

Rehumanizing Mathematics: Why it is Needed and What it Means in the K-12 Context

EquiLearn Virtual Roundtable

Dr. Jami Stone, MAP Center Equity Fellow – South Dakota

TRANSCRIPTION

- Zelideh M H:** Good afternoon and welcome to the EquiLearn Virtual Roundtable. My name is Zelideh Martinez Hoy. I am a post-Doc fellow at the Midwest and Plains Equity Assistance Center, and I am serving as your host. Today's Virtual Roundtable is entitled *Re-humanizing Mathematics: Why it is Needed and What it Means in the K-12 Context*.
- Zelideh M H:** This Virtual Roundtable will provide an understanding and definition of re-humanizing mathematics, and why re-humanizing is a more appropriate word choice than equity in mathematics education. We will also discuss why students' mathematical identity and ways of knowing should be honored in the mathematics classroom. Additionally, we will provide a roadmap that supports school leaders' efforts to re-humanize mathematics.
- Zelideh M H:** Please consider this time an informal space for you to share your thoughts and insights, leverage learning from other educators, and of course to ask questions. Today's agenda will consist of a welcome, then we'll dive right into the roundtable discussion, and the last five minutes we will review resources and wrap up.
- Zelideh M H:** During today's roundtable we will align to the four commitments when discussing the topic. First, we ask you to stay engaged, second experience discomfort, and third, speak your truth, and lastly, expect and accept non-closure.
- Cesur D:** Good Afternoon. My name is Cesur Dagli. I am the Instructional Designer at the Midwest and Plains Equity Assistance Center. I am serving as a technical director today. EquiLearn Virtual Roundtables are intended to be interactive. Participants are asked to interact in a real-time via our

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teleconferencing format. Also, to reduce noise, we ask that all participants mute their microphones when not speaking. Further, we will post additional resources in the chat bar. Plus, the video camera function has been turned on. Thus, if you have a webcam and you would like to join, please feel free to do so by clicking the camera icon at the lower right of your screen. Again, please don't forget to mute your microphone when not speaking.

Zelideh M H:

I am pleased to introduce our roundtable guest speakers. Our first speaker is Dr. Marilyn Strutchens. She is an Emily R. & Gerald S. Leischuck Endowed Professor and a Mildred Cheshire Fraley Distinguished Professor of Mathematics Education in the Department of Curriculum and Teaching at Auburn University, where she teaches graduate and undergraduate courses and serves as the Secondary Mathematics Education Coordinator. She is currently on the advisory committee for the Education and Human Resources Directorate for the National Science Foundation. She has served on the board of directors for the National Council of Teachers of Mathematics, and was president of the Association of Mathematics Teacher Educators. Recently she served on the writing team for AMTE's Standards for Preparing Teachers of Mathematics. Her research interests include equity in mathematics education, field experiences for secondary mathematics teacher education candidates, teacher leadership, and reform mathematics professional development for grades K-12 teachers.

Zelideh M H:

Our second speaker is Mr. RunningHorse Livingston and he is the founder and CEO of Mathematize Inc., whose mission is to promote education and educationally related opportunities for Native people. RunningHorse, a nationally recognized educator and consultant, has spent 13 years helping teachers across the country make sense of their roles in the age of

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Common Core Standards, and making schools more constructive places for Native children. He is an expert in mathematics instruction and school reform.

Zelideh M H: Third we have Dr. Rochelle Gutierrez. Her scholarship focuses on issues of identity and power in mathematics education, paying particular attention to how race, class, and language affect teaching and learning. Through in-depth analyses of effective teaching, learning communities and longitudinal studies of developing and practicing teachers, her work challenges deficit views of students who are Latinx, Black, and Indigenous, and suggests that mathematics teachers need to be prepared with much more than just content knowledge, pedagogical knowledge, or knowledge of diverse students if they are going to be successful.

Zelideh M H: And finally, Dr. Jami Stone. She is an Associate Professor of Mathematics Education in the College of Education and Behavioral Sciences at Black Hills State University in South Dakota. Her research interests include equity in mathematics education, and pre-service students' co-planning and co-teaching during their clinical experiences. And she is also one of our Equity Fellows. Welcome all.

Dr. Stone: Good afternoon let's start off with a participant question. In one sentence or less, what does re-humanizing mathematics mean to you? Please use the chat box and type your response in there.

