



Race, Equity, and Mathematics Education **STEMTLnet monthly theme, August 2020** **Synthesis**

Success in school is understood to be a decisive element in children's success in later life. Mathematics is seen as a key "gatekeeper" in schools, as students' mathematical proficiency is used to decide many aspects of their school path — the instructional quality they deserve, the sort of enrichment opportunities they receive, the kind of problems they are asked to solve, the agency they are accorded.

Mathematics learning thus is value-laden. Since, as Dewey wrote, most schooling has been designed to reproduce and bolster the society that we have, rather than to enable our students to create a society adequate for their futures, the values that school mathematics embodies are those that maintain the way things are. One part of the way things are is that some people have more power, more freedom to realize their potential, than others. People of color are more likely to be excluded from many opportunities, many pathways, many futures, because of their color (and this goes double for people of color who are also poor), and these patterns of prejudice are reinforced by the conserving tendencies of schooling. Thus, the sorting, directing, excluding role of school mathematics has specific, identifiable, differential impacts on students of color: it is therefore racialized.

This racialized mathematics is a cultural product, and this means that, like all cultures, it's not an abstract thing living in people's heads: it is enacted daily, or hourly, by everyone in the school systems, and the society within which they are situated. This means that it takes the shape of practices, and choices about actions. We can all learn to see the meaning of our practices and choices, and learn to choose differently, according to other values than the conventional, conserving ones — values related to equity, justice, and humanity, values that can, if enacted in practice, help make it more likely that our children, all our children, can have the future they deserve. As one webinar participant put it, "This is a system working like it is designed to work. We have to disrupt those systems while we also work on classroom-level change."

This Theme of the Month examined specific, concrete ways that school mathematics is racialized, and ways that this racialization can be reduced and eliminated. As the moderator, Dr. Joi Spencer, said, "It's our job to end racism — all of us. Every child is someone's child." The expert panel addressed four different dimensions of the racialization of school mathematics: 1. Instructional practices that impede, and that promote, African American math learners. 2: Mathematics identity and how to support it for African-American students; 3. The creation of a supportive math culture for and among Black students; 4. Structural issues that affect students' success — especially students of color. The many participants in the webinar provided corroboration and often additional resources for each point as it was addressed, and some of their comments form part of this synthesis.

Topic 1: *Instructional practices that impede and that promote African-American math learners.*

It has long been recognized that mathematics should be taught as the active, inquiry-driven, social, and creative activity that it is. Nevertheless, school mathematics still is most often taught in terms of individual computational skills and techniques for getting 'the right answer' — and this is most especially true for students of color. Moreover, the stereotype of a mathematician as a white male working in isolation reinforces the idea that "real" math is done by a few, specially gifted men. One result of this (often implicit) stereotype is that children (especially girls) of color are not expected to be 'good at' math, and so they are given limited exposure to rich mathematics, may be marginalized (e.g. shunted to SPED classes for perceived deficits in behavior or language), and tend to experience traditional, frontal teaching that does not engage students actively in mathematical discourse. One webinar participant wrote: Valuing individual memorization and speed rather than collective discourse and sense-making is a huge impediment.

To promote mathematical learning for Black students (as well as for other students), schools need to give kids tasks that challenge them to think, and give them time and space to think in. Of course, teachers play a key role in making this happen, and their preparation for this role starts with things that are not about schedules and resources. You can't incite a love of learning, if you don't love learning yourself, so teachers need to be curious about mathematical thinking. They will then be motivated to make the classroom a space that is welcoming of kids from all backgrounds. They will take into account such things as students' attentional signals, their posture, the physical arrangement of work-surfaces and seating. 'Classroom management' will take on a different aspect than in a classroom where success is equated with quiet, obedient seat-work: if there's joy in the classroom, curiosity, the kids struggle with managing themselves. As one participant wrote, All kids are curious. We need to tap that! Problems that are genuinely puzzles, surprises, not mere exercises.

Topic 2: *Practices that support mathematics identity and African-American students.*

Everyone has multiple identities which show up in different "spaces" -- while doing math or in other social interactions, while working in a group vs. as an individual. As one webinar participant wrote, "we often have different personalities when speaking different languages - and in the mathematics classroom we are teaching new language thus developing a new personality."

