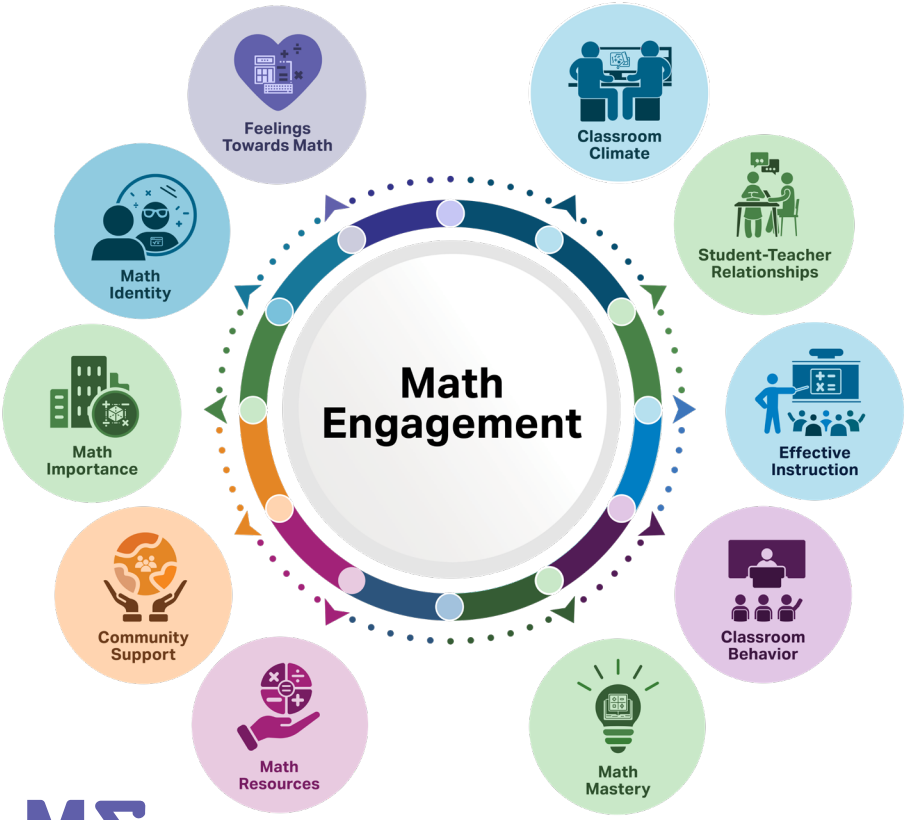
Ten Emerging Themes That Capture How Black and Latino Students Engage in Math

The Adapted Measure of Math Engagement Research Group includes five students (Antonio Chavira, Brianna Espy, Ryan Ombongi, Serrah Ssemukutu, and Diamond Tony-Uduhirinwa), five teachers (Nate Earley, Karina Mazurek, Kathleen Morgan, Karla Rokke, and Ashly Tritch), and five researchers (Marisa Crowder, Samantha E. Holquist, Diane (Ta-Yang) Hsieh, Claire Kelley, and Mark Vincent B. Yu). Alyssa Scott, Olivia Reyes, and Avalloy McCarthy also extensively contributed to this work.

Introduction

How do Black and Latino students understand their engagement in math? Recent findings from the first two years of the Adapted Measure of Math Engagement study show that students see being engaged in math in many different ways. Students talked about how their own behavior, their classrooms, their communities, and their futures shaped their engagement in math.

Based on the data collected during the first two years of the project, we found 10 emerging themes of math engagement. This infographic illustrates these themes and presents some data describing how Black and Latino students in Bloomington Public Schools felt about math. The infographic can be used to help understand emerging patterns in Black and Latino students' engagement in math, and to suggest ways to better support their engagement.