Zelideh M H: Okay, we have two folks Dr. Stone.

Dr. Stone: Great.

Zelideh M H: And their response, would you like me to read some of these?

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- Dr. Stone:** Sure, yes. Please do.
- Zelideh M H:** Okay. And folks are also able to see in the chat as well. We are teaching students rather than content, making a person feel valuable. You are all moving fast. Let's see...
- Dr. Stone:** Do one at a time. I can't see all of them.
- Zelideh M H:** Uh-huh (affirmative).
- Dr. Stone:** But, I'm glad we've got some good-
- Zelideh M H:** Valuing the multiple identities of learners. Purposeful integration. Meeting the students where they are at and moving them forward to be successful mathematicians. Teaching the whole child. Relevant and authentic to the students' lives. Acknowledging that mathematics is a human activity.
- Dr. Stone:** That's right. It is. A human endeavor. Well, keeping these thoughts in mind, how do these connect with our students' mathematical identity and ways of knowing? Which is what we're going to ask for our panel to elaborate upon. Do we want to go to the next slide?
- Dr. Stone:** So the question is, again, for the participants, for the panel. Why should students' mathematical identity and ways of knowing be honored in the mathematics classroom? And how can educators do this?
- Dr. Stone:** We started off, Marilyn, if you'd like to begin the discussion. We have about five minutes per person, but we want this to be a conversation. So, we all look forward to hearing your thoughts.

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Dr. Strutchens: Okay, so I believe that students' mathematical identity and ways of knowing should be honored in the mathematics classroom, because doing so helps students to develop confidence in themselves as learners and doers of mathematics. I believe that it is possible for them to understand and reason and make sense of mathematics. We honor student's mathematic identities and ways of knowing by using practices that build on the knowledge that they bring to the classroom. By using Workwell and relevant tasks. By acknowledging multicultural contributions to mathematics. And by treating the students as capable of understanding high levels of mathematics and seeing how mathematics can be used as a tool in their world.

Dr. Strutchens: And I like what Nasir (2002) states about the relationship between learning and identity. She says that the relationship between learning and identity is bidirectional. With access to learning supporting stronger identities, and identity, in turn, supporting learning. And, I think that if we have that in mind as teachers and people who work with students, then we are going to provide a classroom that really accomplishes the goals that I stated before. Who's next?

Dr. Stone: Thank you Marilyn. Tag team.

Dr. Gutierrez: So, for me, I think re-humanizing really gets, the reason it's re-humanizing and it's not humanizing is that we are all mathematical to start with. For centuries, as humans, we have done mathematical work. We are mathematical doers. And, so it's really trying to think back to how do we address that which gets erased in school? So, addressing students' identities and their ways of knowing is honoring the fact that we are mathematical. Honoring the fact that every student deserves the dignity

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and the respect of any human being. And that no human being is more human or less human than another.

Dr. Gutierrez:

I think that sometimes we get ourselves into these issues where we think, “Well I want to address identity in the classroom. I want to take their funds of knowledge. I want to do these different things.” But we do it, we have to ask ourselves, “What’s the purpose?” Sometimes the purpose for those is to serve as hooks into keeping...into getting students to do mathematics. And really for me, re-humanizing mathematics, it’s not re-humanizing unless we actually question the very mathematics that’s at the heart of the classroom.

Dr. Gutierrez:

We can’t continue to have a mathematics that is presumed to be acultural, or a-versatile, or apolitical, because that’s not the way it is. Mathematics is something that, as a human practice, brings with it all of the politics that are part of us being human. So, for me, it’s not about...re-humanizing mathematics is moving away from this idea of humans in the service of mathematics or preparing people for these STEM fields, and really thinking about how can mathematics help support humans, both individuals and groups, to be whole and to thrive in the classroom and outside of the classroom. How do we learn to reattach to each other so that we can be more humane in the rest of the ways that we interact in society.

Dr. Stone:

Thank you Rochelle. RunningHorse, what are your thoughts?

RunningHorse L:

Hi. I think the first part of this question is actually pretty easy for me. The why should honor mathematical identity. I think because it’s, for me, math is not just a convergent set of fluencies that are to be taught directly, but I think for me it’s a divergent form of understanding pattern and change in our

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environment. And, how we help kids do that? How we help students to do that?

