Discourse, Culture & Identity in the Mathematics Classroom

00:00:00 Adelicia Brienzo

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00:00:10 Josie Yanguas

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00:00:26 Vanessa Figueroa

We have to widen our lens that the U.S. way isn't the only way, that other cultures and countries have a variety of ways to approach the same content, and that's okay.

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00:00:36 Andrea Brothman

Welcome to the Math for All podcast.

In this series, you'll hear from teachers, instructional coaches, and school leaders who are bringing the Math for All approach into their classrooms, schools, and districts. I'm your host, Andrea Brothman.

Math for All is a mathematics professional development program for elementary and middle school teachers. The program helps teachers implement high-quality, standards-based mathematics education for a wide range of students, including those with disabilities.

This episode explores the influence of culture and identity on discourse in the math classroom. To dig into this idea, Math for All staff brought together colleagues from the Illinois Resource Center. Their work focuses on teachers that serve bilingual and ESL students across the state.

You'll hear two big ideas come up in this conversation. One, identity grounds who we are, how we experience the world, and what we bring to our learning experiences. And 2, educators must work towards establishing classroom cultures where everyone's unique ways of approaching the world are welcomed and valued.

Let's get to it.

00:01:50 Babette Moeller

I'm Babette Moeller. I'm the project director of Math for All, based at the Education Development Center.

00:01:56 Matt McLeod

My name is Matt McLeod. I am at EDC with Babette as part of the Math for All team.

00:02:03 Josie

My name is Josie Yanguas. I'm director at the Illinois Resource Center.

00:02:07 Adelicia

I'm Adelicia Brienzo. I'm an education specialist with the Illinois Resource Center.

00:02:11 Vanessa

I'm Vanessa Figueroa. I'm also an education specialist, and we're at the Illinois Resource Center.

00:02:19 Babette

We've been talking about discourse in the mathematics classroom. Discourse refers to the written or spoken exchange about ideas. And in today's math classrooms, it plays a really important role. It contributes to communication, problem-solving, and to students' thinking and sense-making.

So, we've been having some conversations around how students' identities and cultural backgrounds influences their participation in mathematical discourse and how important it is for teachers to be aware of that and to make sure that all students have an opportunity to participate. And so I was wondering if you can share some of your observations that have come up in your work recently about how students' identities and cultural backgrounds influence their participation in mathematical discourse.

00:03:13 Adelicia

I think it's just important to start off with thinking that, math, mathematical discourse is not just about numbers. It's really about identity, relationships, systems of power, creating a culture of belonging in the classroom. Like that's really where math discourse needs to start.

I always bring my early childhood educator lens into the room. And I think recognizing that children bring these cultural ways of knowing into math before they even hold a pencil, right? I mean, just, I'm thinking about my own identity as a Japanese-American woman, and I'm thinking about in my home, Asians laugh all the time that, we're taught to use our finger to measure the rice and when we're cooking. Like it's not about like taking the cup and, now my husband says like, oh, like you're supposed to measure like 1 1/2 cups of water to every...like I was never taught that, right? I was taught, we use the line of our finger to measure. And so, you know, I think that's just a perfect example of how bringing non-traditional strategies into math discourse is really important.

00:04:27 Vanessa

Yeah, I would agree with that. I think as we reflect, and me personally as well, discourse patterns have looked differently in the social context versus the academic context. So I just think of my upbringing. I grew up in a very large family, used to lots of aunts, uncles, cousins around, and there was a lot of overlapping discourse pattern where we interject and show our engagement on a topic by almost what would be considered rude in other mainstream cultures. And the language that we use to describe it is not to say what's appropriate versus inappropriate, but more like this is a different context, so we need to be flexible in our languaging practices.

So I think in my observation working with teachers and also from personal experience that there has to be explicit instruction around the socio-cultural context and how there's specificity around the terms we use, the sentence structure, the verbal, non-verbal communication, all those norms that are context specific.

00:05:36 Josie

I think the other piece that I want to add on to what Vanessa and Adelicia are speaking about is something that in the world of multi-learner education that grounds the three of us. It's so important in our field to talk about both the native language or the first language and culture of the student being of equal value or certainly as an asset in our very English-oriented society that we're here. And so to make sure to recognize those assets that all that students bring into classrooms, that their families bring into classrooms, and that really underlies, I think, both Vanessa and Adelicia's response is regarding how nuanced the interactions are in classrooms. And it's a topic that often isn't necessarily that explicitly discussed among teachers, but in the field of multilingual learners, it's definitely something that we're always, always really cognizant about. So, I think that adds a great additional lens to the whole conversation.