Too often, school cultures assume that a positive math identity is a rare thing. Mathematics identity has to do with your understanding of yourself as a person who can do and like math, your confidence in yourself vis-à-vis mathematics, and your sense of your competence. As we foster students' mathematics identity, seeing themselves as doers and learners in math, we need to monitor how the development is taking place. Students too often tend to say, "I am not good in math." It's our responsibility to build them up. Find a way they can step into the flow, the continuum of mathematical practice, and talk to us honestly about what you are having trouble 'getting.'

Again, as educators we need to work with insight on our own attitudes: we have to be convinced that students have the intelligence to do it, before we can convince the students. They know if we believe in them! This is one effect of engaging the students with rich mathematical experiences. As webinar chat participants noted, "Isn't identity formed through successes and failures? Helping students find success will lead to a positive math identity." and

"Failure [in doing a challenging task] is important step in the process of learning. If teachers can show students their own growth from failure, it removes some of the fear of failure."

We have to foster a sense of community in the classroom as well, so that everyone has a voice and is expressing it. Identity is not just an internal process. We have to get in there and ensure that a math-positive atmosphere for all learners is established and articulated. This is founded on a conviction that people of color are also creators of mathematics, and *you* can be, also. We need to acknowledge that this narrative is what's been put on the students, that they are likely to have accepted it, applied it to themselves. If we don't interrupt the narrative that black students are not capable- the kids will come into our mathematics classrooms with that idea, and not get rid of it.

Topic 3: *The creation of a supportive math culture for and among Black students.*

Much of what was addressed in Topics 1 and 2 relates to the creation of a supportive school math culture. Culture is learned, not in-born, based on a shared understanding. The panelists explored some additional elements of schools and school mathematics culture that need attention. Tracking is a good example of a widespread administrative practice that has deep effects on instruction and on students' identities and futures. It is important to ask, What does it tell students? Starting, in many cases, in middle school, tracking tells students what they are capable of (or not). This is a cultural challenge, but it's also structural: the system conveys values, makes statements about children's identities, and sorts them in ways that can too often express and reinforce stereotyping, as we have discussed already.

The kind of tasks and questions that "count" as school math is another factor in the fostering of a lively and inclusive math culture. We need to allow kids to explore their curiosity in math (and other things) in connection with matters that are real, e.g. research on homelessness or other community issues, or numerous situations that demand reasoning under uncertainty. In engaging with matters that are human, vital, and often close to home, students can learn to see how mathematics can be a tool they can use for their own needs and interests, strengthening their voice as participants in society.

Finally, it is important always for teachers to consider the question, What cultural lens am I, a teacher, bringing to my work with kids? Our panel examined the ways that some teachers react judgmentally to "black English," (and indeed any distinctive language variant that is not "standard"). Attention to some aspects of cultural diversity can distract or disrupt the core focus on mathematics work, shifting the message to issues about who the child is, and conveying the idea that the child is not ready or qualified to learn and do math.

Commenters on the webinar chat said, in connection with this topic, "Yes! Change the narrative of marginalization and what we commonly call *scholastic*." "How do we interrupt and provide the resources of ethnomathematics and other [fields] to build an understanding that mathematics is truly connected to them and something they can be proud to be connected to?"

Topic 4: *Structures that support and impede students' success - especially students of color.*

We have already mentioned tracking. Another common structural feature of American schooling that tends to impede students' success is the extensive use of high-stakes testing. These have been shown to privilege white students, but it's not only the tests themselves that need to be interrogated for their impact on students of color (or poor students), but also the culture that has grown up around the tests. Pacing guides and pre-determined curriculum schedules completely devalues the experiences that we can give to our students in the classroom, by constraining teachers' freedom to attend to the interests, thinking, and needs of the students in their classroom. Tutoring and test-prep consultants, which are natural outgrowths of the high-stakes testing regime, sort children into the kids who can afford to work with tutors, or buy test-prep courses and guides, and those that can't. As one participant wrote, It's difficult to convince students that we believe in them if the structures are not set up to show them that. Another wrote: These kinds of policies appear neutral but actually have disparate impact on students of color, first generation students, and low income students who have demonstrated they are capable of advanced math but who for many reasons, don't end up in those classes.

