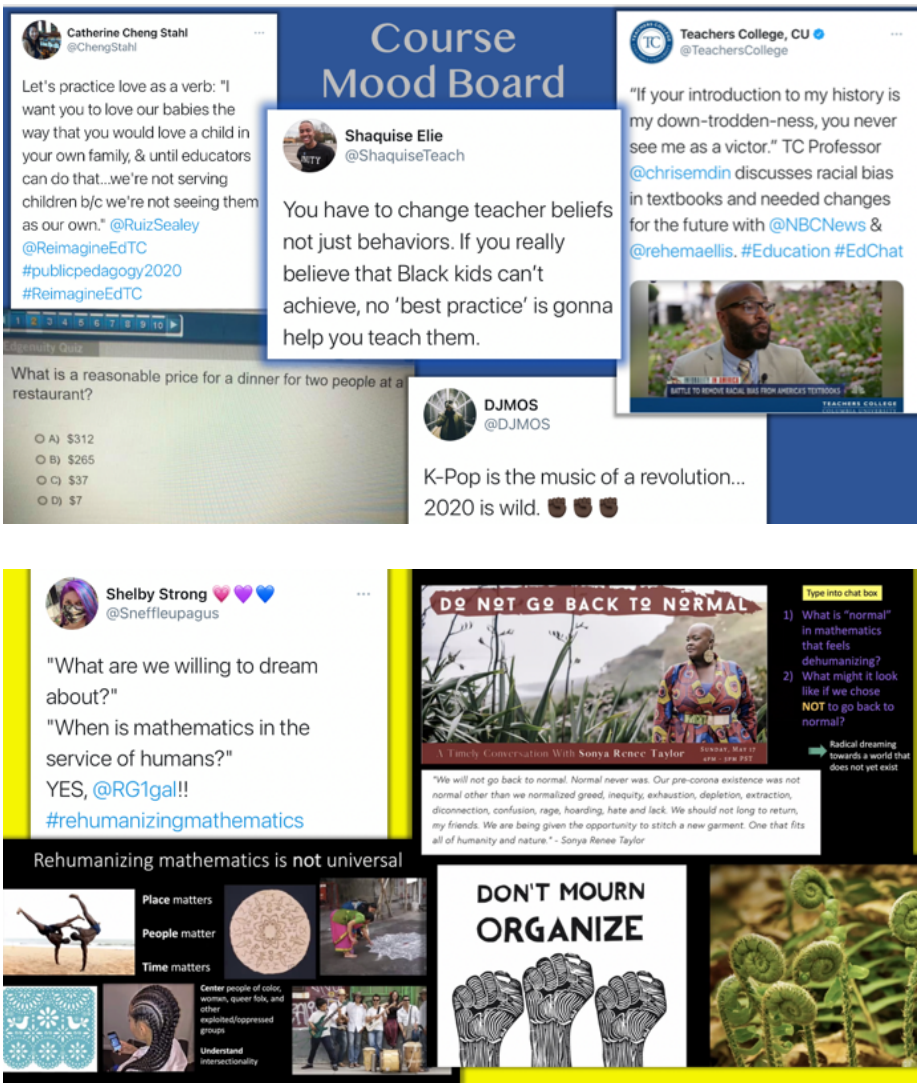
When I knew I needed to redesign my classes for online instruction, I used the opportunity to overhaul my elementary mathematics methods course. In addition to the inequities made visible by COVID and online learning, I saw George Floyd's murder and the subsequent protests as a call to action, reminding me of Deborah Ball's (2016) poignant question: "How can we teach mathematics so people stop killing each other?" Though I had engaged in equity and racial justice issues personally and professionally prior to 2020, I knew I needed to do more, and for me, that "more" was making antiracism and equity central to my teaching.

Dr. Brandie Waid, a friend from graduate school who is an independent mathematics education scholar and co-founder of the Radical Pedagogy Institute (https://bit.ly/3HaOBIZ; https://bit.ly/3V22tLm), served as a "critical friend" throughout my course design process. [A "critical friend" is someone who "asks provocative questions, … offers critique of a person's work as a friend," and who "takes the time to fully understand the context of the work presented and the outcomes that the person or group is working toward" (Costa & Kallick, 1993, p. 50).] I sought Brandie's input and advice when redesigning my course because of her experience designing a range of teacher education courses, including a mathematics methods for elementary preservice teachers and Diversity in Families, Schools, and Communities. Brandie shared a number of course design ideas, and as I began sharing initial ideas for my class, Brandie asked me an essential question: "What is your goal for the course?" My reply: "Equity is *IT*." I no longer wanted equity to be one of many topics added to an overcrowded syllabus. I wanted the course to focus on preparing preservice teachers to look for, see, and build upon the mathematical ideas, understandings, and possibilities of all children in their classrooms.

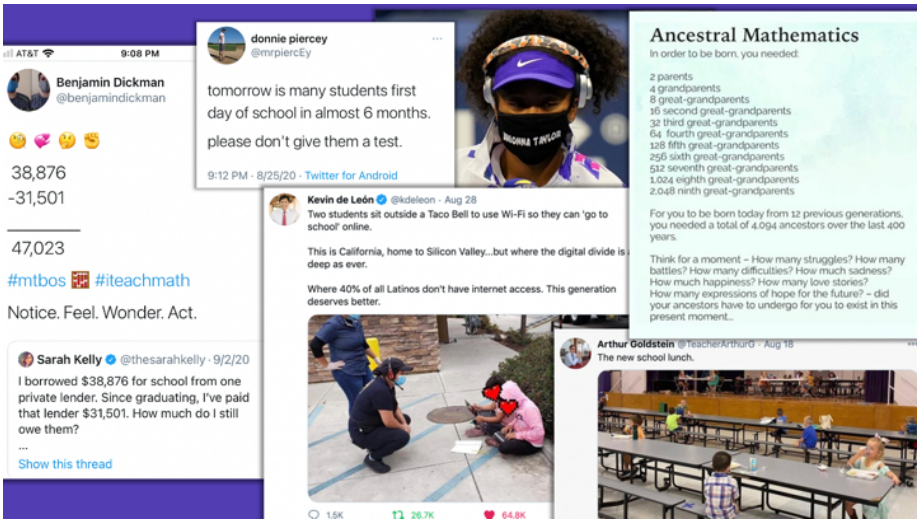
Throughout summer 2020, I collected screenshots of tweets, slides from workshops, and other images that were both depicting and informing the ideas and "vibes" that were percolating in my head for the course. This collection of images and screenshots came to be what I call a "course mood board" (see Figure 1). A mood board is a tool commonly used in fashion and interior design to convey a concept, vision, style, or other visual idea (Pierrus, 2015). Many of the images depicted some of the problems and inequities that plague mathematics teaching and learning—ways that mathematics education has been dehumanizing (Gutiérrez, 2018)—while other images pointed to the possibilities of mathematics education to be rehumanizing (Gutiérrez, 2018), particularly for those who have been marginalized by mathematics. One tweet in particular said it all: "You have to change teacher beliefs not just behaviors. If you really believe that Black kids can't achieve, no 'best practice' is gonna help you teach them" (Elie, 2020). This tweet spoke to me: Without addressing race directly in class, no amount of elementary mathematics teaching methods would prepare my

Figure 1

Course Mood Boards



(Top and bottom right and bottom left images in course mood board 2 are from Gutiérrez, [2020])



preservice teachers to teach their BIPOC students effectively. Addressing equity in class was no longer enough (not that it ever was); antiracism had to become an explicit component of the course. I have come to understand antiracism as Kendi (2019) defines it: endorsing racial equality, "locat[ing] the roots of problems in power and policies," and confronting racial inequities (p. 9). Changing essential, overarching elements of the class allowed us to explore the four dimensions of equity (access, achievement, identity, and power [Gutiérrez, 2009]) while also bringing antiracism to our work—locating mathematics education problems in systems rather than in groups of people and thinking about ways to challenge racial inequities and work toward racial equality through our mathematics teaching practices.