00:06:32 Babette

English is also my second language. And I grew up in Germany, learning, having most of my math education done in German. And I recently observed a Math for All workshop where they were talking about negative numbers. And it occurred to me that the way I learned how to refer to negative numbers was minus 5, not negative 5. And so, if I were to rely on my memory and my direct translation from the way I learned mathematics, I would use the incorrect wording in a U.S. classroom. And I think that that's important for teachers to know that students from different cultural backgrounds may have different norms for how to use language in mathematics.

00:07:27 Adelicia

But I think it's so important to think that, to have space and to recognize that there's space for multiple pathways for learning and to get to the right answer, not just a single correct answer, the single right way of doing things. And I agree, like thinking about making sure that we're acknowledging not just culture, but also home languages, right? And thinking about how we are bringing in language and languaging into math instruction is so important.

00:08:01 Babette

But it's also tricky because, there's on the one hand, there's, an acknowledgement of cultural backgrounds and language diversity and translanguaging. On the other hand, mathematics traditionally sort of has this strong emphasis on precision, right? And how do you balance it? How do you allow translanguaging, which may be less precise, that sort of creates a dilemma for a teacher, right?

00:08:26 Josie

I guess, especially in the world of assessment and testing, if the assessors or the tests value the precision of negative 5 as opposed to minus 5, I would be tempted to say both ways of expressing this is correct, but you know what, for this test, you need to use this label rather than that label. And that is part of the dilemma that I think a lot of us in this field also find. I guess it's also the tyranny of assessments that lead us down one path and not necessarily expanding to others.

00:09:02 Vanessa

It's making me think of a very small moment that I had working with a couple of students that came in 6th grade. So, as I was teaching 6th through 8th grade students, some were newcomers from Spanish-speaking countries, some were newcomers from other continents that were not Spanish speaking. And I had a couple students from Venezuela and the way they were showing me how they learned to divide was kind of a flip method of

how we learn in the United States. As a teacher, I said I had to widen my lens because what I thought was universal was not exactly universal. They learned all the steps, they got to the right answer, they showed their work, but the format of it was very different.

And so, it made me think about what we're serving students that may be from other countries or maybe their parents studied in other countries and they're at home trying to help with homework. Just understand that we have to widen our lens, that the US way isn't the only way, that other cultures and countries have a variety of ways to approach the same content. And that's okay. And so we want to honor all the funds of knowledge and really let parents know too that when you're at home and you feel like, oh, I don't know this math anymore, this is not the way I learned it, it's an opportunity for us as educators to really reach out and build that partnership with families to let them know that we all have something to contribute all of our background knowledge.

00:10:20 Adelicia

There's also curriculum, there's hidden curriculum in what students are bringing from their own cultural backgrounds and their own lived experiences, right? And so just starting, I think every math lesson with some conversation about that. Like, what do you know about this? Or even just in a recent activity that we did in one of our Math for All workshops around lines of symmetry, right? And instead of just coming in and starting as that authority figure of, okay, we're going to start this lesson, this is what I know as a teacher about symmetry, and this is how I'm going to present symmetry, and I need you all to just kind of grasp that information, starting out with conversations. Because when I was going through that activity, I kept thinking, oh my gosh, this is origami, right? Like thinking about how we, that's how I grew up, right? We grew up folding origami and making sure that those lines of symmetry really had to be exact in order for your figure to come out the right way, right? So, I think that's just allowing students to bring in their own stories and their own experiences first and then starting and having those conversations, okay, this is how, this is how it's done this way, or this is how I've seen it done, right? And allowing teachers to have that space for conversation.

00:11:37 Matt

So, I think that reflects back to something that Josie said about considering what the students bring to the classroom from an asset-based perspective and being really careful not to tell them that their way is incorrect. It's different or whatever it is that we're trying to get them to the precision that might be on the assessment. And the more that we can recognize what the students are bringing in, the more that we can recognize the assets that they provide, I think a) will raise their confidence and their belonging into

the classroom and will further their math education and their math understanding even more.

00:12:24 Adelicia

I could not agree more.

00:12:26 Babette

So how can we get teachers to know their students better?

00:12:29 Josie

We all have to become mini ethnographers, really diving deeply into, it's not simply just the culture, culture writ large, but it's also the culture of that student, the language of that student who is in front of you. Cultures share certain elements, but there's also we all know we all have very individualistic patterns amongst our families. The way all those routines that we assume are commonplace, in fact, are not. And so, I think I think it goes back to how Matt was describing it is that we have to kind of catalog it and just add to, say, well, it's part of this big linguistic cultural repertoire that we have here in this classroom.