Other structures can help teachers support our students to give the students the opportunity to voice where they are and what they need, and the agency to do that. One of the most important resources for teachers in this matter is *time* and space to think, to read, to learn. In schools with lots of kids of color, this kind of time is highly constricted or even unavailable. Teachers need time to collaborate, to go into one another's classroom, both to learn from other teachers, and to offer help and a fresh pair of eyes. Sometimes a different teacher can notice things you can't, and help you stretch to address those kids, or use those opportunities. There is a real waste of teacher talent caused by scripted teacher meetings or over-designed collaborative schedules. Such structural barriers prevent real collaboration in our hard, honorable work.

Another factor that needs to be named and addressed is racism towards math teachers of color. These teachers often see their authority being called into question, their teaching ability invalidated, and they are often pushed to adopt more "conventional" methods, rather than shaping their pedagogy to truly help education their students. Such micro-aggressions are far more frequent than overt racism. Some of this also is resistance to any innovation, which itself may include not just resistance to a "new way of teaching," but attributing the objection to this as a way to learn that "these kids" can't do.

Changing such things — values about students, which affect values about teachers — means being intentional about decolonization. A colonized mind-set says, "Sit down, be quiet, and absorb the canon." But we need kids who have voice, work together, and engage in reasoning, inquiry, and active learning. This should relate as well to the "disposition standards" currently

taught in pre-service teacher training, which are also racialized. Who stands at the door where students get access to mathematics opportunity and success? Are successes and failures viewed different based on race? Who gets a second chance on a bad day? Who has to go into suspension? Were they just being a kid that day? These relate directly to the consequences of being treated differently — disproportionate expulsion rates, over-policing, higher consequences for black students on the basis of cultural differences. A webinar participant wrote, "Our students are not blind to the filters through which we see them, particularly our black and brown babies. Acknowledging these filters and cleaning them daily is so necessary in order for us to remain curious and open to their individuality both culturally and academically."

Another participant added a further example: "In high school equivalency we really struggle with the bias and messaging of testing. In our environment, the test is the final gate keeper (be it the GED, the TASC, or the Hi-SET). So many students attend our classes, disrupt narratives of what they can and can't do, learn to value and trust their own sense-making process in math... and then take a test that re-affirms all the messaging that was part of the toxicity that often pushed them to leave school in the first place. "

Recommendations

Recommendations for Teacher Leaders

No progress is possible if important subjects are never addressed, important questions never get asked. You can provide leadership by starting to ask questions about the racialization of mathematics in your school and district. For example, What are the structures and practices that "speak" to your students of color about their math identities? What is your school doing to make sure that all students have the opportunity to experience active, challenging, rich mathematics? In what programs or classes are students of color not showing up?

In addition to interrogating the curriculum, teachers are well-positioned to examine their own and each others' best practices, and asking whether these best practices are used with all their students.

Recommendations for Researchers

Schools that are undertaking to address the racialization of mathematics are good candidates for research-practice partnerships which can help them identify specific interventions, whether in classroom practice, teacher learning or structural changes (e.g. in teaching schedules to encourage substantive collaboration), and the results of such theorized design experiments can be of wide value to the field — both for researchers and practitioners.

Recommendations for Administrators

In addition to supporting and encouraging teacher learning and experimentation in relation to de-racializing and decolonizing school mathematics, administrators are critical in efforts to change structural factors that inhibit such changes. Administrators who take an active and informed stance towards research about current practices, current aspects of the school culture in regard to

mathematics learning for students of color, and teacher support can increase the likelihood of good data collection, and effective use of the data for the design of innovations.

Remember that department chairs often play a key role in shaping the narrative around de-racialization and opportunity in their schools. In many ways, they are gatekeepers, and need to take part in the process of decolonization of the school — and of themselves. Administrators should accordingly provide leadership and support for department chairs, so that they can contribute constructively and creatively to initiatives in this area.



Written by:
Brian Drayton,
Co-Director for the Center
for School Reform at
TERC.



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