In the following sections, I describe changes I made to make equity and antiracism central to the course. I begin with a description of new course goals to guide our learning about elementary mathematics teaching methods through a lens of equity and antiracism. I then describe changes to course content to integrate equity and antiracism with elementary mathematics topics. Finally, I describe changes I made to assessments to make my assessment practices more equitable, to reflect the changes made to course goals and content, and to engage my students in thinking about how to integrate equity and antiracism into their future teaching.

Shifting Course Goals

The first major change to reflect the new course's focus was to the overarching course goals. The previous goals that were in place when I started teaching the course were as follows:

> During each class session students will spend time reviewing and discussing elementary mathematics concepts. In addition, we will explore various methods for teaching the concept across grade levels, focusing on the development of the concepts as students move from one grade level to the next. (Course Syllabus, Fall 2019)

While these course goals reflect typical content for an elementary mathematics methods course, they make no mention of equity, antiracism, or related ideas, and it is easy to imagine how a course with these goals could be taught without bringing these critical ideas into the curriculum. To address elementary mathematics teaching methods *and* equity and antiracism, I crafted new course goals to replace the old goals:

1. To understand some of the ways that mathematics teaching and school contexts have been dehumanizing and have underestimated the mathematical potential of many students, particularly those from marginalized groups, and
2. To explore how we as teachers can implement mathematical practices in our classrooms that lead to access, equity, and empowerment and that reveal/recognize the mathematical brilliance of our students. (Course Syllabus, Fall 2020).

With this shift, we would still explore elementary mathematics content and teaching methods, but we would do so through a lens of equitable, antiracist mathematics teaching, heeding TODOS' (2020a) call to "engage the sociopolitical turn in all aspects of education, including mathematics" and to "stay committed to the role that mathematics teaching and learning plays in our current Black Lives Matter mo(ve)ment and an antiracist society" (p. 9).

Shifting Course Content

The next major change I made to the course was adjusting the course content. The original list of course topics (see Table 1) was so packed that it went beyond ambitious. It was simply not possible to cover that many topics in one semester, and trying to teach them all meant that students likely left my course inadequately prepared to teach any of them—further contributing to inequities in mathematics education. I made difficult decisions about paring down the course content to investigate each topic in greater depth and to create space dedicated to the exploration of equity and antiracism. I focused the mathematics topics in the course on those that make up the bulk of what my students will teach in their future classrooms—early number concepts, place value and base ten, addition and subtraction, multiplication and division, fractions, early algebra, and geometry (Conference Board of the Mathematical Sciences, 2012).

As Brandie helped me think through my course redesign, she suggested cycling course topics between mathematics content and equity topics throughout the semester. This structure allowed for the course to move from an additive approach to an integrated approach to antiracism in course content (Kishimoto, 2018). I

designed class sessions focused on exploring an equity-focused, antiracist approach to teaching mathematics and facilitated these sessions throughout the semester. (See appendix for a list of course readings that guide these sessions.) We then integrated these ideas into our learning of teaching methods during the content-focused class sessions, enabling us to work towards the course goals. Early in the semester, we discussed mathematics teaching practices we had experienced or observed that were dehumanizing, an activity I learned from Rochelle Gutiérrez's (2020) webinar *Subversive Teaching to Rehumanize Mathematics*. Then throughout the semester, we learned about teaching methods that build on students' mathematical and other resources, center students' thinking, support development of deep understanding of mathematics, and contribute to students' mathematical agency (Aguirre, Mayfield-Ingram, & Martin, 2013). In addition, building the work of scholars of color into the foundation of the course ensures a greater variety of voices are guiding our work in the class and helps us to recognize the significant contributions to the field made by scholars of color.

Shifting Course Assessments

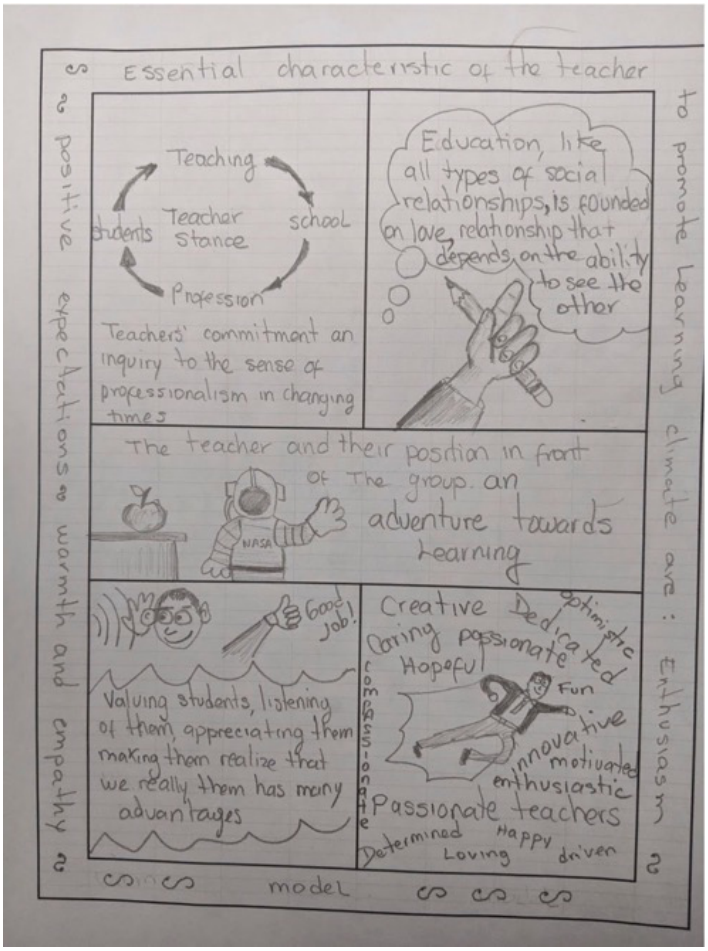
Moving the course away from an additive approach and toward an integrated approach to equity and antiracism meant that the shifts made to course goals and content needed to be reflected in my course assessments. In exploring alternative weekly assignments throughout summer 2020, I learned about the "one-pager" assignment through my participation in a Facebook group for higher education faculty members to communicate and share ideas. A one-pager combines text and images to present thinking about the ideas in a text in a visually interesting way (e.g., Potash, 2019). I provided prompts for components to be included for the two types of readings in the course (broad topics in mathematics education and the teaching of mathematics content). Within those requirements, students were free to use combinations of words, phrases, or sentences along with drawings or digital images to express their ideas about the readings. Kishimoto (2018) argues that antiracist teaching encourages students to "make connections to, and see themselves as part of, the topics being discussed" (p. 547), and making connections is an important part of the one-pager assignment. For readings about broad topics in mathematics education, in addition to including main ideas, quotations, and questions, students were asked to include connections they made to their classroom experiences or to a broader cultural context and applications to their future classroom practice or a critique of the reading. For readings about the teaching of mathematics content, students were asked to include important concepts for the content area, visual models used to help children build conceptual understanding in the content area, teaching considerations or activities they might implement in their future classrooms, common solution strategies or developing conceptions (i.e., (mis)conceptions), and questions about the reading.