00:13:15 Adelicia

If I had to give advice to a teacher, I would say be a listener first and a teacher second. You know, really take the time to listen and to hear from your students, from your families, before going in and teaching what you know, right? I think oftentimes we have to understand where students are coming from, because if we don't know, then oftentimes as human beings, we start filling in the blanks with assumptions, and that's where bias comes in.

Cultural norm in classrooms is raise your hand before you speak, right? And how does that affect students? Also thinking about, do my students feel safe speaking up? Do my students feel safe challenging the norm? Do my students feel safe making mistakes? What kind of culture am I creating within the classroom, my classroom walls? I think is a good place to start.

00:14:10 Vanessa

And as a teacher, I think the first step is building, like you're saying Adelicia, the culture. Kind of to your point with the origami, if I showed a visual to you as a child of origami and a child putting different shapes together, that would probably heighten your interest, which would lead to more rich academic discourse, right? And so, sharing strategies, sharing topics that are culturally relevant, all of those ways are ways that we as

teachers can kind of have some tools in our toolkit to kind of be responsive to the culturally and linguistically diverse populations we serve.

00:14:44 Adelicia

Vanessa, so much of what you just said just resonated with me. And I think that working to kind of reframe our…mindsets and shift to a strength-based perspective is so important, right?

Like in some cultures, children are thought to think before they speak, right? To really take time to hear and to process. And sometimes that thoughtfulness, if we reframe it in a negative way, could be reluctance, or could be looked at as, being too slow, right? But if we reframe that into, wow, this person's really, this child's really reflective, this child is really thoughtful, that can go such a long way in the way our students are learning.

00:15:33 Matt

I also think that there are students who are just out loud thinkers. And sometimes that's also considered inappropriate. But that's the way they process. And so building a culture that, again, like you said, sees that as a strength for them to process that way. That it's okay.

00:16:02 Adelicia

In the classroom, I think that both/and mindset is so important because oftentimes we want to get trapped into that either/or, or right or wrong, or correct or incorrect, versus really thinking about all of it, right? And holding space that there could be multiple truths, there could be multiple ways, right ways of doing things, right?

So, we have students who may need some extra time or may want some extra time and be a little bit more thoughtful. And then we have students that want to process out loud and want to start talking right away and holding space for all of that, right? And all of the ways that students show up in our classrooms I think is so important.

00:16:53 Vanessa

And especially in our world of supporting multilingual learners or elevating the agency and voice of multilingual learners, we always talk about these are the modes of communication. We have to support interpretive skills and expressive skills, the listening, speaking, reading, writing, viewing, representing. All of those pieces help for us to process and should no longer be viewed as, oh, a scaffold or, you know, we're providing support, but rather the norm in the way we teach and the way we frame our pedagogy.

And so thinking about cultural differences, I studied in college for a semester in the University of Costa Rica. And I was taking college level and graduate level courses in Spanish. Not only did it challenge me culturally, but linguistically. And then also the norms over there for teachers was very different from what I was used to. I had studied here in the States at the University of Illinois in different, you know, in the US. When I went there, everything was project-based. Everything was a collectivist approach to learning. I don't think I produced one homework assignment that was done individualistically. And so I felt like that was almost viewed in my country in the US as something that you wouldn't do. Like it was not, it was more individualistic here and some cooperative maybe performance tasks once a year. But over there, that was the norm.

So if we can just bring in some of those norms in, it would really allow for also students to realize that I have something to learn from my peer. I need feedback from my peers just as I need feedback from my teacher. And so we construct learning, we construct meaning together. It's not like one person holds all the knowledge.

00:18:29 Matt

So I want to go back to what Babette said about norms and understanding the expectation of norms as you transition to a different culture than you are used to. And one of the things that I think I've seen some teachers do really well in the realm of respecting the cultures that are coming into the class and honoring the asset, I'll use that word again, of the student that's coming into the class, is that they build norms together. What do *we together* think we should do in order to make this the most constructive learning experience that all of us can have together?

There's also a level of that as a student. If you walk into the room and you know that you have status among your peers, how do you use that? And if you know something and you're trying to help another student learn it, how do you do that?

And that goes back to the culture in the classroom. How do you build that culture in the classroom so you're supporting each other without doing it for somebody else? Or you're honoring their trajectory. You're not trying to give them yours or things like that.

So, this is such a difficult, yet such an important topic to think about as a teacher.