RunningHorse L: As an instructional coach, the second part of this question is sort of a million dollar question. How do we do that? How do we help educators do that? I travel the country. I work with classrooms all over the country and so this has always been a pervasive question with a lot of the teachers that I work with. I specifically work with K-12 teachers in a lot of rural settings. Some of the struggles that I have, and I just listed three, so my answers are short and sweet.

RunningHorse L: Be uncomfortable enough to instigate meaningful and productive student-centered discourse. And the reason I say be uncomfortable enough is because it tends to be...there's a certain level of discomfort that teachers experience when giving up control of the classroom. They feel like, "If I let the kids talk this could get away from me, and I'm not sure how to manage that kind of behavior." Secondly, use intentional social relationships with students to identify and navigate emotional barriers. This I think is especially true for middle and secondary teachers that I work with, simply because of the preparation, in my opinion. It's hard to create and forge relationships with students. We know it's important, but how do we do that?

RunningHorse L: So a lot of the theory that we hear, a lot of the research that we hear, as educators, we buy into, we say "yes" to, but I think that the "how" to do that is the part that gets lost. Because there is no prescriptive sort of process for doing that. And then thirdly, love mistakes and find meaning in the misconception. I think we're, as math educators, we sort of get caught up in the idea of being right. That we have to be right all the time. And I think that nature of math education is sort of perpetuated in generations. Even now

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I look to a postsecondary institutions that prepare teachers, that's still a widely-held belief that, as a teacher you're sort of this holder of information. And you shouldn't be exploring things that may not lead students to the correct answer.

RunningHorse L: When for me, as an Indigenous male, you sort of learn to socially accept that mistakes are part of learning. So, why don't we build those into the pedagogy part of teaching mathematics?

Dr. Gutierrez: Can I build on that?

Dr. Stone: Please do.

Dr. Gutierrez: So I really like what you said RunningHorse, and I think I just want to kind of extend something that you said, and that is that notion of misconceptions. When I think about what we do with practicing teachers and preservice teachers, one of the things we try to help teachers do is stand in the shoes of students. I think that as a nation, we have started to recognize the importance of what we would call “mistakes,” or what we would call “stumbling blocks,” or whatever. But I think that even before we get to that, a lot of times even that notion of misconceptions can move us to a place that's not quite in the space of empathy that I hear you saying is important. And so, when teachers are hearing that they need to anticipate the misconceptions that students will have in their classrooms, and this is one way that they'll address identity, or they'll address equity.

Dr. Gutierrez: A lot of times that jump to seeing those things as misconceptions in the first place, skips a step, which the first step should just be recognizing that students don't have misconceptions. Students have conceptions, and

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those conceptions continue to work for them until they butt up against something that no longer makes sense. They're only misconceptions when we start with the position that we expect learners to come to our way of viewing the world. And so if we can first stop and stand in the shoes of our students and say, "Why would this make sense for the student to think this way," rather than, "Oh, the student doesn't get it and now my next move is going to be 'what's my instructional approach to correct this misconception.'" If first we can say "why would that make sense," because we know throughout history that when people decided they didn't want to go along with Euclid's fifth postulate, we came up with non-Euclidean geometries, right? If everything was about correcting the misconceptions or viewing things as mistakes first, we wouldn't get to some of the more creative versions of mathematics that we have.

Dr. Gutierrez: So, I agree with what you're saying, and then I would just say that I would encourage us to also be thinking about that step that comes even before helping students acknowledge mistakes, or even teachers recognizing misconceptions.

RunningHorse L: Sure, and I just want to respond quick. I had a feeling that you were going to interject there, Dr. Gutierrez, and that's the reason I picked that language specifically. When I work in the field with teachers, there is still a level of language that you have to use that they can relate to. So when we think about mistakes, I know as a researcher, that we don't like to use those words, but I know that I have to use a common language when we talk about alternative or inventive ways of thinking about mathematics. So I feel like the strategy should be to love mistakes. Embrace those. It goes

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beyond just saying, well let's anticipate those. It's actually, "learn to love those things. What does that mean?"

RunningHorse L: And then secondly, find the mean and misconception, because you're right, they're only conceptions. I just said that yesterday in a kindergarten classroom after thinking about your words about misconceptions. And it was great. It was great advice, because you're right, there's sort of a stigma that goes with it when you add those three little letters before what we actually do, and have children do.