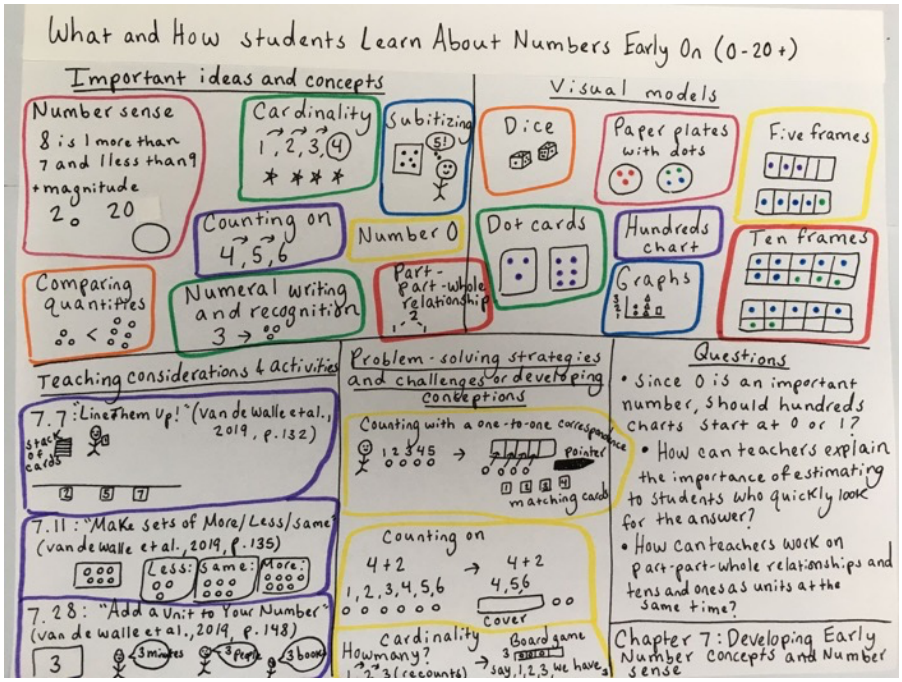
I had used weekly written reading responses in previous courses, but I wanted to move away from an overreliance on written assessments and did so through the one-pager assignment (see Figure 2). The combination of text and images in the one-pager assignment allows for the processing of ideas from the text through both verbal and visual representations of concepts, which can aid in learning (Paivio, 1971). The one-pager also created a more inclusive assessment opportunity. In her work on aurality and multimodal composing, Cynthia Selfe (2009) suggests that the "dominance of print literacy works against the interest of individuals whose cultures and communities have managed to maintain a value on multiple modalities of expression, multiple and hybrid ways of knowing, communicating, and establishing identity" (p. 618). Using a multimodal assessment format aligned with Universal Design for Learning guidelines (CAST, 2018) allows students to make sense of the readings and express their ideas outside of typical "academic writing," creating a more inclusive assessment opportunity in general, and in particular for multilingual students, students with disabilities, and students from cultures that value multiple means of expression (see Figure 2).

The one-pager assignment also helped me to take a step away from my own hyper-focus on written academic language. Kress (1999) argues that "the single, exclusive and intensive focus on written language has dampened the full development of all kinds of human potentials, through all the sensorial possibilities of human bodies" (p. 85), and the one-pager assignment allowed me to see the "sensorial possibilities" in my students. I have been amazed by the outcome of this assignment, which has tapped into students' skill sets I had not seen previously

Figure 2

Examples of Students' One-Pagers





when assignments focused on writing, including their artistic skills and creativity with visual representations.

For evaluating students' work on this assignment, I implemented "specifications grading," a grading system I learned about through a higher education faculty Facebook group. Specifications grading moves away from letters or points and instead evaluates student work based on whether it meets the goals of the assignment based on clearly defined criteria (Bayraktar, 2020), which in this case was the use of words and images to express ideas about the prompts provided for the the one-pager components. In an effort to set students up for success and rehumanize my assessment practices, I gave full credit to all one-pagers in week one regardless of whether they contained the specified components, I provided feedback throughout the semester and implemented a peer feedback activity after the first week's one-pagers were submitted, I dropped a specified number of one-pager grades, and I created and shared a folder of exemplar one-pagers, templates, and a video overview of the assignment.

Later in my course design process, Brandie made an important observation—she noted that I wanted equity to be the focus of the course, but none of my major course assessments focused on equity. We are all familiar with the ubiquitous question, "Will this be on the test?" and when students hear a "no," the untested information goes right out the window—or at least that was my reaction as a student. To address this issue and elevate the importance of equity and antiracism in the course, I created a project called "Forging Your Own Path to Equity and Access for All Students in Mathematics Education." I envisioned this project like a "choose your own adventure" book. Students chose a topic related to equity and access in mathematics education that interests them (see Table 2) and explored two resources on their topic. (Other "critical friends" have shared great resources that students have explored for this project, including Dr. Kari Kokka's (2020) compilation of Social Justice Mathematics and Science Curricular Resources for K-12 Teachers, the TODOS (2020b) website, and the Global Math Department (2020) newsletter and website.) Some of the suggested project topics focus specifically on race, and others related to other identities and experiences that intersect with racial identity. Students created a Flipgrid video to share their learning on their selected topic and their ideas for integrating their learning into their future teaching practice with the class and then responded to one another's Flipgrid videos with comments, ideas, and questions. Though not focused solely on race, the assignment created a space for students to extend their learning of ideas that had come up in the course or to explore new topics related to race and other equity issues in mathematics education, an opportunity which had not existed previously in the course. By changing the format and the content of my assessments, students were now working directly towards the new course goals by engaging with elementary mathematics teaching methods that work towards equity and antiracism and planning for their implementation of the course content in their future teaching practice.

Table 2

Topic Ideas for the "Forging Your Own Path to Equity and Access for All Students in Mathematics Education" Project

- Equity of online mathematics learning
- Social justice/activism and mathematics
- Mathematics experiences for students of color
- Mathematics experiences for emergent bilingual students
- Mathematics experiences related to gender identity
- Mathematics experiences for LGBTQ+ students
- Mathematics experiences for students with disabilities
- Mathematics experiences for students who are immigrants or undocumented
- Mathematics experiences for students of varying religious backgrounds
- Trauma-informed mathematics teaching practices
- Another topic of your choosing related to equity and access in mathematics education

Where I Fall Short and Future Directions

Reflecting on my course redesign and sharing my practice with others for feedback has helped me to identify areas where I fall short that can be improved upon in future iterations of the course. Though I added a number of readings by scholars of color to the course, an opportunity I missed was sharing the racial (or gender, sexuality, or

other) identity of authors with students. Because people often assume that authors of scholarly works are white and male (e.g., Perez, 2019), sharing the identity of authors may help students to better recognize the role that scholars of color have played in building and shaping the field of mathematics and mathematics education. I added the "Forging Your Own Path to Equity and Access" project to the course, but quite honestly, I have no idea how to assess the project. Because students are in such different points in their journeys of awareness and understanding of racism and other injustices, both broadly speaking and in mathematics education, I am unsure of how to assess their learning or their plans for putting their learning into action. Through reflecting on my course redesign, I also realized that I lack clarity about the constructs of *equity*, *antiracism*, *de/re/humanizing*, *culturally relevant teaching*, *social justice*, and related topics. If I lack clarity on these constructs, I will not be able to teach about them in a way that is clear to students (or advocate for these issues effectively at my university and beyond), so I need to continue to evolve my thinking and understanding of these concepts. I also need to continue to develop my skills for facilitating difficult conversations about race and students' reflections on their own biases—a role I find particularly challenging with students who are thinking about these issues for the first time, which is often the case in my teaching context. Ongoing engagement with "critical friends" through syllabus and assignment reviews, class observations, and reflections on class activities and interactions can help me to continue to identify unseen areas in need of improvement in my work towards antiracist teaching and learning.