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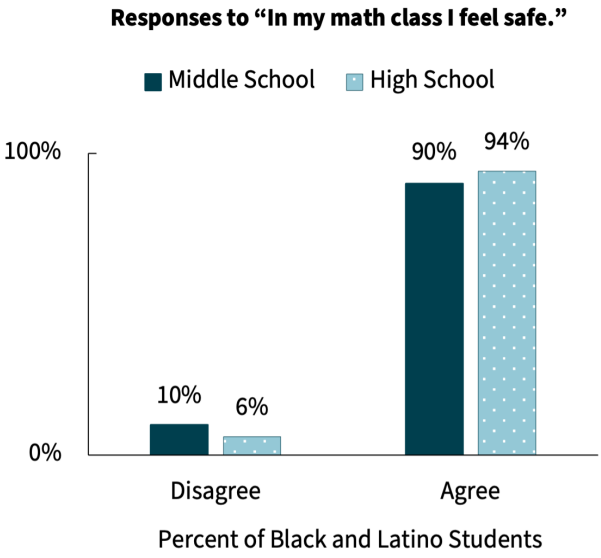
Adapted Measure of Math Engagement

Classroom Climate

Classroom climate refers to the positive, respectful, and supportive environment in a math class.

Students described classroom climate as important to their math engagement, particularly when they can feel comfortable asking the teacher and their peers questions, and can get help when needed.

> *"Me and my friend, we always help each other because we ask our teacher to sit next to each other because we know how to help each other in the ways that both of us know. And then one of us is wrong, but the other one will know what to do. So it's really fun and you learn faster with them."* - **Bella, a Hispanic Ecuadorian female student at Katherine Johnson Middle School**



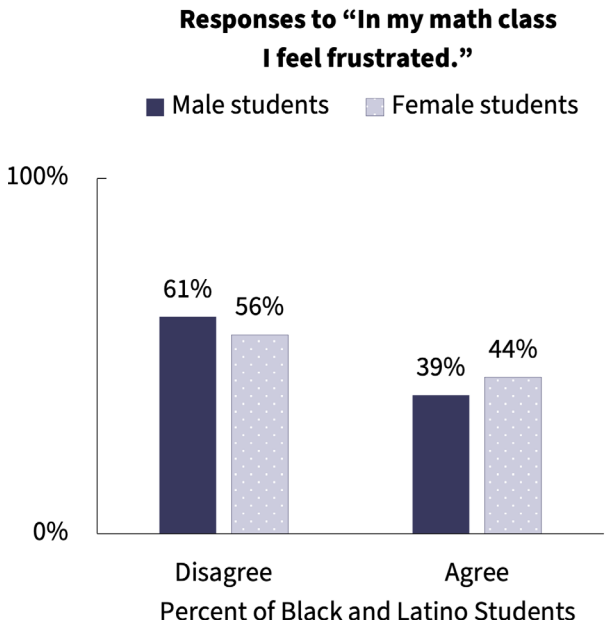
We asked students several questions relating to classroom climate, and most Black and Latino students reported positive feelings. Eighty-nine percent of these students felt like they could be themselves in math class. Most students also felt safe in their math classes: 94 percent of high school students and 90 percent of middle school students agreed or strongly agreed that they felt safe in their math classes (see graph to the right).

Feelings Toward Math

Feelings toward math refers to students' emotions toward math, such as confidence, enjoyment, and interest in math.

When Black and Latino students were asked what engaged them in learning math, many described the satisfaction of solving a hard problem, feeling confident after understanding a concept they used to find confusing, and enjoying that there is always a right answer but many ways to reach it.

> *"I mean, just getting the answer, knowing that I could do it. I'm like, 'Whoa, I did that.' Knowing that maybe I didn't know how to do that before. And I would just be surprised that now I can do that easily."* - **Vanessa, a Mexican female student at Alexa Canady Middle School**

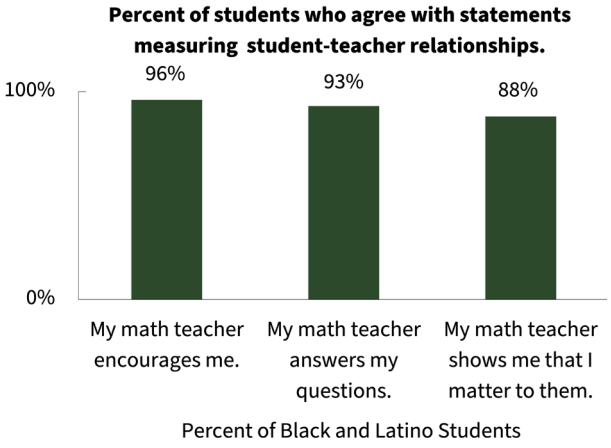


Students also reported mixed feelings about math class on the survey. Although 67 percent of Black and Latino students look forward to math class, 39 percent of male Black and Latino students and 44 percent of female Black and Latino students reported feeling frustrated in math class.