Dr. Stone: The chat feature is lighting up there. We've got a nice resource from Charla Doubting about *Misconceptions as Stepping Stones towards Making Sense of the World*, and Ginger posted one of Dan Myers' blogs about *That Isn't a Mistake*. I know in my class, this past year we started on the heels of the summer just to get their mind set that this is how we learn, and hopefully we won't make the errors that we made again. All right, Marilyn, would you like to add anything?

Dr. Strutchens: I agree with building on students' conceptions, and I think it is hard to come up with good language when teachers are used to using the word misconception. So how do we think about helping people to move forward in that way? So, what are some ways that you help teachers to talk about errors when they see them, Rochelle? Instead of calling them errors or misconceptions, how do we work with that? Do we start with what's right about the answer, and then help students to figure out what's wrong about it, and so on? So, how do you go about helping people make that switch from talking about misconceptions to conceptions of learners, in a way that the students who oftentimes become marginalized in places and aren't moved forward because of those misconceptions or different conceptions

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not been cleared up to match those mathematics that they need to know and be able to do?

Dr. Gutierrez:

I think one of the things is to start by affirmation. To start with, “When you were doing this work, I see where you’re going with this. I can see how this makes sense for you. I can see how when you decided that $3A + 4$ was going to be $7A$. That you started with what you recognized as the numerical values, and you saw the 3 and the 7 and you decided to put the 7 together. But, let’s go back to thinking about does that always work?” And thinking about what kinds of counter-examples you can offer that would say, “But would it work here? Would it work here? Does it only work for negative numbers? Is what you’re doing generalizable to some of the things that we’re trying to get at in these other cases? Does it not matter right now that it’s generalizable, because it’s working well enough for us with what we’re doing, but might we want to think about that when we get to the point of thinking about for example, negative numbers, or working in nonlinear functions, or something?”

Dr. Gutierrez:

But really starting with that, “I see how what you’re doing makes sense,” and you can only do that if you actually see why it makes sense. You actually have to do a bit of work yourself, and say, “Why would this make sense? How could somebody think of it in this way? What would they have to be thinking to think of it in that way?” And I think that by having that start, you’re encouraging teachers to take that step of standing in students’ shoes; not in a superficial way, but literally like, “Okay, I have to try to do this.” And, then thinking about what would be the move. But, helping the student hear that it’s not about mistakes or errors, but a little bit more about

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“How far will this thinking get you? When is this thinking going to stop being useful for your purposes?” And that's how I work with it.

Dr. Strutchens: Okay.

Dr. Stone: And, let's see, we now have a participant question. Again, you can use the chat feature, or if you would like to speak you could unmute your microphone and ask a question. But our question is, how does hearing the panelists' responses make you think about what you are currently doing and what work you might want to do in the future? To help us with bringing about mathematical identity for all students and re-humanizing mathematics. So, go ahead and type away or ask a question.

Dr. Stone: Feel free to share your questions or comments, too, if you'd like. So, if you would rather just speak rather than typing it, since I guess our first one we had a one sentence or less, but here you might have some deeper thoughts that might be better to be verbalized. So, feel free.

Dr. Stone: Ginger, would you like to share? I'm reading your post, but I'd like to hear you elaborate a little bit more.

Ginger: Sure, I can talk about my experience a little bit. I recently was really struck by this blog post from Dan Meyer. He gives an example of student thinking and challenges the idea that we talk about student thinking as mistakes. And, it's interesting because I am deep into the growth mindset stuff, and thought, “Oh, I had posters on my office (I'm higher ed professor), posters in my office like, mistakes are expected,” and it challenged me a little bit to think about what I call a mistake, and a misconception versus a conception. And, I really was struck by the language he gave about when we label

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student thinking as an error or as a mistake, it's really a self-referential sort of activity that we have this idea of what correct mathematical thinking looks like, and we all have been trained to do that well.

Ginger:

And when we interact with a student we're using ourselves as a mirror to judge or to sort of think about how their thinking compares to an expert thinking. Rather than as we interact with them, letting their thinking be a window into their understanding. So, I really thought that was a powerful image. I'm sort of a visual thinker anyway. So that question that he posed at the end of blog post, what question did the student answer correctly? What aspects of her thinking can I see through this window? And, if we view interactions with the students as an opportunity, as a window into that student's thinking, rather than as the self-referential kind of mirror. Like I'm the platonic form, and how did the student measure up to my form? I really thought that was a powerful way to reframe our interactions with students. So, I really like that image.