Antiracism in Your Course and Beyond

Students never expressed divergent opinions or disagreement during class discussions on antiracism and equity. Nevertheless, comments on my end-of-semester course evaluations (which are anonymous) such as the following indicated that these sentiments were certainly there: "The professor used class time to push [a] political agenda and talk about our 'cultural context.'" Despite comments such as this indicating that some students were not engaging with ideas of antiracist, equitable mathematics teaching as I had hoped, comments from end-of-semester reflections on TODOS' (2016) position statement *Mathematics Education Through the Lens of Social Justice* and course learning related to antiracism and equity (which were not anonymous) showed that other students experienced the course's focus quite differently.

> "I want to support students' identities and approach math teaching from a very inclusive standpoint. By this I also mean including students' worlds in math teaching so they see the relevancy and humanity in the subject."
>
> "I think the biggest thing I will take away from [TODOS' (2016) position statement *Mathematics Education Through the Lens of Social Justice*] is to not assume. As a teacher it is unjust to assume a students' [*sic*] capabilities based on their background, culture and/or race."
>
> "One of the things that I took away from this course that will help me implement [*Mathematics Education Through the Lens of Social Justice*] is that you have to be the one who takes action and holds others accountable. Throughout my time in this class I have seen Dr. Fletcher take her own action in making sure what needs to be said is said, whether it was easy or hard to say. It showed me that as a teacher you have to be brave and bold if you want to see the changes you know need to happen."

Comments such as these demonstrated that some students were engaging with ideas about antiracism and equity in mathematics education in powerful ways, and that teaching mathematics methods through a lens of antiracism and equity has the potential to transform preservice teachers' future classroom practices and, in turn, have a positive impact on their future students.

For those that are new to this work, overhauling a course can seem like a daunting task. But the current climate of book bans, anti-Critical Race Theory protests at school board meetings, and laws censoring teaching about race and racism, as well as the ways race intersects with other issues such as anti-trans laws and reproductive justice, highlights the urgency of preparing preservice teachers to engage in antiracist mathematics teaching practices. If you are looking to bring antiracist practices into your course, you may consider reframing your course goals with a focus on equitable and antiracist teaching methods as a starting point. From there, you can begin to integrate connections between course content and antiracism and embed antiracist practices into your pedagogy and assessments to work towards an integrated

approach to antiracism in course design (Kishimoto, 2018). As you integrate equity and antiracism into your teaching practice, it is important to build your community of "critical friends" within and beyond your institution. Sharing ideas with friends and colleagues, attending workshops, participating in teaching circles and professional learning opportunities, and interacting with fellow educators on social media platforms have all been critical to my learning and growth and have been sources of inspiration and support throughout this journey.

But to implement antiracist teaching practices authentically and effectively, you must also be engaging in antiracist work beyond the courses you teach. It is imperative that you embark on a journey of self-reflection to examine your own biases and gaps in knowledge and awareness and then take action to change your biases, particularly related to anti-Blackness and other forms of racism. Without reflecting on our own biases and the ways racial trauma impacts all of us, attempting to implement antiracist activities in our courses may not be beneficial for preservice teachers or their future K-12 students (TODOS, 2020a). And remember that the work of pushing towards an antiracist future is never finished, whether personally or in your classes. Antiracism is an unending journey, not a destination. You may identify as antiracist, you may incorporate antiracist practices into your classes, but "it is more realistic to conceptualize antiracist teaching as an ongoing practice one must continue to develop and expand over the course of a career" (Shah & Coles, 2020, p. 596). Become an advocate for antiracism in all arenas of your professional life—on committees, through research, in hiring decisions, in your support of and advocacy for students, faculty, staff, and community—as well as in your personal life. And seek allies and "critical friends" who can challenge, guide, support, and encourage you on this imperfect but imperative journey towards antiracism.

NOTE: The article builds on a previous contribution to the Global Math Department newsletter in June 2021.

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. Have you observed tensions between stated support of antiracist pedagogy and practices that maintain Whitestream standards in mathematics teacher education? Describe these tensions.

2. In the discussion of a class project in which students explore a topic of interest related to equity and access in mathematics education, the author states, "Because students are in such different points in their journeys of awareness and understanding of racism and other injustices, both broadly speaking and in mathematics education, I am unsure of how to assess their learning or their plans for putting their learning into action." How would you assess student work related to antiracism? What challenges might arise in assessing student work related to antiracism?

3. The author described a number of ways that equity and antiracism can be incorporated into course design:
    a. reframe your course goals with a focus on antiracist, equitable mathematics teaching practices
    b. integrate connections between course content and equity and antiracism
    c. embed antiracist practices into your pedagogy or assessments.

    What would you add to this list to bring antiracism to the center of course design in mathematics education?

4. Try this: Look at your current mathematics education syllabus. Which of the practices described in this article for incorporating equity and antiracism into mathematics education course design are already present in your course? Would you assess your current approach to equity and antiracism in your course as "additive" or "integrated" (Kishimoto, 2018)? What are 1-2 things you can change/add/do differently in your courses (or within yourself) next semester to move towards a more integrated approach to antiracism in your course? How will you reflect on the effectiveness of your change at the end of the semester? You may choose to do this activity independently, or you may choose to do this activity with a colleague who can serve as a "critical friend" and accountability partner.

Appendix

Course readings that guided our sessions on equity and antiracism

- Djonko-Moore, C. (2020). Culture in early childhood mathematics. *Mathematics Teacher: Learning and Teaching PK-12*, *113*(9), 702-707.
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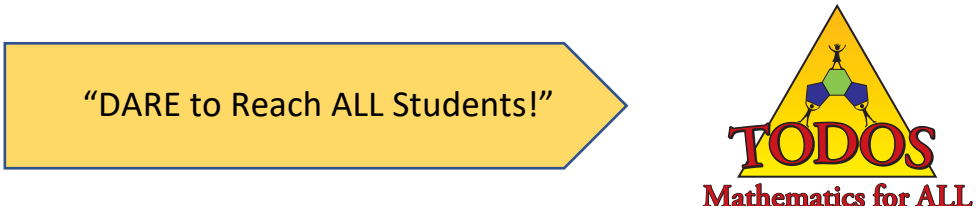

Gatekeeping in Mathematics for Social and Racial Justice: Reflections on a Conversation Among Colleagues

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Abstract

Many educators personally value social justice and antiracism. However, personal identities, the perception of competing mathematics and social justice goals for teaching, and public discourses and policies can create barriers to realizing these commitments in mathematics classrooms. In this commentary, we share excerpts from one of our many conversations with connections to current literature and selected artifacts representing gatekeepers to social justice and antiracist mathematics. In addition to framing the gatekeepers, we highlight productive points of change for educators navigating tenuous situations in their schools and communities.

Discussion And Reflection Enhancement (DARE) Pre-Reading Questions

1. What challenges and tensions do you face in realizing your commitments to antiracism in mathematics classrooms?

2. What are the sources of those tensions? Do they arise from personal/internal conflicts, competing school/curricular goals, or public discourses about mathematics education?