Student-Teacher Relationships

Student-teacher relationships refers to the positive and supportive interactions between students and teachers, where teachers show care, provide encouragement, communicate effectively, and build trust.

Black and Latino students shared that when teachers have conversations with them about real life, check on them during class, and help them understand how math will help them in the future, they are more likely to be engaged in math.



> *"They talk to us about stuff other than school. They talk to us about things that are outside of school. And they ask us about how we're doing personally and how our day is going. And if we're having an odd day, they'll know that we're having an odd day."* - **Shane, a Black male student at Helen Rodríguez Trías High School**

The relationship between students and their teachers was one of the most important elements of student engagement in math. Most Black and Latino students felt positively about their relationships with their teachers: 96 percent felt that their teacher encourages them, 93 percent felt their teacher answers their questions, and 88 percent felt their teachers show them that they matter.

Effective Instruction

Effective instruction involves teachers using clear instructions, varied activities, and real-life connections to make math learning interesting and accessible while challenging students at different levels to keep them actively engaged in their learning.

It can be difficult, and at times frustrating, to learn math. Black and Latino students shared ways they felt teachers effectively taught and engaged them in math class, including planning a variety of activities, relating math to real life, clearly explaining difficult math concepts, and demonstrating different ways to solve math problems.

> *"Yesterday, my teacher, she made up a game that would be like we were doing median mode kind of work. And it would be cards. It would be like if the faces are tens and the aces are ones, and you would find what the median is. And if it was the range, you would subtract the bottom number with the top number and see whoever—you would play with the partner. And then you would see who has the most for the little card. Depends on which we're playing, median or mode."* - **Bella, a Hispanic Ecuadorian female student at Katherine Johnson Middle School**

A strong majority of Black and Latino students felt that their math teacher offered them a variety of ways to learn (91%) and provided clear instructions (93%). There were some differences between middle and high school student experiences: 68 percent of middle school students agreed that their teacher lets them decide how to learn, while 77 percent of high school students agreed with this statement.

Classroom Behavior

Classroom behavior refers to how students actively participate in math class, stay focused, help others, try different strategies to solve problems, and use their background knowledge.

Black and Latino students described that when they are engaged in their math classes, they have fewer off-topic side conversations with peers, ask more questions, usually finish their work before the end of class, and help other students around them who are struggling.

> *"I think, yeah, when you're finished with work and your teacher notices it, I feel like sometimes the teacher might be like, 'Yeah, go around and see if anyone else needs help.'"* - **Hermione, Hispanic female student at Katherine Johnson Middle School**

Nearly all Black and Latino students listen to their teachers (94%), complete their assigned work (86%), check their work (85%), and think about different ways to solve problems (84%).

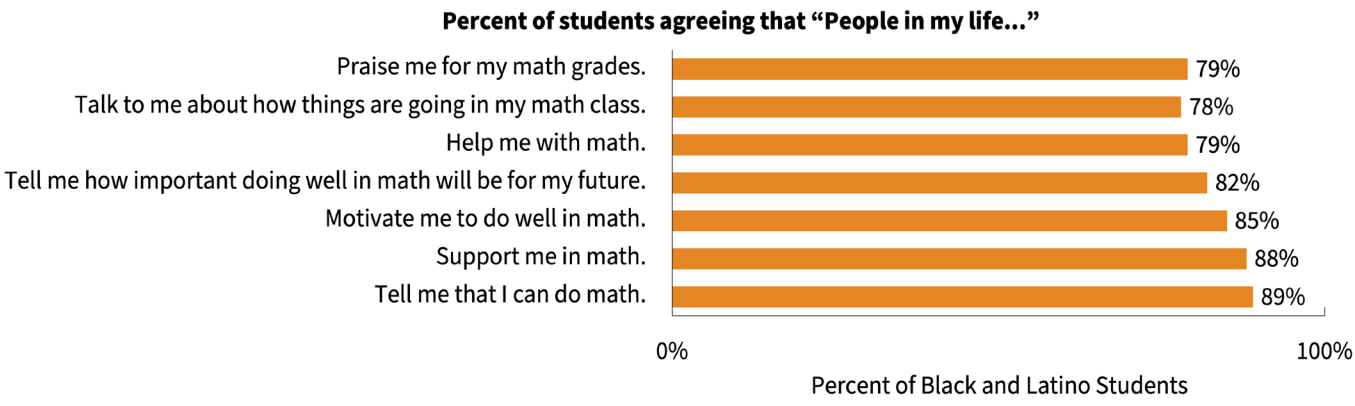
Community Support

Community support refers to the encouragement, help, and guidance students receive from people outside of school, such as family, friends, and community members.