Dr. Stone:

That you for sharing, Ginger. I know one of the things I've noticed with my pre-service teachers is the fact that they might view something as too difficult for their students, and so they'll walk them through problems, rather than letting the students have the opportunity to grapple with them first and be that facilitator to provide the supports later. So, just something I noticed. Would anybody else like to share?

Cesur D:

Jami, we have some comments.

Dr. Stone:

So, Nicole wrote, "It seems like thinking about conceptions instead of misconceptions allows both teachers and students to be more vulnerable and engaged while doing mathematics. It seems that it is important to think

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about doing mathematics in this way when interacting with mathematics is a teacher, too. Still doing a lot of pondering on this. So, I really like that idea of conceptions rather than this misconceptions.”

Dr. Stone: Shakeya has, “Questioning the data rather than accepting it as fact. I am encouraging teachers that I mentor to provide more mathematical discourse and support students in posing questions of each other concerning statistics and formulas. Absolutely, my mantra is ‘questions are the answer.’”

Dr. Stone: And, Jan has, “To me I need to value a student’s understanding and see a value in building a shared understanding in the classroom through discussion and discourse.”

Dr. Stone: Thank you so much for sharing, everyone. And, so then now our next question is, “How can teachers, administrators and community stakeholders move towards re-humanizing mathematics?” Honoring all students’ mathematical identities? So please go ahead and let’s start this time with Rochelle. We’ll just order Rochelle, RunningHorse, and then follow up with Marilyn.

Dr. Gutierrez: Can you put the question back up?

Dr. Stone: You bet. I guess maybe it’s not up there yet.

Zelideh M H: Yes, PowerPoint decided to crash on us. So, if you would just hold tight. If you want to go ahead and type the question in the chat, and that way everybody has access to it.

Dr. Stone: I sure will.

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Zelideh M H: Thank you.

Dr. Stone: You bet. Get it off to everyone. All right.

RunningHorse L: I have it here Dr. Gutierrez. Is that all right? Can I read it?

Dr. Stone: Please do.

RunningHorse L: How can teachers, administrators, and community stakeholders move towards re-humanizing mathematics?

Dr. Gutierrez: So, I think one of the things that's first required for me, when I first started on this whole language of re-humanizing mathematics and kind of not using that word of equity anymore in my work, it really requires sitting deeply with the dehumanization that happens. So, I think it's easy for us to kind of think we all know what this thing is that we're talking about. That we all say that we want to each humanize mathematics, and we can sometimes get ourselves back into that space of, what I think are many the problems around equity language, which again, we all think we know what we're talking about, so we don't really deeply theorize what this thing is. I think one of the first steps is when we say "What are these action steps to try and re-humanize," the first is just trying to understand the forms of dehumanization that are happening on a regular basis with respect to students, and with respect to teachers, who are being asked to carry out instruction in particular ways.

Dr. Gutierrez: So, it's understanding that those deep levels of dehumanization, and then recognizing that it's not a list of protocols that we're going to follow. It's not, as you said RunningHorse, it's not a kind of "here's a list of what to do," but rather for me, I have eight dimensions to re-humanizing mathematics, and

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those dimensions that I've been talking about involve participation and positioning, that's one dimension. Cultures and histories; windows and mirrors, I think that's maybe where Dan Meyer got his windows and mirrors stuff, I think. Living practice; broadening mathematics; creation; body and emotions; and ownership. So, I think of these, for me, as kind of a mapping space. Instead of saying "here's the things we should do," I can say "here's the eight dimensions," or "the eight kind of guiding principles that I would want to see in re-humanizing mathematics." So that if we don't understand that mathematics has a culture and that there's histories that have contributed to this practice, then we can't understand it as a living practice. And, if we can't understand it as a living practice, we can't have ownership over it. Students are never going to move beyond feeling like this thing belongs to them, and that relates to creation. They're not gonna feel like they actually can create any new mathematics.

Dr. Gutierrez:

So each of these dimensions are connected to each other, and then become synergistic and become kind of like a net. But I see it as a mapping space for teachers to be able to say, "Okay, if these are the places that I want to be focusing on..." then for example, let's just take this space and say, "Which areas am I not doing such a great job on in my classroom?" Let's say that it's cultures and histories. Or, let's say its body and emotions. Then I want to ask myself, let's take something, a practice in my classroom. Let's say it's assessments, and then I would say, "How are assessments giving students a sense of what mathematics is? Are my assessments, either my formative or my summative, are they getting at a sense of any kind of a culture or history? Or a sense of living practice that this mathematics is? Or, is it conveying to students and reinscribing this

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notion that mathematics is a noun? That it's something that is, that exists and that we need to consume?"