Michael Lolkus (mikelolkus@cpm.org) recently graduated from Purdue University. Michael is a former secondary mathematics teacher, instructional coach and department chair, and now works at an educational nonprofit organization focused on secondary mathematics. He develops and explores the promise of culturally sustaining and social justice-focused mathematics curricula.

Eric Cordero-Siy (ericcs@bu.edu) is a Clinical Assistant Professor at Boston University. Eric is a former math teacher. He focuses on in-service elementary mathematics teachers' sensemaking as they facilitate equitable classroom discussions focused on representations. He is also exploring the nature of knowledge production in mathematics education research.

Frances K. Harper (francesharper@utk.edu) is an Associate Professor of STEM (Mathematics) Education at the University of Tennessee-Knoxville. Frances is a former PK-12 mathematics and reading educator. Her current work explores the potential for teacher-family-community partnerships to advance racial justice in PK-5 STEM and mathematics education.

We would like to extend our gratitude to the reviewers for suggesting that we more intentionally draw on and amplify the voices of BIPOC authors. We agree that as we work toward TMSRJ, we must continue to critically reflect on and expand whose voices and ideas inform our research. This manuscript serves not as an example of what this could look like, but rather a snapshot of our current progress toward finding resonance between our instructional and research practices.

Gatekeeping in Mathematics for Social and Racial Justice: Reflections on a Conversation Among Colleagues

Michael Lolkus, Eric Cordero-Siy, and Frances Harper

Many in the United States are calling for change in response to increased awareness of police killings of Black people and unjust policies promoting and sustaining white supremacy. Educators are recognizing the political nature of their work as they strive to promote change alongside community members. These efforts underscore calls, such as those from TODOS: Mathematics for All (2020), to rethink collective action through renewed community partnerships and pledges to dismantle racist structures in mathematics education. Taking an antiracist stance is to "dismantle systems and structures that maintain racism within teaching and learning mathematics" (TODOS, 2020, p. 2), which works in tandem with broader efforts toward teaching mathematics for social justice (TMSJ). Husband (2016) distilled antiracist education into four defining characteristics: knowledge deconstruction and critique, an overtly political stance, analyses of racial and economic oppression simultaneously, and social activism. TMSJ can (but does not necessarily) include these four characteristics. We use TMSRJ (teaching mathematics for social and racial justice) to refer to efforts to emphasize antiracist education as part of broader efforts to teach and learn mathematics for social justice.

While progress is being made in some states to embrace TMSRJ movements (e.g., A Pathway to Equitable Math Instruction, 2021; Seattle Public Schools, 2021), others are working to restrict what is taught about systemic racism (e.g., Adams, 2021; Allison, 2021). Emerging policy gatekeepers may restrict teachers' and teacher educators' ability to engage in antiracist work. Gatekeepers, however, are not limited to groups or policies that oppose TMSRJ (Appelbaum & Davila, 2007), but those who deem certain practices as TMSRJ-worthy or not can also act as gatekeepers by amplifying individuals' self-doubt about their antiracist commitments. Gatekeepers determine what efforts toward TMSRJ are viable, by which educators, and for which students. As such, we refer to gatekeepers, not as physical gates, but individuals, conceptualizations, and discourses that inform who has access to and what counts as TMSRJ.

We, three mathematics teacher educators and researchers, explore these tensions by sharing our conversations about fully realizing mathematics education as a tool to critically understand and change the world by (a) complexifying TMSRJ; (b) identifying gatekeepers to TMSRJ; and (c) providing resources and recommendations.

Background for the Conversation

Our conversation grew out of our collaboration on a virtual symposium for the annual conference hosted by the American Educational Research Association (Berry et al., 2021) focused on mathematics teachers' experiences with TMSRJ. Sparked by questions raised in the discussion of our respective presentations, we continued regular Zoom discussions (six in three months) to investigate and unpack tensions in mathematics teachers' engagements with TMSRJ. We also regularly brought artifacts (e.g., policy documents, social media posts, news articles) to share as we collectively sought to understand evolving gatekeepers to TMSRJ. We have organized several of the artifacts that served as reference points in our ongoing conversation on a website (http://sites.google.com/view/gatekeepingartifacts), and we invite you to visit this site, to engage with and reflect

on the artifacts yourself, and to reference specific artifacts as we evoke them in our conversation. To capture the nature of our ongoing discussions, we recorded our most recent one. This paper is organized around illustrative excerpts from that discussion, and you can find the full transcripts on the website. In this article, we reflect on the conversation that occurred at the beginning of the 2021-2022 academic year when we were all early-career mathematics education researchers working across three states that had legislative efforts to ban critical race theory (CRT; Loughlin, 2022; McGreevy, 2022; Redman, 2022). We draw on our diverse teaching and personal experiences from our varied backgrounds and different career stages. In doing so, we provide some recommendations on how to confront various barriers to TMRSJ, but we wish to emphasize that these examples are contextually situated and should not be seen as prescriptive. We provide a brief overview of our positionalities, with more details unfolding through the selected excerpts.

Cordero-Siy is a cis BIPOC[1] man who grew up in diverse, middle-class environments and has lived on the boundaries of identities. He learned being a mathematics teacher goes beyond "teaching mathematics" when a student said she was happy to have a math teacher embrace her queerness. He learned about movements and theories explaining this. At the time of our conversation, he identified as still on the boundary of social justice and "not enough" in his role as a Research Associate. As this piece moved towards publication, he entered his current role as a Clinical Assistant Professor.

Harper is a white cis woman. Her commitments to social and racial justice came from growing up in poverty as a member of a multiracial family. She chose a career in mathematics education because of the power of mathematics as a gatekeeper, and she has been learning how to disrupt inequities with and within mathematics since her first year as a teacher. Her relationships with BIPOC students, families, and community leaders guide her work. During our conversation, she was an Assistant Professor and was promoted to Associate Professor as this article moved toward publication.

Lolkus is a white cis man with suburban, upper-middle class lived experiences. He learned more about racial injustices and his own unearned privilege as a secondary mathematics teacher with BIPOC students. Lolkus continues to explore the affordances of TMSRJ with prospective mathematics teachers and undergraduate students. These efforts were central to his work as a doctoral candidate at the time of our conversation, and he transitioned into a role as a Curriculum Writer and Editor for a secondary mathematics educational nonprofit organization.

We were brought together by our commitments to TMSRJ, and we see the challenges to centering antiracism that we face as mathematics teacher educators as related to those challenges faced by K-12 mathematics teachers with similar commitments. We hope that in holding a mirror up to ourselves that others—in particular, early career mathematics (teacher) educators with a variety of positionalities in relation to antiracism—might find these ideas to be mirrors or windows for themselves. By analyzing our conversations through a lens of antiracism, we also hope to trouble or expand what TMSRJ can be, specifically in the service of antiracism.

Snapshots of Ongoing Conversations

We recognize many gatekeepers limit opportunities for TMSRJ, including those that are self-imposed, restrictions through public policies, and mis-categorized positionings of mathematics educators as those who "do equity" and "do math." Here, we provide a narrative of, and selected quotations from, our conversation about personal, public, and conceptual barriers (i.e., gatekeepers) to TMSRJ. We also provide direct links to the referenced artifacts and encourage you to engage with these artifacts as you consider the ideas we present in this article.