Black and Latino students described how valuable it was to receive support from people in their lives. They shared that when there was enough time to receive support, particularly one-on-one support, their performance improved.

> *"Parents checking on you too. That helped me a lot. I got into tutors, and that helped me understand it more, like getting one-on-one privately when they noticed my grades were really low."* - **Riley, an African American female student at Alexa Canady Middle School**

Most Black and Latino students (88%) felt that people in their lives supported them in math. Students also felt that people in their lives offered other support, such as motivating them to do well in math (85%) or helping them with math (79%).

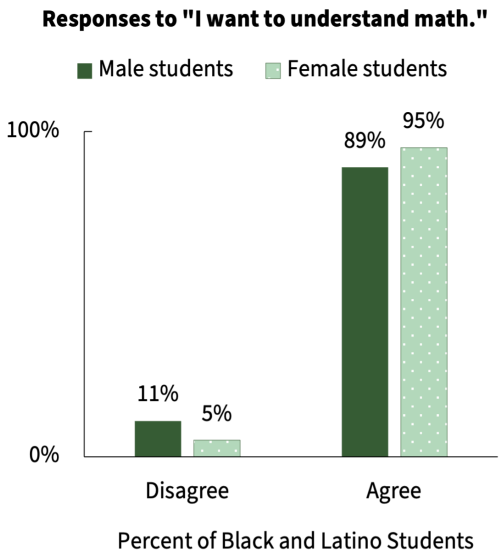


Math Mastery

Math mastery involves students grasping both the steps to solve math problems and the reasons behind those steps allowing students to connect ideas, apply math to new situations, and explain their thinking in different ways.

Some Black and Latino students mentioned how helping their peers in turn supported their own learning because it allowed them to understand problems in different ways. Whether students self-identified as being "good" or "bad" at math, they overwhelmingly agreed that taking time to work through math problems and concepts was a great way to develop deeper math understanding.

The majority of Black and Latino students very much wanted to understand math. Ninety-five percent of female students and 89 percent of male students agreed that they want to understand math.



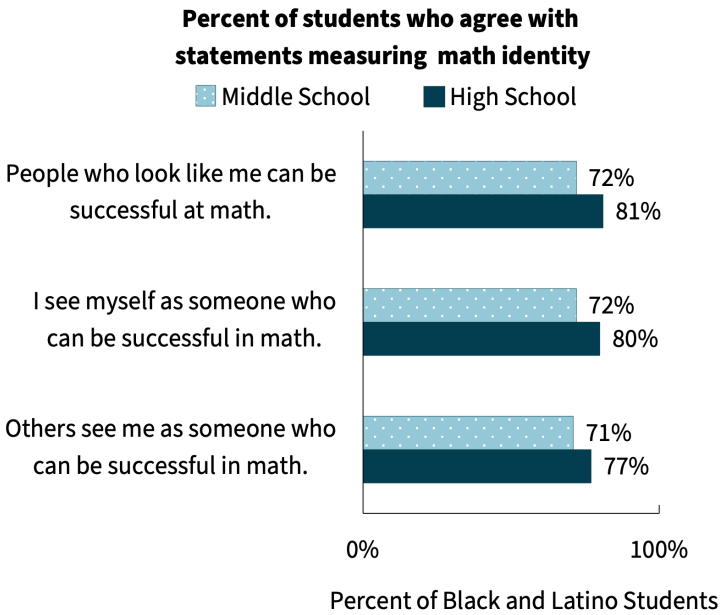
> *"I used to be very bad at math, and so the way I fixed that was just constantly going over basic facts, just like multiplication tables, times, subtraction. And just basically, I worked step-by-step to be like, 'All right. I got this down. Now I'm going to work on the next level. I got this down. I'm going to work on the next level.' And so, it's kind of aggressively building it up."* **- Willow, a German, Spanish, Swedish, Native student at Alexa Canady Middle School**

Math Identity

Math identity refers to how students see themselves and are seen by others in terms of their ability and potential in math.