Dr. Gutierrez: As you said, RunningHorse, it's not content right? It's a practice. So again, thinking about those dimensions as mapping spaces, and then thinking about how can any single aspect of any practice that we're doing in our classroom, how can it relate to reinforcing that those dimensions are going to continue to be part of the classroom.

Dr. Stone: Thank you Rochelle. RunningHorse would you like to-

RunningHorse L: Yes. So, I have two points that I wanted to make with this particular item. First of all, when I think about classrooms that I work with, especially middle and secondary classrooms, there tends to be a fallibilism in mathematics about mathematical knowledge, that it's sort of sequential and that it's finite. And if we subscribe to that, it can be a little dangerous, because we think that there's a particular structure. As I mention with the first question, there's a convergence that happens; and when we start to talk about math as something that sort of widdles down to one thing, and one way of thinking about it, that's when I think we run into issues.

RunningHorse L: As far as getting stakeholders to move toward this goal, which it feels like that's the constant battle also. One of the things that I think a lot about is how do we co-develop a translational language that bridges the shared experience of these groups? I think one of the things that's missing, at least for me as a Native person, in my community back home in Wisconsin, we do a lot of cultural, I guess quote unquote "cultural trainings" for teachers, which are essentially...we bring regional teachers in, and we can teach them about the history, and the language, and sovereignty, and all of these

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sort of surface things about what tribal culture is. And then we expect them, in turn, to go back to their classrooms and practice in a way that's meaningful to our students.

RunningHorse L: And, so there is no language that bridges that gap. Just like when we talk about the gap between theory and practice, it's sort of the same between different cultures, if they're different from the mainstream. And, if the teacher's culture is varied from the students in her classroom. So I think finding that translational language that really connects teaching and culture, what we define as culture, but it's really a shared experience. How do we connect those two? How do we talk the same language?

RunningHorse L: My second point is, I see a lot of...there's a lack of mechanisms that allow community members to contribute and collaborate. I know for a lot of parents that I had the pleasure of meeting and working with, there is sort of a disconnect between that building space, and the classrooms that their children are in every single day. They don't feel a part of that classroom. There's sort of this disconnect that I think that interferes with the collaboration that we always talk about in theory. We always say we want stakeholders at every level to be invested in this process. And, I think that's true, we need that.

RunningHorse L: But, again it comes back to that question of, “How do we do that? What are the techniques and the moves that we need to do that?” We can all agree, I think, that it needs to happen. But the biggest question, for me, is “What are the steps that we need to start taking to do that?” Given that they're all different and it's not a prescriptive set of steps, but it's ideas for about moving toward the same goal.

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- Dr. Stone:** Thank you RunningHorse. Marilyn, what are your thoughts?
- Zelideh M H:** Dr. Strutchens, you are muted.
- Dr. Strutchens:** Okay. Sorry.
- Dr. Stone:** That's all right.
- Dr. Strutchens:** I said a whole lot that no one heard. But I was just saying that I really agree with Dr. Rochelle Gutierrez, dimensions I'll properly speak about them in different ways. I talk about them in terms of equitable pedagogy, but I don't think that one has to do them in a certain order as she mentioned. I think you have to really think about "How are you going to meet the needs of the students within your classroom?" I think it's important, too, for administrators to attend professional development, along with their teachers, and understand what they are experiencing. And then to be able to go into classrooms and observe what is happening in classrooms. And know when good things are happening, and when they're not.
- Dr. Strutchens:** So I think it's important for all of us, as stakeholders, to become educated together and really think about mathematics as a human endeavor. And I just like the dimensions again that Rochelle mentioned in terms of including history and different cultural contributions to mathematics. Really helping students to own the mathematics for themselves, and seeing how they think about mathematics for themselves. Then also, creating an environment where students feel free to talk about what they understand and believe. And building on what students bring to the table.
- Dr. Strutchens:** Because I always see myself more as an eclectic, than someone that follows one straight path. But I can appreciate your work, and then I also

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Rehumanizing Mathematics: Why it is Needed and What it Means in the K-12 Context

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appreciate how I look at things in terms of those same constructs. I think it's not so important that we get caught up in semantics, but that we really do the work and move people forward in the way that we're talking about today.