Personal Gatekeeper: Identities

Status and power differences related to one's own identities—regardless of their role in the classroom, teacher education, or research—may hinder or support efforts to engage in TMSRJ. A salient identity of our

[1] Drawing from the *Mo(ve)ment to Prioritize Antiracist Mathematics* (TODOS, 2020), we use BIPOC to refer to Black, Indigenous, and People of Color in recognition of the unique experiences and relationships different BIPOC communities have to whiteness and white supremacy in the United States.

group was that of early career mathematics education researchers and teacher educators working to promote antiracist mathematics instruction. We considered how this early career identity might conflict with some of our personal and professional commitments. For example, as an assistant professor (in Tennessee), Harper raised concerns about racism more selectively (i.e., less frequently) during meetings and in her classes than she had done as a doctoral student (in Michigan). As a new faculty member, she felt more vulnerable given that her colleagues voted annually on whether to retain her in her position, based in part on "collegiality" and student course evaluations. This early career dimension of our collective identities underscores the tensions that educators might face when trying to find their place in their professional communities. For instance, Cordero-Siy shared hesitation to commit to the work while reflecting on institutions to apply to:

> In choosing spaces where we want to start our careers, it's becoming a little more difficult [Conceptual Artifact V]. I'd like to do this type of work, and there's an opening in this state, but I don't want to go there because of all the executive orders. This is not going to bring me joy, this is not where I need to be—it's going to suck.

While efforts to engage in antiracist work are needed everywhere, we acknowledge that our decisions on where to work toward TMSRJ were partly informed by opportunities to join supportive communities. This seemed even more pressing given our roles as early-career educators working toward antiracist mathematical spaces and facing potential backlash for challenging the status quo (cf. Robertson, 2022), as well as not yet having the same career protections or as established community and institutional partnerships as our later-career peers. Efforts to reform mathematics education in schools prove more successful when teachers committed to change do their work within supportive networks and as part of a collective enterprise (Coburn et al., 2013; Gutiérrez, 1996). Antiracist initiatives are no exception, and the evolving political climate will require supportive and innovative approaches to network formation and change regardless of the geopolitical context where people live.

We also reflected on how our identities, particularly our racial identities, and dispositions influence our efforts toward TMSRJ. Lolkus, for example, acknowledged the apparent paradox of white people, like himself, who have benefited from systemic injustices working toward TMSRJ:

> So, white folks, in particular, who are in positions of power, are the ones who are deciding what culturally relevant pedagogy looks like in K-12 schools and are the people who are most likely to continue to perpetuate these issues. It's bringing a lot of questions about my individual role, specifically as a white man [Identity Artifact I], but then also thinking about how does each person's identity then inform their efforts towards TMSJ and antiracist math [Identity Artifact II]?

Our personal and professional identities are intricately linked with what we can recognize in our research and inform how we can reimagine mathematics education (Youdell, 2006). These identities are continually evolving, as are our relationships with our research collaborators and participants (Walshaw, 2010). By simply engaging in the mathematics education research enterprise, "we are implicated in constructing part of the practices of mathematics" (Valero, 2004, p. 19). The same can be said of teachers engaging in the enterprise of schooling. As educators, it is important to embrace the complexities of our identities in our efforts toward TMSRJ, and not allow them to serve as barriers to getting started. For example, in actively working towards justice, white folks might worry that they will "get it wrong," while BIPOC folks may fear backlash and hostility from others.

Collaboration provides one way of finding supportive networks and overcoming self-doubt and anxiety based on our racial identities. In our conversation, Harper shared about the role of collaboration in her efforts working toward TMSRJ, specifically given her positionality as a white faculty member at a historically white institution:

> The work that I feel most passionate about is imagining something new [Identity Artifact III], with people who are better positioned to imagine what that looks like than I am [Identify Artifact VII].
>
> Lolkus (in response): So, if we're not yet able to reimagine mathematics education on our own as an independent endeavor, we need to find and connect with the folks who are.

We must recognize how our individual identities (e.g., privileged backgrounds, restricted decision-making

power) shape our capacity for anti-racist actions at different moments and in varied contexts, and continue to question the implications of our work. Do our actions disrupt mainstream discourses and raise awareness or reinforce stereotypes of marginalized communities (Darragh, 2018)? Engaging with folks from diverse experiences and backgrounds can support our reimagination of mathematics education. For example, Harper reflected on her experiences in Allies for Change (n.d.), an antiracist seminar for white people, which set norms for expecting joy when engaging in antiracist work. Meaning, as we do the hard work of confronting systems of oppression and inequities in our communities and schools, we must also look for and anticipate joy as we partner with others in collective action toward TMSRJ. This prompted Cordero-Siy to reflect on our responsibilities and our spheres of influence working toward TMSRJ:

> What is our role in this? Who needs to speak up? Us to try to help people think through the things like what the Heritage Foundation said, [that Critical Race Theory is racial discrimination; Identify Artifact IV], or perhaps to empower some parents who I personally know?
>
> Lolkus (in response): The role that I play in that is being able to help navigate some of the predominately white spaces in ways that the parents, the teachers, the students that I work with don't have access to navigate those spaces in that same way.

Confronting Personal Gatekeepers

Our conversation prompted Lolkus to connect the need for teachers to critically reflect on their own positionalities while also working to understand other folks' perspectives through analogies like those of "Windows and Mirrors" (Gutiérrez, 2012 [Identity Artifact V]; Learning for Justice, n.d. [Identity Artifact VI]). This reflection is necessary given that those in dominant groups have historically (a) appropriated the ideas of those of the oppressed (Kivel, 2017); and (b) burdened their colleagues of Color as the source, explanation, and final arbiter of their actions (Brazas & McGeehan, 2020). Since school mathematics "is placed largely in the hands of Whites or in the hands of non-Whites who are positioned to preserve White interests" (Martin, 2015, p. 21), educators must re-learn history and actively confront their complicity in creating today's sociopolitical conditions that promote white supremacy (Bell et al., 2021). Lolkus, for instance, worked to unpack the ways that his efforts toward TMSRJ were still embedded in and upheld whiteness so as to continue revising and rethinking his antiracist pedagogies (Lolkus, 2022). Nuanced understandings through self-reflection of how we are all impacted by racial trauma is necessary for TMSRJ (TODOS, 2020) and can support us to embrace the complexities of our identities. To be clear, we are not suggesting racism harms white people in the same way or to the same extent it harms BIPOC people, but we all have healing work to do (e.g., Case, 2019; Menakem, 2014) if we are to prevent racial trauma and anxiety from creating barriers to getting started in TMSRJ efforts.

Conceptual Gatekeeper: Mathematics and Social and Racial Justice Goals for Teaching

Mathematics teachers and teacher educators are often framed as supporting either core content or justice-centered practices [Conceptual Artifact I]. This postulated binary functions as a gatekeeper as to who does "the work" and conceals the complexity of teaching and teacher education. Even so, these extremes are imagined. Students' experiences with racism become salient in mathematics classrooms, whether teachers acknowledge them or not (e.g., Harper, 2016), and you do not "arrive" as a social justice teacher—it is always a process of learning with and from students and communities how to better disrupt inequitable systems. To prepare teachers, teacher educators cannot simply address each pole of the binary separately or "add equity and stir," but by arguing against the core values that have driven research and teacher preparation to uphold the binary (Dunn, 2016). Relatedly, our conversation explored apolitical framings of mathematics, as Cordero-Siy shared:

> I'm thinking about the word "organized" now…. I'm also wondering if [attacks on mathematics educators by far-right extremist groups; MathEdCollective, n.d.; Conceptual Artifact II]… feels organized because of popular ways people conceive of, say, mathematics. I'm looking at what Mike in Idaho said: "Whenever I put y = mx + b for a student from China, Bulgaria, or Bolivia, they immediately knew what we were covering and went to work [Conceptual Artifact IV]."