00:20:01 Adelicia

That piece of co-constructing norms is just so crucial in setting the tone for whose voices are being centered in classrooms' discourse, right? Just starting conversations with what do you need as a learner to feel safe in mathematical conversations? What do you need to

learn? What do you need to be able to share your own perspectives and the strategies that you know in a way that feels safe?

00:20:31 Vanessa

I really love the questions because…it might look differently for different people. So, some students might say, “I really need to talk things out with someone.” And someone might say, “I really just need to work by myself and think by myself for a second, and then I'll be ready. Like I have to think and write and then talk.”

So like we all, but I think that's the metacognitive awareness part that we talk about a lot in terms of guiding principles for multilingual learners, but all benefit from that is just helping students to get, without giving them or imposing opinions or imposing your own observations, but giving them those questions like you have just shared to say, these questions are here for you to build ongoing reflection as you develop as a learner. You might change and shift over time, but at least you're aware of how you best learn and what you need from me as a teacher, from your peers.

And I love that co-construction piece, Matt, like just having a visual and anchor chart instead of feeling like a teacher, like I have to have my classroom set up with wonderful decorations, but things come up as we develop them together and the students are part of the process.

00:21:38 Babette

I think that the traditional culture of mathematics that's procedural oriented and that is about answering problems that have one right or wrong answer really pushes people into thinking that there's only one right way of doing it, and that there's only one set of norms that's the right one. It goes away from acknowledging that there's a diversity of approaches, and the thinking has changed in the field about what mathematics is, and there's different approaches to solving problems and teaching mathematics have been around, but it's like the traditional way of approaching mathematics has been really counterproductive in terms of embracing students who learn differently.

00:22:28 Adelicia

Just think that by honoring students' lived experiences, by honoring students' cultural identities, and allowing students’ agency and space to co-construct what those classroom norms look like, that allows us to grow students who trust their own voices, right, who trust their own processes, who are able to challenge systems and challenge thought processes. And I think that's what we ultimately want.

00:22:59 Vanessa

And just adding to that, I think that creating those opportunities so that students know that they don't have to take this passive role where the teacher's gonna model everything for me, I'm gonna learn from the teacher and the teacher's all knowing, and I sit and just take notes or record what I'm seeing. And that's kind of a traditional approach. I think of my math memories, and it was a lot of that. The teacher at the front, on the board or on the projector, and we take notes, and there was not much discourse, there was not much paired work, it was just kind of rote drills and memorization of skills.

And so there's like generations of people, those of us here in this country that have learned that way. So, we have to rewire ourselves to create opportunities for students to know that they have to take ownership of their learning, and they shouldn't take that passive role, but empowering students and motivating them to say there's a new way of learning, right? We want to all be part of that process, and it will take some time.

00:23:53 Babette

Teachers are the most important factors in students' learning, and teachers need support and have opportunities to learn new things and to work together to continually improve their practice. And I mean, unfortunately, teachers are often not trusted to teach mathematics. There's probably a lot of teachers who don't necessarily feel like they are mathematicians, and they may not feel that math is their most favorite subject. But many curricula that are out there are really designed in such a way that are very scripted. And many school districts are insisting on teachers teaching exactly by the book, which leaves very little room for creativity on part of teachers. And that's really unfortunate because, even very well-intentioned curricula that claim to be universally designed and culturally relevant, there's always more that a teacher needs to do in order to really make sure it meets the kids that are in front of them.

00:24:36 Josie

Regarding what Babette was saying about scripted curriculums that a lot of school districts are going to glom onto because they want to make sure those test scores are up to snuff. That actually runs in the complete opposite direction when you're relying on that. And again, undermines teachers' confidence to be able to more independently try to bring out those core values, those core assets from their students. Yeah, so not an easy problem to solve.

00:25:08 Babette

But that's why we're around, right?

[music]

[music]

I just want to thank everybody.

00:25:19 Adelicia

Thank you so much for having us. I really, it's been an honor to be part of this conversation, really.

00:25:23 Babette

It's an honor to have you.

00:25:25 Vanessa

I've learned so much with you all. So, thank you for all that you all do with Math for All and kind of putting all this information with the two wings of the same dove, like the academic part of math with the multilingual learner lens.

00:25:38 Babette

Thank you so much.

00:25:39 Andrea

Thank you to Babette and Matt for facilitating today's conversation. Thanks to our guests, Josie Yanguas, Adelicia Brienzo, and Vanessa Figueroa for sharing their stories and insights.

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Thank you for listening and for your dedication to equitable math instruction.