Several Black and Latino students recalled times when their racial identities impacted how they see themselves and how they are perceived by others. Students most commonly mentioned instances when their peers expressed disbelief in their high math performance, which caused them to question their own abilities.

> *"No, I think most people are surprised when they hear that I'm doing good in any class, actually… I'm going to keep it all the way above. I think it's because I'm Black."* - **Shane, a Black male student at Helen Rodríguez Trías High School**



High school Black and Latino students were generally more confident in their math identity than middle school students. Eighty percent of high school students agreed with the statement, "I see myself as someone who can be successful in math" while only 72 percent of middle school students agreed with the same question.

Math Resources

Math resources refers to the external supports and tools available to students—such as help from adults, online tools, personal study materials, and seeing role models succeed in math—to help them in their math learning.

When Black and Latino students were asked about external supports, some identified mentors and counselors that helped them do their best in math. Other students discussed their physical or technological tools—like study sheets or online apps and videos—that assist them in math work.

> *"Photomath. But those apps, they give you instructions and steps how to do it. That's what I do. That's what I do when I kind of forget how to do this."* - **Naz, an African American male student at Helen Rodríguez Trías High School**

Black and Latino students varied in their perceptions of which resources they have to support them in math. While 95 percent of students said they have the supplies they need to learn in math class, 60 percent of students said they feel tired when they get to math class, and 55 percent of students said they feel hungry when they get to math class.

Math Importance

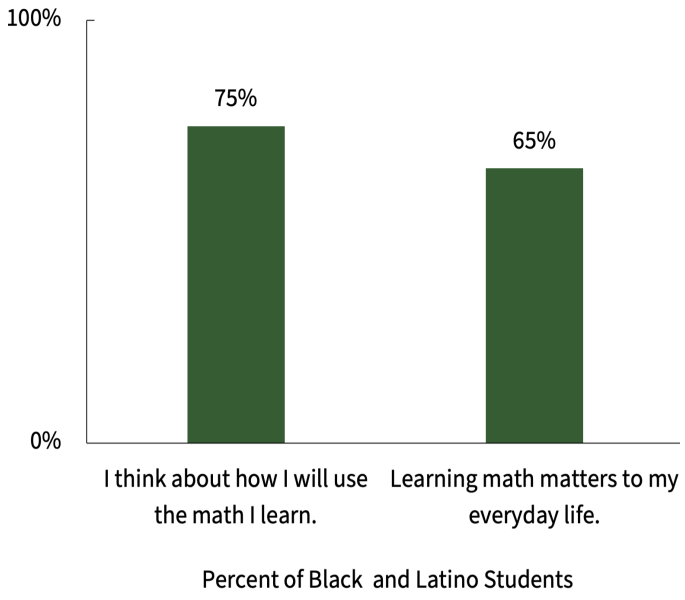
Math importance refers to how useful and valuable students perceive math to be in their daily lives, future careers, and in addressing real-world and community issues.

Most Black and Latino students could cite the future uses of math, whether that be in college courses or careers, but many still pushed back on the applicability of some math skills, especially in our technologically advanced world. By struggling to see the relevance of the math they were learning, students engaged less in their math class.

More students think about how they will use math (75%) than think that learning matters to their everyday lives (65%).

> *"While I'm learning, I'm like, 'When am I going to have to use this form?' Especially because technology is so advanced. I don't think I'm going to have to break down equations like that [...] I don't think I'm just going to stop in the middle of the day to break down the quadratic formula."* - **Lauren, a Black female student at Walter Lincoln Hawkins High School**

Percent of students who agree with statements measuring the relevance of math to everyday life.



Data Notes

Data Notes: This research is conducted in partnership with students and teachers from Bloomington Public Schools working alongside researchers from three nonprofit research organizations: Child Trends, Search Institute, and McREL International. This infographic presents the results of qualitative and quantitative data analysis conducted during 2023-2024 in Bloomington Public Schools. All names of students, teachers and schools have been made anonymous to protect privacy. This project is funded by the National Science Foundation, Grant #2200437. Any opinions, findings, and conclusions, or recommendations expressed in these materials are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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