The attacks on mathematics educators who challenge the status quo of mathematics teaching and learning provide examples of how many people currently hold a narrow understanding of what is and what counts as mathematics. This resistance to acknowledging an expanded conception of mathematics, and TMSRJ in particular, echoes backlash to mathematics education reforms that worked to prioritize students' conceptual understandings of mathematical ideas over memorization and procedures (Cordero-Siy et al., 2022). As such, these tensions, in and of themselves, underscore the historical role of mathematics being used as a tool of whiteness (e.g., colorblind [Stinson, 2011], culturally neutral [Ernest, 1991; Felton, 2010; Gutiérrez, 2017], normed behaviors and emotions [Battey & Leyva, 2016]). As Harper noted:

> We know that it is often the case, right, that when reform efforts are scaled up, the marginalization of BIPOC in classrooms just continues.

Many mathematics education reform efforts continue to perpetuate whiteness through the promotion of white interests and white ideals (Berry et al., 2014; Martin, 2010, 2013).

Confronting Conceptual Gatekeepers

For these tensions to be minimized, we must reimagine mathematics (Martin, 2015). Namely, we see promise in teachers and teacher educators moving beyond positioning TMSRJ as solely adding social justice topics to the mathematics curriculum (and "stirring"). Instead, we work to reimagine every aspect of the mathematics classroom experience from an anti-racist lens, thus blurring boundaries around what counts as teacher activism. Cordero-Siy, for instance, challenges dominant discourses about and conceptions of "what counts" in his design and delivery of a doctoral seminar focused on forbidden texts, theories, and methodologies in mathematics education. Harper takes a different approach by partnering directly with teachers and caregivers of BIPOC children to reconceptualize content and curriculum (Harper et al., 2023). Moreover, some educators look to engage in social justice practices beyond their immediate spheres of influence (Kokka, 2019), leading to teacher activism, or working toward social justice, both in and out of the classroom (Picower, 2012). Such political struggle can support teachers to develop political relationships with the community and crucial knowledge needed for TMSRJ (Gutstein, 2018).

Public Gatekeeper: The Public and "The Public"

Through either attacks on or support for those working to reform mathematics education, the public functions as a gatekeeper to what schools and mathematics classrooms should be about. We questioned the extent to which attacks and support reflect broader public sentiments with Cordero-Siy noting louder voices masquerade as "the public." Current events, such as calls for schools to "cancel" Critical Race Theory (CRT) in K-12 curricula ["Public" Artifact III, "Public" Artifact IV], have precariously positioned teachers. As one Nashville high school mathematics teacher, Travis Vaughn, shared, these curricular restrictions "will make it harder for me in the classroom as most of my students face racism and discrimination in this country… every system in the U.S. is built on racism and white supremacy" (Stout, 2021, para. 6). Vaughn's reaction provides an example of the tension mathematics teachers face as their work continues to transition to a point of activism in and of itself. Meanwhile, lawmakers in 13 states used legislative means to ban, in their understanding, CRT (Education Week, 2021). This sentiment does not apply only to CRT or in politically conservative locations. There is growing opposition to California's ethnic studies curriculum, Seattle's mathematics curriculum focused on ideas of power and oppression, and Virginia's de-tracking of mathematics. Harper shared:

> Those who have the most power to determine what's allowed in schools have decided that social justice, equity, and even social emotional learning and culturally responsive teaching ["Public" Artifact II], which some people would not lump in with these other things, are not allowed anymore in classrooms. So, I see that as sort of pressing more teachers into acknowledging that the work they do in their classroom on a day-to-day basis is activism.

Although this sentiment has been echoed in town halls and school board meetings across the country, there is no evidence that this perspective is shared across dinner tables. It seems that the public gatekeeping may be limited to smaller, yet more vocal sectors of the public such as the groups who attacked Gutiérrez and Rubel (see Gutiérrez, 2018; Rubel & McCloskey, 2019).

Confronting Public Gatekeepers

In Aguirre's (2016) interview, Martin called for mathematics educators to continue to challenge current systems (e.g., white privilege, racial hierarchy). Despite efforts to name and understand systemic injustices in mathematics education, Martin shared, "much of this is contained and absorbed by the system. Or, if it gets too critical and borders on the radical then it is actively resisted by the system." (p. 12). We see this resistance playing out in "the public's" response to CRT in schools. As we work to understand and enact our roles, we must continue to question, educate, and challenge those with the loudest voices who deem TMSRJ inappropriate ["Public" Artifact III]. Furthermore, we see community engagement as central to TMSRJ. To this end, Harper acknowledged an opportunity for growth:

> We, as math educators, aren't good at communicating with public audiences, or even parents. A lot of what gets shared is only a small portion of the conversation. We're not having these conversations in spaces that get disseminated more broadly.

Further enhancing community partnerships and communication is one productive point of inflection for promoting social justice and antiracist mathematics. Taking up this call, Harper works to engage community members, such as parents and community organizers, as active agents in her research through research-practice partnerships (e.g., CRRAFT: Harper et al., 2022 and PLANAR: Harper, 2022b) and outreach through her website, Solving World Problems, with TMSRJ resources (Harper, 2022a).

Conclusion

In this commentary, we reflect on numerous gatekeepers that we have encountered on our journeys toward TMSRJ: (a) educators' *personal* identities and experiences, (b) *conceptual* expectations to prioritize mathematics or social justice goals, and (c) *public* stakeholders with disproportionate voice and power. While we consider productive points of change in our discussion above, we also acknowledge that we are embedded in the tensions and don't always know the best next steps. Those sites of tension, however, can provide a catalyst for breaking through barriers and reinforce the need for ongoing discussions and collaborations. Harper noted these tensions in narratives about TMSRJ:

> So, we're hearing those who we know have influence and power, which are the voices of "Why are we doing this antiracist stuff in math class?" instead of "Why is my child's math teacher racist?"
>
> Lolkus (in response): [Like when we discussed the podcast, Nice White Parents (Joffe-Walt, 2020),] sometimes we need to relinquish power to move toward a more equitable system [Additional Artifact I].

As we move forward in our conversations and efforts to confront TMSRJ gatekeepers, we recognize the need to include voices from more stakeholders in mathematics education. Cordero-Siy questioned whose voices were represented, sharing that "we should also grab student voices–how are they interpreting this idea?" Incorporating students' voices in mathematics education, specifically from BIPOC students, is even more urgent given many students from historically marginalized groups report less social capital than their white counterparts (Caldas & Cornigans, 2015).

Common across these gatekeepers were tensions of individual or systemic endeavors. We see ongoing conversations among colleagues – teacher educators, teachers, parents, and students – as building the collective endeavors necessary for breaking down barriers to TMSRJ. As we move toward actualizing antiracist mathematical spaces, we recognize the need to continue building coalitions of resistance, specific to our own contexts, so as to recognize and challenge evolving and orchestrated efforts that restrict TMSRJ within our respective spheres of influence. Engaging in collective learning and critical reflection is necessary for recognizing and challenging gatekeepers to TMSRJ in our respective situations. It is our hope that these coalitions will continue to collectively learn about social justice pedagogies, through, for instance, literature circles (Leonard & Moore, 2014), confront the supposed neutrality and apolitical nature of mathematics teaching and learning (Martin et al., 2010), and acknowledge and work to unpack the complex intersectional nature of TMSRJ (Larnell et al., 2016).