Dr. Strutchens: Just going back to the conceptions, I totally agree with the approach that you talked about. I didn't get a chance to say that I agree with what you are saying, but I do. And we use different videos to help people, to help teachers, both veteran teachers and teacher candidates, to see how to build on students' answers. And how to question their answers in ways that helps the students to think about what he or she...to think about their responses, as well as to think about how to go beyond that place, as you mentioned. I think it's important that we are all growing together.

Dr. Strutchens: When we provide new ways of thinking to our teachers, and to our administrators, it's also important to work with our parents to help them to understand what we are doing, and why we're doing it, so that we don't run up against traditional opposition. Because people think we're doing something totally different than what students need. When in fact we're doing exactly what they need.

Dr. Stone: Thank you for sharing that. There was a question on the chat: "I am interested in building collaborative spaces with secondary educators and families to support connections. I've heard of summer math camps, and after school math camps. Are there any other ideas or resources?" And this is one of the great things about having this collaborative environment with so much wisdom. So, anybody have some ideas?

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Dr. Stone: Diana, from the Midwest and Plains Equity Assistance Center that mention that at Indiana University Purdue, they have a faculty member that holds Girls STEM camps, where girls and their parents, or caregivers, attend for a day of learning.

Dr. Gutierrez: I know that there are more efforts to kind of try to rethink what math circles are about. And, I know that there's a number of Native communities that have taken on this work and that are trying to think about intergenerational spaces for thinking about math circles. Whereas, traditionally math circles were these spaces where kind of your elite high school students or middle school students came and did these high-level math problems. Often preparing for math exams and math competitions. Now, math circles are being reconsidered to think about how they can be kind of third spaces almost, outside of school. But outside of just a community space where mathematicians and community members are coming together and thinking about how do we do mathematics together in ways that are more humane.

Dr. Gutierrez: And I think one of the important pieces in that is it's not just a means to getting more Brown people into STEM. But, some of the trauma, if we think about not just what's happening in schools, and teachers, but the long-term effect on people of this kind of dehumanization in mathematics classrooms, means that people are carrying around a lot of trauma about how they feel about themselves. Whether they're smart enough. Whether they think of themselves as mathematical. Whether when they're reading a book or a news article or something, and numbers come up, what feelings they have about being able to read that chart, or do whatever. So recognizing that this practice, or these math circles, can be a different kind of a space, I think, for me, is very hopeful.

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Dr. Stone: Thank you for sharing that, and that excites me because living most of my life so close to the Pine Ridge Indian Reservation, that's always been something that I wanted to do. Is to have something that's not like the math circles that you mentioned, but more for enjoyment of mathematics. If you look at the star quilts and dream catchers, there's so much mathematics that's implicit, but it needs to be examined further. Thank you for sharing that.

RunningHorse L: Can I make a point Dr. Stone about-

Dr. Stone: Yeah.

RunningHorse L: I know that when I was thinking about this hour that we had to talk about these really important topics, for me, part of re-humanizing that process was really talking about humanizing the pedagogy of mathematics. When I think about that work and how important that is, especially from an Indigenous perspective, there's a comment on here from Robert about storytelling, and storytelling is also a big part of Native culture. Pine Ridge is big on storytelling, that's a big part of Lakota culture. One of the things that I think we've had to differentiate, at least in Native cultures, is that there's a huge difference between teaching culture and teaching culturally. So, it's okay to talk about dream catchers, and it's okay to talk about ethno-mathematics, but beyond ethno-mathematics, what is the, for example storytelling?

RunningHorse L: When you tell an algebra II teacher that storytelling is important part of Native culture, Pine Ridge, it's a part of their culture. As a math teacher, how do I take that information and go back to my classroom now become [inaudible 00:48:33]. It doesn't mean that I should bring an elders to come

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and tell stories, instead I think what we're trying to say about re-humanizing this process, it's how do we take the act of storytelling and academize that? What is powerful about storytelling, it's situating a lot of content in a way that's engaging, in a way that's relevant, and it's a way that kids can comprehend and retain that information. So it's not the act of storytelling itself, but rather the pedagogy behind that process that I've tried to, in my work, translate to—from the cultural aspect to the pedagogical piece of teaching.