Evolving Conversations

Our discussions and understandings about TMSRJ gatekeeping continue to evolve. Since recording our conversation and writing this manuscript, conceptual and public gatekeepers to TMSRJ efforts in the United States have become more prominent through open letters (e.g., Barak et al., 2022) that attempt to discredit non-status quo mathematics and public policies (e.g., Florida H, 2022) that aim to ban antiracist curricular resources (e.g., Florida H, 2022). Collectively, we continue to explore how backlash to TMSRJ, such as resisting non-binary framings of mathematics and reform efforts that center racial and social justice in mathematics classrooms, is both a product and perpetuation of whiteness (Cordero-Siy et al., in press). Individually, we are negotiating new professional identities and re-evaluating how to maintain and expand our anti-racist actions and commitments. Through these efforts, we aim to frame and conceptualize current gatekeepers so as to confront the backlash which limits opportunities to work toward social and racial justice in mathematics classrooms.

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Discussion And Reflection Enhancement (DARE) Post-Reading Questions

1. What are other gatekeepers that influence mathematics educators working toward antiracist mathematical spaces?

2. What influence do gatekeepers currently have on your efforts toward engaging in equity, social justice, and antiracist mathematics?

3. In what ways have you upheld these gatekeepers?

4. How are you challenging these gatekeepers? What is working and where do you have room for growth?

5. What does community engagement in your current role look like? How are you working to enhance these opportunities?

6. In what ways are you uplifting students' voices? Where do you have room to grow?

2022-23
ELECTED LEADERSHIP

Florence Glanfield President	University of Alberta Edmonton, Alberta
Linda Fulmore Past-President	Mathematics and Educational Equity Consultant Cave Creek, AZ
Sylvia Celedón-Pattichis Vice President	University of Texas at Austin Austin, TX
Nicole Lindgren Director	Mathematics Education Consultant Asheville, NC
Luz A. Maldonado Rodríguez Director	Texas State University San Marcos, TX
Marian Dingle Director	Advanced Education Research and Development Fund Peachtree Corners, GA
Theodore Chao Director	The Ohio State University Columbus, OH
Trevor Warburton Director	Utah Valley University Orem, UT

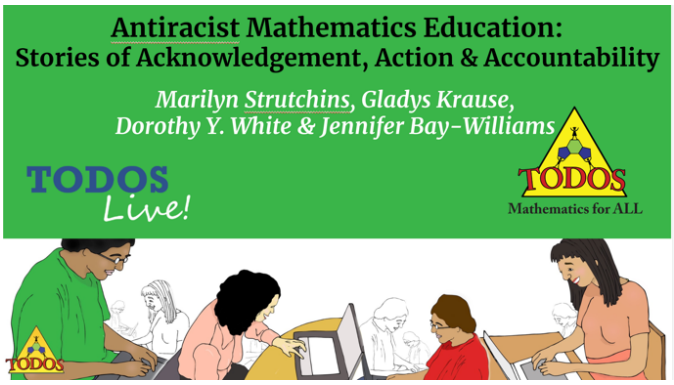
APPOINTED LEADERSHIP

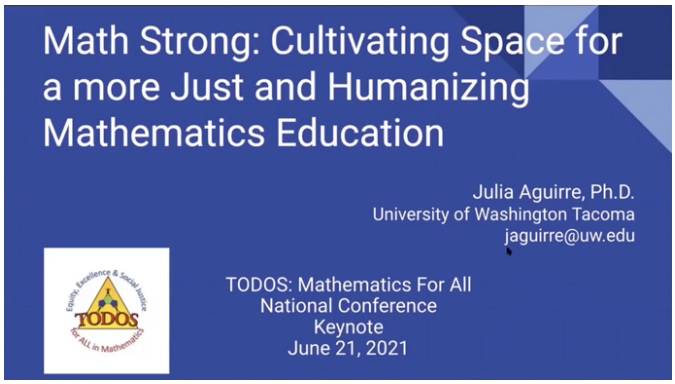
Nora Ramirez Appointed Executive Director	Mathematics Education Consultant Tempe, AZ

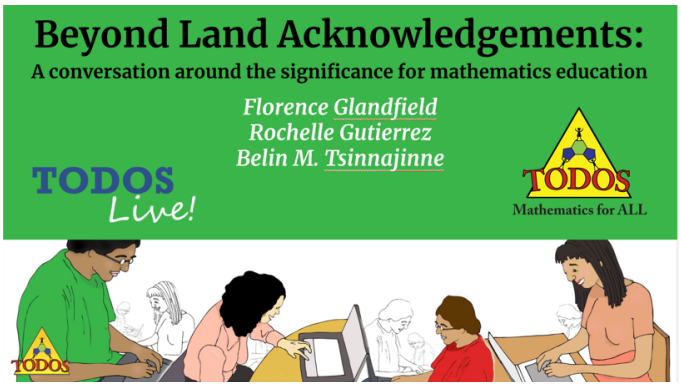
TODOS Video Project

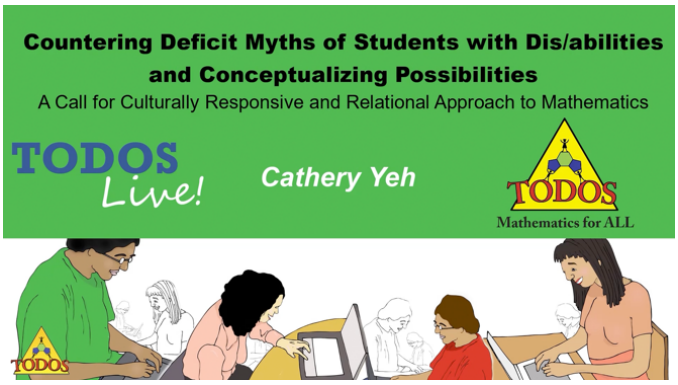
TODOS Live! began in 2011 as a project to help teachers reach ALL their students with high quality mathematics. Funding through a NCTM MET grant and active members got TODOS Live! moving. Now, thanks to a grant from the Heising-Simons Foundation, TODOS members are revisiting and revising the TODOS Live! Vimeo Channel (https://vimeo.com/user56336191) in ways that will make this resource more impactful. View the videos below!

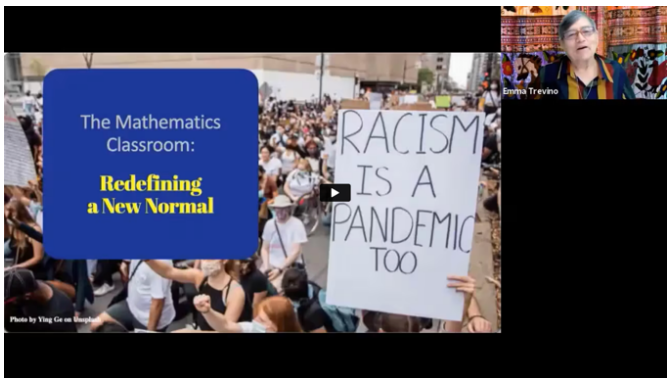
Contact TVP@todos-math.org with your thoughts, ideas, and questions. As TODOS Founding President Miriam Leiva often said, "We need more worker bees!"

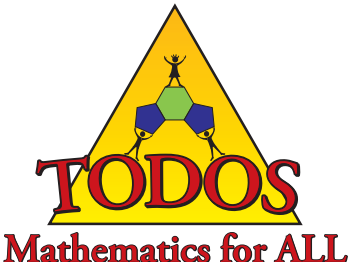












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