Dr. Stone:

One thing that, going off of that with the storytelling, I love using case scenarios and role playing. How strong that is to help students really grapple with the mathematics or whatever the topic is, rather than just saying, “Here it is. Read it. Now you're going to just be tested on it.” There's a couple of good comments on, all of the comments are good, but one from Jill: “It would be interesting to think about standards for mathematical practice from a re-humanizing perspective. Storytelling seems to, like an important mathematical practice.”

Dr. Stone:

And then also Crystal Morton, who is another Equity Fellow says, “In the work I do with Black girls at IUPUI, I hear about the dehumanizing experiences from both the girls and the parents/caregivers. In my work, we take a holistic approach to provide a counterspace for girls to be their authentic selves while learning. We shouldn't have to give up who we are so that we can learn something.”

Dr. Stone:

So, thank you all for sharing your perspectives. I hope that we can continue this conversation in another roundtable, because this work is so important. The next one of the other things that we wanted to do was to share the

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resources that are currently available, and people may not know about them, that are on the Midwest and Plains Equity Assistance Center website.

Zelideh M H: Do you want to-

Dr. Stone: Yes, let's go ahead and change there.

Zelideh M H: So, we want to thank each one of you for participating in today's EquiLearn Roundtable, *Re-humanizing Mathematics: Why it is Needed, and What it Means in the K-12 Context*. We want to also provide a special thanks to Dr. Jami Stone, Mr. RunningHorse Livingston, and Dr. Marilyn Strutchens, and Dr. Rochelle Gutierrez, for taking the time to share a bit more about themselves, their research, and some approaches and practices that can support the work of educators. We also want to thank them for giving us insights on how to create an environment that is inclusive, exploring how educators can honor in action the respective students, and providing guidance for what steps can be taken by multiple stakeholders to re-humanize mathematics.

Zelideh M H: And, as Dr. Stone mentioned, we have these resources, and I'm gonna go ahead and highlight a couple of them. The first one is titled *Re-humanizing Mathematics for Black, Indigenous, and Latinx Students*, and it's a book from the National Council of Teachers of Mathematics. The 2018 volume of NCTM's *Annual Perspectives in Mathematical Education Series* focused on the challenges and possibilities of teaching and learning mathematics with Black, Indigenous, and Latinx students. Its chapters describe successful classroom methods for attending to the identities of both students and teachers, along with suggestions for professional development programs that embrace the entire community of learners.

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Zelideh M H: The second resource that I'd like to share is a podcast titled *Within the Intersection: What Does it Mean to be Black and a Young Woman in Mathematics Classrooms?* This podcast discusses what it means to be a Black girl in today's mathematics classroom, and how the experience of Black girls and mathematics can help inform how educators can create more equitable mathematics learning opportunities for Black girls. And, this is from Dr. Crystal Morton, who we heard from in the chat, just a little shout out.

Zelideh M H: The third one, is a podcast entitled *Centering Equity in Supporting American Indian Students through Culturally Responsive and Sustaining Practices*. And, this is also from our Virtual Equity Library. And in this podcast Mr. Brian Jackson, a member of the Lac du Flambeau Band of Lake Superior Ojibwe, speaks openly about issues that affect American Indian communities and the education of American Indian students. He discusses ways school systems can center equity in educational practices with American Indian students, including some examples of experiential learning rooted in Native history and addressing mascot logos in public schools.

Zelideh M H: And finally, we want to encourage you to visit our website for tools and resources, such as the Virtual Equity Library. Again, there's quite a bit there. We have a monthly newsletter that is a Center production. And of course we have 13 Equity Fellows. You saw one in action today, Dr. Stone. And also participating was Dr. Crystal Morton, but we have 11 other Fellows who produce content for our resources, and it's all free access. So this is available to you. No institutional membership. And we also have our calendar of events for you to stay tuned with other upcoming events.



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Zelideh M H: And now we'd like to move on to continuing the conversation via Twitter. So for the next 15 minutes, our panelists will be available via Twitter. And if you would like to ask them questions or continue sharing of resources.

Zelideh M H: So thank you again everyone for your participation. We would like to hear how you felt about the session. Please provide opinions and feedback on this session in our post-session questionnaire, which has been posted in the chat bar. Thank you so much for attending.

[End of Audio]